



### SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 10310

EVENT NAME: Mortandad/Sandia (Chromium and General Surveillance)  
MY2015 Q4 Watershed Sampling\_Mortandad

SAMPLE ID: CAMO-15-102575

WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	<u>08/13/2015</u>	<u>Y</u>	FIELD MATRIX:	WG	<u>Y</u>
TIME COLLECTED (HH:MM):	<u>0931</u>	<u>Y</u>	MEDIA:	UA	<u>Y</u>
PRS ID:	<u>NA</u>	<u>Y</u>	SAMPLE TECH CODE:	UA	<u>GSP</u>
LOCATION ID:	<u>R-15</u>	<u>Y</u>	FIELD PREP:	UF	<u>Y</u>
LOCATION TYPE:	<u>MON</u>	<u>Y</u>	FIELD QC TYPE:	REG	<u>Y</u>
TOP DEPTH:	<u>NA</u>	<u>Y</u>	SAMPLE USAGE:	INV	<u>Y</u>
BOTTOM DEPTH:	<u>↓</u>	<u>↓</u>	EXCAVATED:		YES / NO / <u>NA</u>

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

SAMPLE COMMENTS: None

LOCATION COMMENTS: Sampled 50 ft from runway disposal generator

**FIELD PARAMETERS:**

Dissolved Oxygen	<u>0.58</u> <u>7.42</u> mg/L	Flow (in gpm)	<u>6.38</u> GPM	Oxidation-Reduction Potential	<u>52.8</u> mV
pH	<u>8.05</u> SU	Specific Conductance	<u>167</u> uS/cm	Temperature	<u>20.53</u> deg C
Turbidity	<u>1.4</u> NTU				

COLLECTED BY (PRINT): T. Benham

RELINQUISHED BY (Printed Name) <u>Daniel Jarak</u> (Signature) <u>[Signature]</u>	Date/Time <u>8/13/15</u> <u>10:22</u>	RECEIVED BY (Printed Name) <u>K. Green</u> (Signature) <u>[Signature]</u>	Date/Time <u>8/13/15</u> <u>10:22</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

### SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 10310

EVENT NAME: Mortandad/Sandia (Chromium and General Surveillance)  
MY2015 Q4 Watershed Sampling\_Mortandad

SAMPLE ID: CAMO-15-102599

WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	8/13/2015	y	FIELD MATRIX:	WG	y
TIME COLLECTED (HH:MM):	0931	y	MEDIA:	UA	↓
PRS ID:	UA		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-15		FIELD PREP:	F	y
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:	YES / NO / <del>NA</del>	

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Denise Sark 8-13-15

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

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) Daniel Serrano (Signature) <i>[Signature]</i>	Date/Time 8/13/15 10:22	RECEIVED BY (Printed Name) K. Green (Signature) <i>[Signature]</i>	Date/Time 8/13/15 10:22
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## DATA VALIDATION REPORT

Chain Of Custody No. 2015-2156

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
379325	EPA:120.1	1				
379325	EPA:150.1	1				
379325	EPA:160.1	1				
379325	EPA:245.2	2				
379325	EPA:300.0	1				
379325	EPA:310.1	1				
379325	EPA:335.4	1				
379325	EPA:350.1	1				
379325	EPA:351.2	1				
379325	EPA:353.2	1				
379325	EPA:365.4	1				
379325	SM:A2340B	1				
379325	SW-846:6010C	1				
379325	SW-846:6020	1				
379325	SW-846:6850	1				
379325	SW-846:9060	1				

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
379325	EPA:120.1	1501375	1501375	1										1				2			
379325	EPA:150.1	1501372	1501372	1										1				2			
379325	EPA:160.1	1500913	1500913	1				1						1				1			
379325	EPA:245.2	1503112	1503111	2				1	2					1				2			
379325	EPA:300.0	1500831	1500831	1				1						1				1			
379325	EPA:310.1	1501380	1501380	1				1	1					1				1			
379325	EPA:335.4	1500478	1500477	1				1	2					1				2			
379325	EPA:350.1	1500587	1500585	1				1	2					1				2			

## DATA VALIDATION REPORT

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
379325	EPA:351.2	1500575	1500574	1					1	1				1				1			
379325	EPA:353.2	1501200	1501200	1					1					1				2			
379325	EPA:365.4	1500565	1500564	1					1	1				1				1			
379325	SM:A2340B	1503257	1503257	1																	
379325	SW-846:6010C	1500655	1500654	1					1	1				1				1			
379325	SW-846:6020	1500668	1500667	1					1	1				1				1			
379325	SW-846:6850	1502487	1502486	1					1	1	1			1							
379325	SW-846:9060	1500883	1500883	1					1					1				1			

### 2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-15-102599	379325002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-15-102607	1203376811	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-15-102657	1203376810	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203376809	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-15-102599	379325002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-15-102607	1203376805	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102657	1203376806	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203376804	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-15-102599	379325002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-15-102650	1203375600	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203375599	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203375598	MB	1	0	0	0
EPA:245.2	INORGANIC	CAMO-15-102575	379325001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-15-102599	379325002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203381562	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203381561	MB	1	0	0	0
EPA:245.2	INORGANIC	Urban-15-102336	1203381569	DUP	1	0	0	0
EPA:245.2	INORGANIC	Urban-15-102336	1203381571	MS	0	0	1	0
EPA:245.2	INORGANIC	Urban-15-102376	1203381563	DUP	1	0	0	0
EPA:245.2	INORGANIC	Urban-15-102376	1203381565	MS	0	0	1	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-15-102593	1203375381	DUP	4	0	0	0

### DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:300.0	GENERAL CHEMISTRY	CAMO-15-102599	379325002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203375380	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203375379	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-15-102599	379325002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-15-102607	1203376822	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-15-102607	1203376826	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203376819	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1203376817	MB	2	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-15-102575	1203374459	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-15-102575	1203374461	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-15-102575	379325001	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102636	1203375613	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102636	1203375615	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203374458	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203374457	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-15-102598	1203374764	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-15-102598	1203374766	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-15-102599	379325002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102650	1203374763	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102650	1203374765	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203374762	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203374761	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-15-102575	379325001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-15-102738	1203374726	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-15-102738	1203374727	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203374725	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203374724	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-15-102599	379325002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-15-102603	1203376388	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102650	1203376385	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203376384	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203376383	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-15-102599	379325002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102657	1203374698	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102657	1203374700	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203374696	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203374695	MB	1	0	0	0
SM:A2340B	INORGANIC	CAMO-15-102599	379325002	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-15-102599	379325002	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-15-102615	1203374945	DUP	17	0	0	0

### DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6010C	INORGANIC	CAMO-15-102615	1203374946	MS	0	0	17	0
SW-846:6010C	INORGANIC	LCS	1203374944	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203374943	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-15-102599	379325002	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-15-102615	1203374976	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-15-102615	1203374977	MS	0	0	11	0
SW-846:6020	INORGANIC	LCS	1203374975	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203374974	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-15-102599	379325002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-15-102600	1203379718	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-15-102600	1203379719	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203379717	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203379716	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-15-102575	379325001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-15-102583	1203375544	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203375542	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203375541	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

No.

6. Any surrogate recoveries outside the control limits?

No.

## DATA VALIDATION REPORT

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CASA-15-102650	1203374765		EPA:350.1	Ammonia as Nitrogen	1500585	08-20-2015	W	118		110	90	10		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

None.

**Reason Code**

**Description**

J\_LAB

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

## DATA VALIDATION REPORT

**Reason Code**

**Description**

NQ

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

U\_LAB

The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-15-102575	R-15	REG	EPA:245.2	0	1
CAMO-15-102575	R-15	REG	EPA:335.4	0	1
CAMO-15-102575	R-15	REG	EPA:351.2	0	1
CAMO-15-102575	R-15	REG	SW-846:9060	0	1
CAMO-15-102599	R-15	REG	EPA:120.1	0	1
CAMO-15-102599	R-15	REG	EPA:150.1	0	1
CAMO-15-102599	R-15	REG	EPA:160.1	0	1
CAMO-15-102599	R-15	REG	EPA:245.2	0	1
CAMO-15-102599	R-15	REG	EPA:300.0	0	4
CAMO-15-102599	R-15	REG	EPA:310.1	0	2
CAMO-15-102599	R-15	REG	EPA:350.1	0	1
CAMO-15-102599	R-15	REG	EPA:353.2	0	1
CAMO-15-102599	R-15	REG	EPA:365.4	0	1
CAMO-15-102599	R-15	REG	SM:A2340B	0	1
CAMO-15-102599	R-15	REG	SW-846:6010C	0	17
CAMO-15-102599	R-15	REG	SW-846:6020	0	11
CAMO-15-102599	R-15	REG	SW-846:6850	0	1



September 08, 2015

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

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

Re: LANL- WQH Water Samples  
Work Order: 379325  
SDG: 2015-2156

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on August 14, 2015, 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,

Hope Taylor for  
Valerie Davis  
Project Manager

Chain of Custody: 2015-2156  
Enclosures



**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 379325**  
**SDG: 2015-2156**

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# Case Narrative

**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 379325  
SDG # : 2015-2156**

**September 08, 2015**

**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 August 14, 2015 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
379325001	CAMO-15-102575
379325002	CAMO-15-102599

**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.

top a d

Hope Taylor for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 08 September 2015**

<b>State</b>	<b>Certification</b>
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
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
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122015-18
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# **Chain of Custody and Supporting Documentation**





SAMPLE RECEIPT & REVIEW FORM

Client: <u>LANL</u>		SDG/AR/COC/Work Order: <u>2015-2156</u>	
Received By: <u>Brielle Luthman</u>		Date Received: <u>8/14/15 0840</u>	
Suspected Hazard Information	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u>
Classified Radioactive II or III by RSO?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____
Samples identified as Foreign Soil?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags <u>Blue ice</u> Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <u>E5032015885</u>
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	Do Low Level Perchlorate samples (EPA 6850) have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
8	Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
9	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
10	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
11	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
13	Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
14	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
15	Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other  <u>5908 1779 3290-1°</u> <u>5908 1779 3267-1°</u> <u>5908 1779 3289-2°</u> <u>5908 1779 3278-2°</u>

Comments (Use Continuation Form if needed):

ST  
F1  
RTT  
257

08:14  
3289  
10:30  
F

ORIGIN ID: SAFA (505) 6  
KEITH GREENE  
LOS ALAMOS NATL LAB.  
TRA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

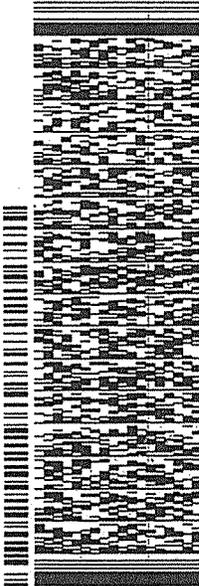
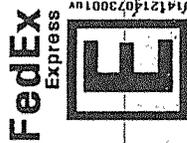
CHARLESTON SC 29407

(843) 566-8171  
REF: MRGW04BAGWEO

521C1/FECA/6F03

29407

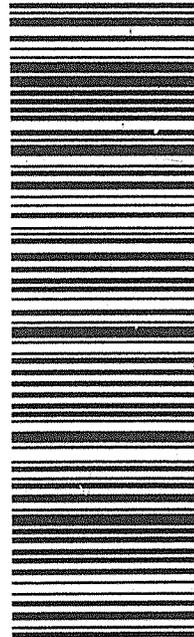
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FRI - 14 AUG 10:30A  
PRIORITY OVERNIGHT

1 of 2  
TRK# 5908 1779 3289  
0201  
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SC-US 29407 CHS

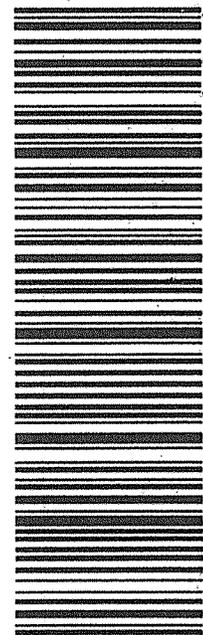


Pan # 156148-434 RIT2 10/11 991

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1 of 2  
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X7 CHSA 1  
SC-US 29407 CHS



Pan # 156148-434 RIT2 10/11 991

257

08:10  
5

F

08.14 3256 F  
10:30 F1 257

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

SHIP Df  
ACTWGT: 47.0 LB MAN  
CAD: 0014176/GAFEB2807

BILL SENDER

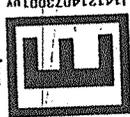
LOS ALAMOS, NM 87545  
UNITED STATES US

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

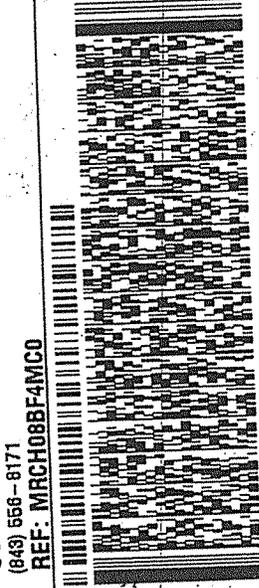
CHARLESTON SC 29407

(849) 566-8171  
REF: MRCH08BF4MCO

FedEx Express



11412140730011W



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PRIORITY OVERNIGHT

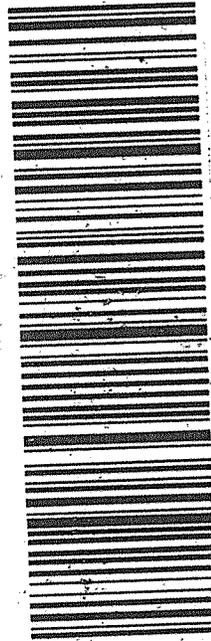
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0201

X7 CHSA 23

29407 CHS

SC-US



Part # 156148-453 RIT2 10/11

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

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ACTWGT: 47.0 LB MAN  
CAD: 0014176/GAFEB2807

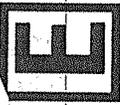
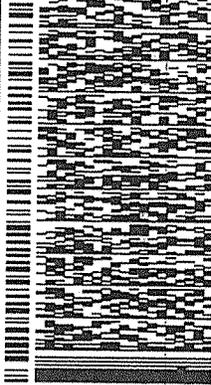
BILL SENDER

LOS ALAMOS, NM 87545  
UNITED STATES US

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(849) 566-8171  
REF: MRGW04BAGWEO



11412140730011W

FRI - 14 AUG 10:30A  
PRIORITY OVERNIGHT

MPS# 5908 1779 3290

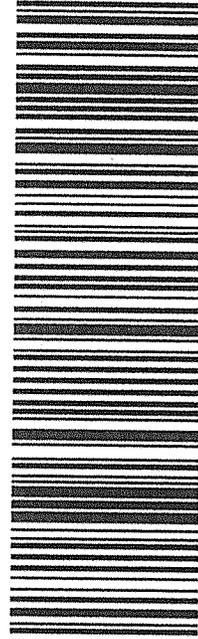
Mstr# 5908 1779 3289

0201

X7 CHSA

29407 CHS

SC-US



Part # 156148-434 RIT2 10/11

08.14 3290 F1  
10:30 F1 257

ORIGIN ID: SAFA (505) 665-9966  
KEITH GREENE  
LOS ALAMOS NATL LAB  
1800 BLDG 1237 DPU 03  
LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 13AUG15  
ACTWGT: 45.0 LB MAN  
CAD: 0014176/CAFE2807

BILL SENDER

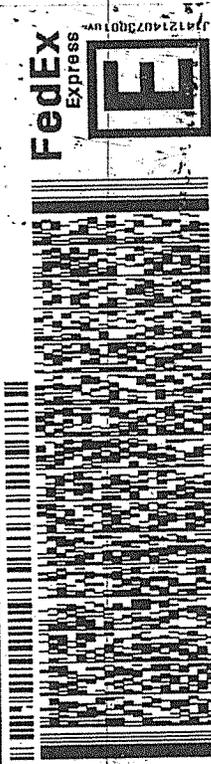
521C1/FECA/6F03

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

**CHARLESTON SC 29407**

(843) 666-8171

REF: MRSW12CHWCA0



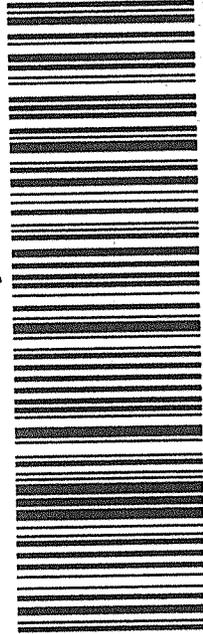
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**PRIORITY OVERNIGHT**

2 of 2  
MPS# 5908 1779 3278  
0263

Mstr# 5908 1779 3267 0201

**X7 CHSA**

**29407**  
**SC-US**  
**CHS**



Form # 155148-434 R1T2 10/11 \*\*

3278  
08.14

# **Data Review Qualifier Flag Definition Sheet**

## Data Review Qualifier Definitions

Qualifier	Explanation
*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

- P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.  
For HPLC, the difference is >70%.
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

# **Perchlorates by LCMSMS Analysis**

# Case Narrative

**Perchlorates by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2015-2156  
Work Order #: 379325**

**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: 1502487  
Prep Batch Number: 1502486

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
379325002	CAMO-15-102599
1203379720	Interference Check Sample (ICS)
1203379716	Method Blank (MB)
1203379717	Laboratory Control Sample (LCS)
1203379718	379726005(CAMO-15-102600) Matrix Spike (MS)
1203379719	379726005(CAMO-15-102600) 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# 12.

**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**

The initial calibration verification standard (ICV) met the acceptance criteria.

**CCB Requirements**

All continuing calibration blanks (CCB) bracketing the analyses associated with this batch were within acceptance criteria.

**CCV Requirements**

All continuing calibration checks (CCV) requirements were met by all bracketing CCV standards.

**Low Level Standard (CRI) Requirements**

All low level calibration verification (CRI) requirements were met by all bracketing CRI standards.

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

The MB analyzed with this SDG met the acceptance criteria.

**Interference Check Sample (ICS)**

The ICS spike recoveries met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**QC Sample Designation**

Client sample 379726005 (CAMO-15-102600) was chosen for matrix spike and matrix spike duplicate analysis.

**Matrix Spike (MS) Recovery Statement**

The MS recoveries were within the established acceptance limits.

**Matrix Spike Duplicate (MSD) Recovery Statement**

The MSD recoveries were within the established acceptance limits.

**MS/MSD Relative Percent Difference (RPD) Statement**

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

**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 379325002 (CAMO-15-102599) was diluted to bring the over range concentration within the calibration range.

**Sample Re-extraction/Re-analysis**

All samples in this batch were re-analyzed the following day. The initial calibration did not meet all acceptance criteria. However, review of the data provided information for dilutions needed for many samples in this batch.

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

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

**Manual Integrations**

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

**Method Comments**

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

**Additional Comments**

The Perchlorate Isotope Ratio on the Form I may differ slightly from the ratio on the corresponding raw data due to rounding rules and/or significant figures or due to software limitations when there are manual integrations, dilutions or other factors. The ratio value of the Form I is the correct value. The retention time marker, Perchlorate-O (18), is added to all samples, instrument blanks, and standards prior to injection. It is used to verify the retention time of Perchlorate and Perchlorate-101 and to insure an accurate injection occurred. Due to various anions affecting the recovery of Perchlorate-O (18) and not Perchlorate and Perchlorate-101, the calibration curves of Perchlorate and Perchlorate-101 are 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 a Micromass Quattro Ultima Mass Spectrometer/Mass Spectrometer. It is designated as LCMSMS #2. It is fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis. The laboratory may also utilize an Agilent 1100 liquid chromatography instrument for Perchlorate analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/Mass Spectrometer, designated as LCMSMS #3 or LCMSMS #4. It is also fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis.

### **Electronic Packaging Comment**

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

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

### **Chromatographic Columns**

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

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

Dionex: IonPac AG-16 2 x 50 mm.

### **Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2015-2156 GEL Work Order: 379325

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

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, 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: 05 SEP 2015

Title: Group Leader

# **Sample Data Summary**

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

CAMO-15-102599Lab Code: GELDate Received: 14-AUG-15Instrument: LCMSMSGEL Job No (SDG): 2015-2156Method: SW846 6850 ModifiedGEL Sample ID: 379325002Matrix: WATERDate Filtered: 26-AUG-15Extraction Batch ID: 1502486Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids: .

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.5	2	8.93	ug/L		10	27-AUG-15 13:52	per0827030a
	Perchlorate Isotope Ratio			3.07			10	27-AUG-15 13:52	per0827030a
14797-73-0	Perchlorate-101	.5	2	9.00	ug/L		10	27-AUG-15 13:52	per0827030a
	Perchlorate-O(18)			5.09	ug/L		10	27-AUG-15 13:52	per0827030a

^ 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):** 2015-2156

**Extract Batch Code:** 1502486

**Date Filtered:** 26-AUG-15

**Matrix:** WATER

**Sample ID:** 1203379717

Analyte <sup>^</sup>	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.209	ug/L	104		85 - 115
Perchlorate Isotope Ratio		3.08				-
Perchlorate-101	0.200	.21	ug/L	105		85 - 115
Perchlorate-O(18)		.523	ug/L			-

<sup>^</sup> 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):** 2015-2156

**Extract Batch Code:** 1502486

**Date Extracted:** 26-AUG-15

**GEL MS/PS ID:** 1203379718

**Client ID:** CAMO-15-102600

**GEL MSD/PSD ID:** 1203379719

**QC Type:** MS

Compound^	Spike Added	Sample Conc	Units	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Recovery Limit
Perchlorate	0.200	0.450	ug/L	0.655	102	.656	103	0	30	75 - 125
Perchlorate Isotope Ratio	0	3.07		3.08		3.12		1		-
Perchlorate-101	0.200	0.456	ug/L	0.659	102	.652	98	1	30	75 - 125
Perchlorate-O(18)	0	0.511	ug/L	0.526		.514		2		-

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

# Quality Control Data

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

MBLab Code: GELDate Received: 26-AUG-15Instrument: LCMSMSGEL Job No (SDG): 2015-2156Method: EPA 6850 ModifiedGEL Sample ID: 1203379716Matrix: WATERDate Filtered: 26-AUG-15Extraction Batch ID: 1502486Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids: .

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.200	ug/L	U	1	27-AUG-15 12:08	per0827019a
	Perchlorate Isotope Ratio						1	27-AUG-15 12:08	per0827019a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	27-AUG-15 12:08	per0827019a
	Perchlorate-O(18)			0.493	ug/L		1	27-AUG-15 12:08	per0827019a

^ 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: 1502486Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 26-AUG-15GEL Job No (SDG): 2015-2156GEL Sample ID: 1203379717Date Filtered: 26-AUG-15Injection 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	0.209	ug/L		1	27-AUG-15 12:17	per0827020a
	Perchlorate Isotope Ratio			3.08			1	27-AUG-15 12:17	per0827020a
14797-73-0	Perchlorate-101	.05	.2	0.210	ug/L		1	27-AUG-15 12:17	per0827020a
	Perchlorate-O(18)			0.523	ug/L		1	27-AUG-15 12:17	per0827020a

^ 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: STORM WATERExtraction Batch ID: 1502486Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2015-2156GEL Sample ID: 1203379720Date Filtered: 26-AUG-15Injection 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	0.234	ug/L		1	27-AUG-15 12:27	per0827021a
	Perchlorate Isotope Ratio			3.15			1	27-AUG-15 12:27	per0827021a
14797-73-0	Perchlorate-101	.05	.2	0.230	ug/L		1	27-AUG-15 12:27	per0827021a
	Perchlorate-O(18)			0.551	ug/L		1	27-AUG-15 12:27	per0827021a

^ 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: 1502486Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-15-102600MSDate Received: 21-AUG-15GEL Job No (SDG): 2015-2156GEL Sample ID: 1203379718Date Filtered: 26-AUG-15Injection 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	0.655	ug/L		1	27-AUG-15 15:55	per0827043a
	Perchlorate Isotope Ratio			3.08			1	27-AUG-15 15:55	per0827043a
14797-73-0	Perchlorate-101	.05	.2	0.659	ug/L		1	27-AUG-15 15:55	per0827043a
	Perchlorate-O(18)			0.526	ug/L		1	27-AUG-15 15:55	per0827043a

^ 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: 1502486Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-15-102600MSDDate Received: 21-AUG-15GEL Job No (SDG): 2015-2156GEL Sample ID: 1203379719Date Filtered: 26-AUG-15Injection 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	0.656	ug/L		1	27-AUG-15 16:05	per0827044a
	Perchlorate Isotope Ratio			3.12			1	27-AUG-15 16:05	per0827044a
14797-73-0	Perchlorate-101	.05	.2	0.652	ug/L		1	27-AUG-15 16:05	per0827044a
	Perchlorate-O(18)			0.514	ug/L		1	27-AUG-15 16:05	per0827044a

^ 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 =  
Instrument Value X  $\frac{\text{Concentrated Extract Volume}}{\text{Aliquot}}$  X  $\frac{1}{\% \text{Solids}}$

# **Metals Analysis**

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2015-2156**  
**Work Order #: 379325**

<b>Sample ID</b>	<b>Client ID</b>
379325001	CAMO-15-102575
379325002	CAMO-15-102599
1203374943	Method Blank (MB)ICP
1203374944	Laboratory Control Sample (LCS)
1203374947	379326002(CAMO-15-102615L) Serial Dilution (SD)
1203374945	379326002(CAMO-15-102615D) Sample Duplicate (DUP)
1203374946	379326002(CAMO-15-102615S) Matrix Spike (MS)
1203374974	Method Blank (MB)ICP-MS
1203374975	Laboratory Control Sample (LCS)
1203374978	379326002(CAMO-15-102615L) Serial Dilution (SD)
1203374976	379326002(CAMO-15-102615D) Sample Duplicate (DUP)
1203374977	379326002(CAMO-15-102615S) Matrix Spike (MS)
1203381561	Method Blank (MB)CVAA
1203381562	Laboratory Control Sample (LCS)
1203381573	379490001(Urban-15-102336L) Serial Dilution (SD)
1203381569	379490001(Urban-15-102336D) Sample Duplicate (DUP)
1203381571	379490001(Urban-15-102336S) Matrix Spike (MS)

**Sample Analysis**

**Method/Analysis Information**

<b>Analytical Batch:</b>	1500655, 1500668, 1503112 and 1503257
<b>Prep Batch :</b>	1500654, 1500667 and 1503111
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 24, GL-MA-E-006 REV# 12, GL-MA-E-014 REV# 26, GL-MA-E-010 REV# 30 and GL-GC-E-107 REV# 9
<b>Analytical Method:</b>	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.1/245.2 and SM 2340 B
<b>Prep Method :</b>	SW846 3005A and EPA 245.1/245.2 Prep

**Preparation/Analytical Method Verification**

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

**System Configuration**

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

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

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

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

### **Calibration Information**

#### **Instrument Calibration**

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

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

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

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

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

#### **Continuing Calibration Blanks (CCB) Requirements**

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

#### **Continuing Calibration Verification (CCV) Requirements**

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

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

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

The MBs analyzed with this SDG met the acceptance criteria.

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

The LCS spike recoveries met the acceptance limits.

#### **Quality Control (QC) Sample Statement**

The following samples were selected as the quality control (QC) samples for this SDG: 379326002 (CAMO-15-102615)-ICP and ICP-MS and 379490001 (Urban-15-102336)-CVAA.

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

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

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

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

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

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

### **Technical Information**

#### **Holding Time Specifications**

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

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

All procedures were performed as stated in the SOP.

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

#### **Preparation Information**

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

### **Miscellaneous Information**

#### **Electronic Packaging Comment**

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

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

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

A data exception report was not required for this SDG.

#### **Additional Comments**

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

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

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

### **Certification Statement**

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

# GEL LABORATORIES LLC

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

## Qualifier Definition Report for

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

Client SDG: 2015-2156 GEL Work Order: 379325

### 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.

### Review/Validation

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

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

Signature:



Name: **Nik-Cole Elmore**

Date: **10 SEP 2015**

Title: **Data Validator**

# **Sample Data Summary**

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

**SDG No:** 2015-2156

**CONTRACT:** ESHL00114

**METHOD TYPE:** EPA

**SAMPLE ID:**379325001

**BASIS:** As Received

**DATE COLLECTED** 13-AUG-15

**CLIENT ID:** CAMO-15-102575

**LEVEL:** Low

**DATE RECEIVED** 14-AUG-15

**MATRIX:** W

**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	08/27/15 09:46	082715W1-7	1503112

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1503112	1503111	EPA 245.1/245.2 Prep	20	mL	20	mL	08/26/15	AXS5

**\*Analytical Methods:**

AV EPA 245.1/245.2

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

**SDG No:** 2015-2156

**CONTRACT:** ESHL00114

**METHOD TYPE:** EPA

**SAMPLE ID:**379325002

**BASIS:** As Received

**DATE COLLECTED** 13-AUG-15

**CLIENT ID:** CAMO-15-102599

**LEVEL:** Low

**DATE RECEIVED** 14-AUG-15

**MATRIX:** W

**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	08/27/15 09:48	082715W1-7	1503112

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

SDG No: 2015-2156

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 379325002

BASIS: As Received

DATE COLLECTED 13-AUG-15

CLIENT ID: CAMO-15-102599

LEVEL: Low

DATE RECEIVED 14-AUG-15

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	08/24/15 12:05	082415-1	1500655
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	09/02/15 20:39	150902-3	1500668
7440-38-2	Arsenic	3.17	ug/L	J	1.7	5	5	1	MS	BAJ	09/03/15 10:29	150902-4	1500668
7440-39-3	Barium	29.5	ug/L		1	5	5	1	P	HSC	08/24/15 12:05	082415-1	1500655
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/24/15 12:05	082415-1	1500655
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	HSC	08/24/15 12:05	082415-1	1500655
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	BAJ	09/02/15 20:39	150902-3	1500668
7440-70-2	Calcium	14400	ug/L		50	200	200	1	P	HSC	08/24/15 12:05	082415-1	1500655
7440-47-3	Chromium	12.5	ug/L		2	10	10	1	MS	BAJ	09/02/15 20:39	150902-3	1500668
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/24/15 12:05	082415-1	1500655
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	08/24/15 12:05	082415-1	1500655
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	08/24/15 12:05	082415-1	1500655
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	09/02/15 20:39	150902-3	1500668
7439-95-4	Magnesium	3920	ug/L		110	300	300	1	P	HSC	08/24/15 12:05	082415-1	1500655
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	08/24/15 12:05	082415-1	1500655
7439-98-7	Molybdenum	0.925	ug/L		0.165	0.5	0.5	1	MS	BAJ	09/02/15 20:39	150902-3	1500668
7440-02-0	Nickel	2	ug/L	U	0.5	2	2	1	MS	BAJ	09/02/15 20:39	150902-3	1500668
7440-09-7	Potassium	1850	ug/L		50	150	150	1	P	HSC	08/24/15 12:05	082415-1	1500655
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	BAJ	09/04/15 10:35	150903-6	1500668
7631-86-9	Silica	74000	ug/L		53	213	213	1	P	HSC	08/24/15 12:05	082415-1	1500655
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	BAJ	09/02/15 20:39	150902-3	1500668
7440-23-5	Sodium	9160	ug/L		100	300	300	1	P	HSC	08/25/15 07:25	082515-2	1500655
7440-24-6	Strontium	63.8	ug/L		1	5	5	1	P	HSC	08/24/15 12:05	082415-1	1500655
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	BAJ	09/02/15 20:39	150902-3	1500668
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	08/24/15 12:05	082415-1	1500655
7440-61-1	Uranium	0.439	ug/L		0.067	0.2	0.2	1	MS	BAJ	09/04/15 09:22	150903-5	1500668
7440-62-2	Vanadium	6.8	ug/L		1	5	5	1	P	HSC	08/24/15 12:05	082415-1	1500655
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	08/25/15 07:25	082515-2	1500655

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

**SDG No:** 2015-2156

**CONTRACT:** ESHL00114

**METHOD TYPE:**

**SAMPLE ID:**379325002

**BASIS:** As Received

**DATE COLLECTED** 13-AUG-15

**CLIENT ID:** CAMO-15-102599

**LEVEL:** Low

**DATE RECEIVED** 14-AUG-15

**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	52.1	mg/L		0.453	1.24	1.24	1		JJ2	08/26/15 12:52		1503257

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1500655	1500654	SW846 3005A	50	mL	50	mL	08/14/15	JP1
1500668	1500667	SW846 3005A	50	mL	50	mL	08/14/15	JP1
1503112	1503111	EPA 245.1/245.2 Prep	20	mL	20	mL	08/26/15	AXS5

**\*Analytical Methods:**

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

# **Quality Control Summary**

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

**SDG NO.** 2015-2156  
**Contract:** ESHL00114  
**Matrix:** W

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Acceptance Window</u>	<u>Conc Qual</u>	<u>M*</u>	<u>MDL</u>	<u>RDL</u>
1203374943	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203374974	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	1.7	ug/L	+/-5	U	MS	1.7	5
	Chromium	2	ug/L	+/-10	U	MS	2	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.165	ug/L	+/-0.5	U	MS	0.165	0.5
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Cadmium	0.11	ug/L	+/-1	U	MS	0.11	1
	Selenium	1.5	ug/L	+/-5	U	MS	1.5	5
	Silver	0.2	ug/L	+/-1	U	MS	0.2	1
	Thallium	0.45	ug/L	+/-2	U	MS	0.45	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203381561	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

## \*Analytical Methods:

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

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2156 Client ID: CAMO-15-102615S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 379326002 Spike ID: 1203374946

<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	5160		68	U	5000	103		P
Barium	ug/L	75-125	546		28.6		500	104		P
Beryllium	ug/L	75-125	518		1	U	500	104		P
Boron	ug/L	75-125	551		15	U	500	107		P
Calcium	ug/L	75-125	24700		19200		5000	110		P
Cobalt	ug/L	75-125	504		1	U	500	101		P
Copper	ug/L	75-125	539		3	U	500	108		P
Iron	ug/L	75-125	5320		30	U	5000	106		P
Magnesium	ug/L	75-125	10700		5280		5000	107		P
Manganese	ug/L	75-125	515		2	U	500	103		P
Potassium	ug/L	75-125	6650		1300		5000	107		P
Silica	ug/L		75400		64300		10700	104	N/A	P
Sodium	ug/L	75-125	15600		10600		5000	98.2		P
Strontium	ug/L	75-125	624		85.8		500	108		P
Tin	ug/L	75-125	527		2.96	J	500	105		P
Vanadium	ug/L	75-125	528		3.44	J	500	105		P
Zinc	ug/L	75-125	463		3.3	U	500	92.1		P

\*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2156 Client ID: CAMO-15-102615S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 379326002 Spike ID: 1203374977

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	50.7		1	U	50	101		MS
Arsenic	ug/L	75-125	55.6		2.93	J	50	105		MS
Cadmium	ug/L	75-125	51.1		0.11	U	50	102		MS
Chromium	ug/L	75-125	166		116		50	101		MS
Lead	ug/L	75-125	51.5		0.5	U	50	103		MS
Molybdenum	ug/L	75-125	53		0.763		50	105		MS
Nickel	ug/L	75-125	55.5		1.92	J	50	107		MS
Selenium	ug/L	75-125	53.3		1.5	U	50	104		MS
Silver	ug/L	75-125	52.3		0.2	U	50	105		MS
Thallium	ug/L	75-125	50.6		0.45	U	50	101		MS
Uranium	ug/L	75-125	59.8		0.907		50	118		MS

\*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2156 Client ID: Urban-15-102336S

Contract: ESHL00114 Level: Low

Matrix: STORM WATER % Solids:

Sample ID: 379490001 Spike ID: 1203381571

<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	2.09		0.067	U	2	102		AV

\*Analytical Methods:

AV EPA 245.1/245.2

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

**SDG No.:** 2015-2156

**Lab Code:** GEL

**Contract:** ESHL00114

**Client ID:** CAMO-15-102615D

**Matrix:** WATER

**Level:** Low

**Sample ID:** 379326002

**Duplicate ID:** 1203374945

**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%	28.6		28.4		.692		P
Beryllium	ug/L		1	U	1	U			P
Boron	ug/L		15	U	15	U			P
Calcium	ug/L	+/-20%	19200		19300		.499		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%	5280		5280		.00568		P
Manganese	ug/L		2	U	2	U			P
Potassium	ug/L	+/-20%	1300		1330		2.41		P
Silica	ug/L	+/-20%	64300		64500		.34		P
Sodium	ug/L	+/-20%	10600		10700		.627		P
Strontium	ug/L	+/-20%	85.8		88		2.55		P
Tin	ug/L		2.96	J	2.5	U	200		P
Vanadium	ug/L	+/-5	3.44	J	3.43	J	.376		P
Zinc	ug/L		3.3	U	3.3	U			P

\*Analytical Methods:

P SW846 3005A/6010C

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

**SDG No.:** 2015-2156

**Lab Code:** GEL

**Contract:** ESHL00114

**Client ID:** CAMO-15-102615D

**Matrix:** WATER

**Level:** Low

**Sample ID:** 379326002

**Duplicate ID:** 1203374976

**Percent Solids for Dup:** N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	2.93 J		3.32 J		12.5		MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L	+/-20%	116		114		1.43		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.763		0.769		.783		MS
Nickel	ug/L	+/-2	1.92 J		1.79 J		7.39		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	0.907		0.899		.886		MS

\*Analytical Methods:

MS SW846 3005A/6020A



METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2015-2156

Contract: ESHL00114

Aqueous LCS Source:OS2I

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203374944	Strontium	ug/L	500	516		103	80-120	P
	Tin	ug/L	500	526		105	80-120	P
	Vanadium	ug/L	500	530		106	80-120	P
	Zinc	ug/L	500	475		94.9	80-120	P
	Sodium	ug/L	5000	5110		102	80-120	P
	Aluminum	ug/L	5000	5160		103	80-120	P
	Barium	ug/L	500	527		105	80-120	P
	Beryllium	ug/L	500	521		104	80-120	P
	Boron	ug/L	500	535		107	80-120	P
	Calcium	ug/L	5000	5210		104	80-120	P
	Cobalt	ug/L	500	520		104	80-120	P
	Copper	ug/L	500	534		107	80-120	P
	Iron	ug/L	5000	5270		105	80-120	P
	Magnesium	ug/L	5000	5330		107	80-120	P
	Manganese	ug/L	500	524		105	80-120	P
	Potassium	ug/L	5000	5340		107	80-120	P
	Silica	ug/L	10700	10800		101	80-120	P

\*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2015-2156

Contract: ESHL00114

Aqueous LCS Source:O2Si

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203374975								
	Antimony	ug/L	50	50.2		100	80-120	MS
	Arsenic	ug/L	50	51.9		104	80-120	MS
	Cadmium	ug/L	50	51.5		103	80-120	MS
	Chromium	ug/L	50	49.2		98.3	80-120	MS
	Lead	ug/L	50	50.2		100	80-120	MS
	Molybdenum	ug/L	50	48.8		97.6	80-120	MS
	Nickel	ug/L	50	48.6		97.2	80-120	MS
	Selenium	ug/L	50	54.4		109	80-120	MS
	Silver	ug/L	50	50.6		101	80-120	MS
	Thallium	ug/L	50	48.9		97.8	80-120	MS
	Uranium	ug/L	50	54.9		110	80-120	MS

\*Analytical Methods:

MS SW846 3005A/6020A

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2015-2156

Contract: ESHL00114

Aqueous LCS Source:GEL

Solid LCS Source:

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<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>
1203381562	Mercury	ug/L	2	2.05		102	85-115	AV

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\*Analytical Methods:

AV EPA 245.1/245.2

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2015-2156 Client ID: CAMO-15-102615L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 379326002 Serial Dilution ID: 1203374947

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	28.6		28.4		.616			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	19200		18700		2.7		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	5280		5100		3.52			P
Manganese	2	U	10	U				P
Potassium	1300		1130		13.1			P
Silica	64300		62900		2.19		10	P
Sodium	10600		10000		6.02		10	P
Strontium	85.8		86.8		1.15		10	P
Tin	2.96	J	12.5	U	100			P
Vanadium	3.44	J	5	U	100			P
Zinc	3.3	U	16.5	U				P

\*Analytical Methods:

P SW846 3005A/6010C

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2015-2156 Client ID: CAMO-15-102615L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 379326002 Serial Dilution ID: 1203374978

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2.93	J	8.5	U	100			MS
Cadmium	.11	U	.55	U				MS
Chromium	116		114		1.55			MS
Lead	.5	U	2.5	U				MS
Molybdenum	.763		1.1	J	43.5			MS
Nickel	1.92	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	.907		.895	J	1.32			MS

\*Analytical Methods:

MS SW846 3005A/6020A

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2015-2156 Client ID: Urban-15-102336L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 379490001 Serial Dilution ID: 1203381573

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

\*Analytical Methods:

AV EPA 245.1/245.2

# **General Chem Analysis**

# Case Narrative

**General Chemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2015-2156  
Work Order #: 379325**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1500883

**Method:** SW 9060 Total Organic Carbon

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
379325001	CAMO-15-102575
1203375541	Method Blank (MB)
1203375542	Laboratory Control Sample (LCS)
1203375544	379323003(CAMO-15-102583) Sample Duplicate (DUP)
1203375546	379323003(CAMO-15-102583) 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# 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 Carbon analysis was performed on a O-I Analytical 1030W Carbon Analyzer.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

acceptance limits.

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

The LCS spike recovery met the acceptance limits.

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

Sample 379323003 (CAMO-15-102583) was selected for QC analysis.

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

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

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

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

### **Technical Information**

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

#### **Holding Times**

All samples in this SDG met the specified holding time.

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

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

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

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

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

### **Miscellaneous Information**

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

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

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

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

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

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

**Method/Analysis Information**

**Product:** Cyanide and Total  
**Analytical Batch:** 1500478      **Method:** WSP-CN(T)  
**Prep Batch :** 1500477      **Method:** EPA 335.4

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
379325001	CAMO-15-102575
1203374457	Method Blank (MB)
1203374458	Laboratory Control Sample (LCS)
1203374459	379325001(CAMO-15-102575) Sample Duplicate (DUP)
1203374461	379325001(CAMO-15-102575) Matrix Spike (MS)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 17.

**Preparation/Analytical Method Verification**

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

**Calibration Information**

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

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

The LCS spike recovery met the acceptance limits.

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

Sample 379325001 (CAMO-15-102575) was selected for QC analysis.

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

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

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

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

### **Technical Information**

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

#### **Holding Times**

All samples in this SDG met the specified holding time.

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

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

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

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

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

### **Miscellaneous Information**

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

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

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

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

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

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

### **Method/Analysis Information**

**Product:** Ion Chromatography  
**Analytical Batch:** 1500831      **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:

<b>Sample ID</b>	<b>Client ID</b>
379325002	CAMO-15-102599
1203375379	Method Blank (MB)
1203375380	Laboratory Control Sample (LCS)
1203375381	379330006(CAMO-15-102593) Sample Duplicate (DUP)
1203375382	379330006(CAMO-15-102593) Post Spike (PS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 24.

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

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

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

### **Y Intercept Rule**

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

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

The LCS spike recovery met the acceptance limits.

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

Sample 379330006 (CAMO-15-102593) was selected for QC analysis.

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

The spike recovery falls outside of the GEL acceptance limits but within the client specified limits. 1203375382 (Non SDG 379330006PS).

### **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 were diluted because target analyte concentrations exceeded the calibration range. 1203375381 (Non SDG 379330006DUP) and 1203375382 (Non SDG 379330006PS).

### **Sample Re-analysis**

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

## **Miscellaneous Information**

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

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

### **Manual Integrations**

Samples 1203375381 (Non SDG 379330006DUP), 1203375382 (Non SDG 379330006PS) and 379325002 (CAMO-15-102599) were manually integrated to correctly position the baseline as set in the calibration standards.

### **Additional Comments**

Additional comments were not required for this SDG.

### **Electronic Packaging Comment**

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

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

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

**Method/Analysis Information**

**Product:** Ammonia Nitrogen  
**Analytical Batch:** 1500587      **Method:** NH3  
**Prep Batch :** 1500585      **Method:** EPA 350.1 Prep

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
379325002	CAMO-15-102599
1203374761	Method Blank (MB)
1203374762	Laboratory Control Sample (LCS)
1203374763	379148002(CASA-15-102650) Sample Duplicate (DUP)
1203374764	379268002(CAMO-15-102598) Sample Duplicate (DUP)
1203374765	379148002(CASA-15-102650) Matrix Spike (MS)
1203374766	379268002(CAMO-15-102598) 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+ 8500 Series.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Calibration Verification Information**

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

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Samples 379148002 (CASA-15-102650) and 379268002 (CAMO-15-102598) were selected for QC analysis.

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

The matrix spike recovered outside of the established acceptance limits due to matrix interference.

Analyte	Sample	Value
Nitrogen, Ammonia	1203374765 (CASA-15-102650MS)	118* (90%-110%)

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

A data exception report (DER) 1440840 was generated for sample 1203374765 (CASA-15-102650MS) in this SDG/batch.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1500575	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1500574	<b>Method:</b>	EPA 351.2 Prep

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
379325001	CAMO-15-102575
1203374724	Method Blank (MB)
1203374725	Laboratory Control Sample (LCS)
1203374726	379324001(CAMO-15-102738) Sample Duplicate (DUP)
1203374727	379324001(CAMO-15-102738) Matrix Spike (MS)

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

**SOP Reference**

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

**Preparation/Analytical Method Verification**

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

**Calibration Information**

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 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**

Sample 379324001 (CAMO-15-102738) was selected for QC analysis.

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

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

#### **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**

Sample379325001 (CAMO-15-102575) was re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

### **Miscellaneous Information**

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

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

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

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

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

**Method/Analysis Information**

**Product:** Nitrate Nitrite by Cadmium Reduction  
**Analytical Batch:** 1501200 **Method:** NO3NO2

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
379325002	CAMO-15-102599
1203376383	Method Blank (MB)
1203376384	Laboratory Control Sample (LCS)
1203376388	379323002(CAMO-15-102603) Sample Duplicate (DUP)
1203376433	379323002(CAMO-15-102603) Post Spike (PS)

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

**SOP Reference**

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

**Preparation/Analytical Method Verification**

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

**Calibration Information**

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

**Calibration Verification Information**

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

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 379323002 (CAMO-15-102603) was selected for QC analysis.

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

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

**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 were diluted because target analyte concentrations exceeded the calibration range. 1203376388 (CAMO-15-102603DUP), 1203376433 (CAMO-15-102603PS) and 379325002 (CAMO-15-102599).

Analyte	379325
	002
Nitrogen, Nitrate/Nitrite	5X

**Sample Re-analysis**

Sample 379325002 (CAMO-15-102599) was re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

**Miscellaneous Information**

**Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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**Method/Analysis Information**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1500565	<b>Method:</b>	EPA 365.4 Phosphorus, Total in
<b>Prep Batch :</b>	1500564	<b>Method:</b>	EPA 365.4 Prep

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
379325002	CAMO-15-102599
1203374695	Method Blank (MB)
1203374696	Laboratory Control Sample (LCS)
1203374698	379146002(CASA-15-102657) Sample Duplicate (DUP)
1203374700	379146002(CASA-15-102657) 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+ 8500 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**

Sample 379146002 (CASA-15-102657) was selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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



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. A data exception report (DER) was not generated for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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**Method/Analysis Information**

**Product:** Specific Conductivity  
**Analytical Batch:** 1501375                      **Method:** EPA120.1 Specific Conductivity

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
379325002	CAMO-15-102599
1203376809	Laboratory Control Sample (LCS)
1203376810	379146002(CASA-15-102657) Sample Duplicate (DUP)
1203376811	379323004(CAMO-15-102607) 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 Titration and Ion analysis was performed on a ManSci PC-Titrate TitraSip System.

**Initial Standardization**

The titrant was properly standardized

**Quality Control (QC) Information**

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Samples 379146002 (CASA-15-102657) and 379323004 (CAMO-15-102607) were selected for QC analysis.

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Method/Analysis Information**

**Product:** pH  
**Analytical Batch:** 1501372 **Method:** PH

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
379325002	CAMO-15-102599
1203376804	Laboratory Control Sample (LCS)
1203376805	379323004(CAMO-15-102607) Sample Duplicate (DUP)
1203376806	379146002(CASA-15-102657) Sample Duplicate (DUP)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-008 REV# 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 Titration and Ion analysis was performed on a ManSci PC-Titrate TitraSip System.

**Initial Standardization**

The titrant was properly standardized

**Quality Control (QC) Information**

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Samples 379146002 (CASA-15-102657) and 379323004 (CAMO-15-102607) were selected for QC analysis.

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

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

**Technical Information**

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

**Holding Times**

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

Sample	Analyte	Value
379325002 (CAMO-15-102599)		Received 14-AUG-15, out of holding 13-AUG-15

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

A data exception report (DER) 1440141 was generated for sample 379325002 (CAMO-15-102599) in this SDG/batch.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Method/Analysis Information**

**Product:** Alkalinity  
**Analytical Batch:** 1501380      **Method:** EPA 310.1 Total Alkalinity

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
379325002	CAMO-15-102599
1203376817	Method Blank (MB)
1203376819	Laboratory Control Sample (LCS)
1203376822	379323004(CAMO-15-102607) Sample Duplicate (DUP)
1203376826	379323004(CAMO-15-102607) Matrix Spike (MS)

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

**SOP Reference**

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

**Initial Standardization**

The titrant was properly standardized

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 379323004 (CAMO-15-102607) was selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Certification Statement**

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

# GEL LABORATORIES LLC

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

## Qualifier Definition Report for

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

Client SDG: 2015-2156 GEL Work Order: 379325

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

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

### Review/Validation

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

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

**Signature:**



**Name: Thomas Lewis**

**Date: 10 SEP 2015**

**Title: Data Validator**

# **Sample Data Summary**

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: September 10, 2015

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

Los Alamos, New Mexico 87545

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

Client SDG: 2015-2156

Client Sample ID: CAMO-15-102575

Project: ESHL00114

Sample ID: 379325001

Client ID: ARSL004

Matrix: W

Collect Date: 13-AUG-15 09:31

Receive Date: 14-AUG-15

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Carbon Analysis</b>											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L	1	TSM	08/18/15	0730	1500883	1
<b>Flow Injection Analysis</b>											
WSP-CN(T) "As Received"											
Cyanide, Total	U	ND	1.67	5.00	ug/L	1	AXH3	08/17/15	1327	1500478	2
<b>Nutrient Analysis</b>											
TKN "As Received"											
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1	KLP1	08/25/15	1310	1500575	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	08/17/15	1031	1500477
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	08/24/15	2000	1500574

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 335.4	
3	EPA 351.2	

**Notes:**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: September 10, 2015

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

Los Alamos, New Mexico 87545

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

Client SDG: 2015-2156

Client Sample ID: CAMO-15-102599  
Sample ID: 379325002  
Matrix: W  
Collect Date: 13-AUG-15 09:31  
Receive Date: 14-AUG-15  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Ion Chromatography</b>											
<b>EPA 300.0 Anions Liquid 28 day "As Received"</b>											
Bromide	U	ND	0.067	0.200	mg/L	1	RXB5	08/15/15	1845	1500831	1
Chloride		3.99	0.067	0.200	mg/L	1					
Fluoride		0.143	0.033	0.100	mg/L	1					
Sulfate		6.22	0.133	0.400	mg/L	1					
<b>Nutrient Analysis</b>											
<b>EPA 365.4 Phosphorus, Total in "As Received"</b>											
Phosphorus, Total as P	J	0.027	0.017	0.050	mg/L	1	KLP1	08/18/15	1450	1500565	2
<b>NH3 "As Received"</b>											
Nitrogen, Ammonia		0.122	0.017	0.050	mg/L	1	KLP1	08/20/15	1233	1500587	3
<b>NO3NO2 "As Received"</b>											
Nitrogen, Nitrate/Nitrite		1.69	0.085	0.250	mg/L	5	AXH3	08/18/15	0945	1501200	4
<b>Solids Analysis</b>											
<b>TDS "As Received"</b>											
Total Dissolved Solids		159	3.40	14.3	mg/L		MXB3	08/17/15	1447	1500913	5
<b>Titration and Ion Analysis</b>											
<b>EPA 310.1 Total Alkalinity "As Received"</b>											
Alkalinity, Total as CaCO3		54.3	0.725	1.00	mg/L		PXO1	08/18/15	1705	1501380	6
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						
<b>EPA120.1 Specific Conductivity "As Received"</b>											
Conductivity		141	3.63	14.5	umhos/cm	1	PXO1	08/18/15	1347	1501375	7
<b>PH "As Received"</b>											
pH at Temp 23.7C	H	8.11	0.010	0.100	SU	1	PXO1	08/18/15	1528	1501372	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	08/19/15	1307	1500585
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	08/17/15	1700	1500564

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: September 10, 2015

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

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

Client SDG: 2015-2156

Client Sample ID: CAMO-15-102599  
Sample ID: 379325002

Project: ESHL00114  
Client ID: ARSL004

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The following Analytical Methods were performed:

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

**Notes:**

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: September 10, 2015

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

Contact: Mr. Keith Greene

Workorder: 379325

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1500883										
QC1203375544	379323003	DUP									
Total Organic Carbon Average	J	0.864	J	0.869	mg/L	0.577	^	(+/-1.00)	TSM	08/18/15	05:39
QC1203375542	LCS										
Total Organic Carbon Average	10.0			9.92	mg/L			(85%-115%)		08/17/15	21:40
QC1203375541	MB										
Total Organic Carbon Average			U	ND	mg/L					08/17/15	21:26
QC1203375546	379323003	PS									
Total Organic Carbon Average	10.0	J	0.864	10.5	mg/L			(65%-120%)		08/18/15	06:21
<b>Flow Injection Analysis</b>											
Batch	1500478										
QC1203374459	379325001	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	08/17/15	13:28
QC1203374458	LCS										
Cyanide, Total	50.0			53.0	ug/L			(90%-110%)		08/17/15	13:23
QC1203374457	MB										
Cyanide, Total			U	ND	ug/L					08/17/15	13:22
QC1203374461	379325001	MS									
Cyanide, Total	100	U	ND	110	ug/L			(90%-110%)		08/17/15	13:29
<b>Ion Chromatography</b>											
Batch	1500831										
QC1203375381	379330006	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		RXB5	08/15/15	20:19
Chloride			79.3	79.2	mg/L	0.162		(0%-20%)		08/18/15	19:00
Fluoride			0.826	0.824	mg/L	0.291		(0%-20%)		08/15/15	20:19
Sulfate			13.9	13.9	mg/L	0.0505		(0%-20%)			
QC1203375380	LCS										
Bromide	1.25			1.32	mg/L			(90%-110%)		08/15/15	14:03
Chloride	5.00			4.87	mg/L			(90%-110%)			

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1500831										
Fluoride	2.50			2.55	mg/L		102	(90%-110%)			
Sulfate	10.0			10.1	mg/L		101	(90%-110%)	RXB5	08/15/15	14:03
QC1203375379 MB											
Bromide			U	ND	mg/L						08/15/15 13:31
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203375382 379330006 PS											
Bromide	1.25	U	ND	1.41	mg/L		108	(90%-110%)			08/15/15 20:51
Chloride	5.00		3.96	9.52	mg/L		111 *	(90%-110%)			08/18/15 19:31
Fluoride	2.50		0.826	3.54	mg/L		108	(90%-110%)			08/15/15 20:51
Sulfate	10.0		13.9	25.8	mg/L		119 *	(90%-110%)			
<b>Nutrient Analysis</b>											
Batch	1500565										
QC1203374698 379146002 DUP											
Phosphorus, Total as P		U	ND	U	ND	mg/L	N/A		KLP1		08/18/15 14:26
QC1203374696 LCS											
Phosphorus, Total as P	1.00			1.09	mg/L		109	(83%-123%)			08/18/15 14:23
QC1203374695 MB											
Phosphorus, Total as P			U	ND	mg/L						08/18/15 14:22
QC1203374700 379146002 MS											
Phosphorus, Total as P	1.00	U	ND	1.11	mg/L		110	(59%-141%)			08/18/15 14:27
Batch 1500575											
QC1203374726 379324001 DUP											
Nitrogen, Total Kjeldahl			0.179	0.177	mg/L	1.12 ^		(+/-0.100)	KLP1		08/25/15 12:46
QC1203374725 LCS											
Nitrogen, Total Kjeldahl	1.00			1.04	mg/L		104	(90%-110%)			08/25/15 12:27
QC1203374724 MB											
Nitrogen, Total Kjeldahl			U	ND	mg/L						08/25/15 12:26

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1500575										
QC1203374727	379324001	MS									
Nitrogen, Total Kjeldahl	1.00	0.179		1.13	mg/L		95.1	(90%-110%)	KLP1	08/25/15	12:47
Batch	1500587										
QC1203374763	379148002	DUP									
Nitrogen, Ammonia		0.083		0.075	mg/L	10.1 ^		(+/-0.050)	KLP1	08/20/15	12:19
QC1203374764	379268002	DUP									
Nitrogen, Ammonia		0.157		0.129	mg/L	19.6 ^		(+/-0.050)		08/20/15	12:24
QC1203374762	LCS										
Nitrogen, Ammonia	1.00			0.971	mg/L		97.1	(90%-110%)		08/20/15	12:14
QC1203374761	MB										
Nitrogen, Ammonia			U	ND	mg/L					08/20/15	12:13
QC1203374765	379148002	MS									
Nitrogen, Ammonia	1.00	0.083		1.26	mg/L		118*	(90%-110%)		08/20/15	12:20
QC1203374766	379268002	MS									
Nitrogen, Ammonia	1.00	0.157		1.24	mg/L		108	(90%-110%)		08/20/15	12:25
Batch	1501200										
QC1203376388	379323002	DUP									
Nitrogen, Nitrate/Nitrite		3.53		3.65	mg/L	3.34		(0%-20%)	AXH3	08/18/15	08:47
QC1203376384	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.932	mg/L		93.2	(90%-110%)		08/18/15	08:38
QC1203376383	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					08/18/15	08:37
QC1203376433	379323002	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.353		1.32	mg/L		96.7	(90%-110%)		08/18/15	08:48
<b>Solids Analysis</b>											
Batch	1500913										
QC1203375600	379148002	DUP									
Total Dissolved Solids		203		206	mg/L	1.4		(0%-5%)	MXB3	08/17/15	14:47
QC1203375599	LCS										
Total Dissolved Solids	300			301	mg/L		100	(95%-105%)		08/17/15	14:47
QC1203375598	MB										
Total Dissolved Solids			U	ND	mg/L					08/17/15	14:47
<b>Titration and Ion Analysis</b>											

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1501372										
QC1203376805	379323004	DUP									
pH	H	7.83	H	7.87	SU	0.481		(0%-5%)	PXO1	08/18/15	15:24
QC1203376806	379146002	DUP									
pH	H	7.88	H	7.88	SU	0.0795		(0%-5%)		08/18/15	14:11
QC1203376804	LCS										
pH	7.00			7.02	SU		100	(99%-101%)		08/18/15	13:56
Batch	1501375										
QC1203376810	379146002	DUP									
Conductivity		565		568	umhos/cm	0.526		(0%-10%)	PXO1	08/18/15	13:29
QC1203376811	379323004	DUP									
Conductivity		486		488	umhos/cm	0.409		(0%-10%)		08/18/15	13:45
QC1203376809	LCS										
Conductivity	1410			1390	umhos/cm		98.3	(95%-105%)		08/18/15	13:27
Batch	1501380										
QC1203376822	379323004	DUP									
Alkalinity, Total as CaCO3		66.2		66.7	mg/L	0.749		(0%-20%)	PXO1	08/18/15	16:57
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203376819	LCS										
Alkalinity, Total as CaCO3	50.0			51.3	mg/L		103	(90%-110%)		08/18/15	16:36
QC1203376817	MB										
Alkalinity, Total as CaCO3			U	ND	mg/L					08/18/15	16:36
Carbonate alkalinity (CaCO3)			U	ND	mg/L						
QC1203376826	379323004	MS									
Alkalinity, Total as CaCO3	50.0	66.2		116	mg/L		101	(80%-120%)		08/18/15	16:59

- 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



# Miscellaneous

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 19-AUG-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> PC-Titrate TitraSip System	<b>Test / Method:</b> EPA 150.1	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> BETT, ESHL
<b>Batch ID:</b> 1501372	<b>Sample Numbers:</b> See Below		
<p><b>Potentially affected work order(s)(SDG):</b> 379142(2015-2128),379146(2015-2126),379148(2015-2125),379162,379215(2015-2138),379221(2015-2141),379268(2015-2137),379322(2015-2150),379323(2015-2151),379325(2015-2156),379326(2015-2157),379330(2015-2152)</p> <p><b>Application Issues:</b></p> <p>Sample received out of holding</p>			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Sample received out of holding:</p> <p>379142 008</p> <p>379146 002,004</p> <p>379148 002</p> <p>379162 002,006,010</p> <p>379215 001,005</p> <p>379221 001</p> <p>379268 002</p> <p>379322 007,009</p> <p>379323 002,004</p> <p>379325 002</p> <p>379326 002</p> <p>379330 006</p>		<p>1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.</p> <p>379142008 (WTLAP-15-103775) [See applicable report].</p> <p>379146002 (CASA-15-102657) [See applicable report].</p> <p>379146004 (CASA-15-102622) [See applicable report].</p> <p>379148002 (CASA-15-102650) [See applicable report].</p> <p>379162002 (15-LE06-0436) [See applicable report].</p> <p>379162006 (15-LE06-0440) [See applicable report].</p> <p>379162010 (15-LE06-0444) [See applicable report].</p> <p>379215001 (WSTSIP-15-103065) [See applicable report].</p> <p>379215005 (WSTSIP-15-103064) [See applicable report].</p> <p>379221001 (WST09-15-103883) [See applicable report].</p> <p>379268002 (CAMO-15-102598) [See applicable report].</p> <p>379322007 (WTLAP-15-103896) [See applicable report].</p> <p>379322009 (WTLAP-15-103916) [See applicable report].</p> <p>379323002 (CAMO-15-102603) [See applicable report].</p> <p>379323004 (CAMO-15-102607) [See applicable report].</p> <p>379325002 (CAMO-15-102599) [See applicable report].</p> <p>379326002 (CAMO-15-102615) [See applicable report].</p> <p>379330006 (CAMO-15-102593) [See applicable report].</p>	

**Originator's Name:**

Patrick Orgel 19-AUG-15

**Data Validator/Group Leader:**

Thomas Lewis 21-AUG-15

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 20-AUG-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LACHAT Flow Injection Analyzer	<b>Test / Method:</b> EPA 350.1, EPA 350.1 SC	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1500587	<b>Sample Numbers:</b> See Below		
<p><b>Potentially affected work order(s)(SDG):</b> 379148(2015-2125),379197,379248,379268(2015-2137),379323(2015-2151),379324(2015-2153),379325(2015-2156),379326(2015-2157),379330(2015-2152),379340,379350</p> <p><b>Application Issues:</b></p> <p>Failed Recovery for MS/MSD, or PS/PSD</p>			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
<p>1. Failed Recovery for MS/MSD, or PS/PSD:</p> <p>QC 1203374765MS</p>		<p>1. The matrix spike recovered outside of the established acceptance limits due to matrix interference. Nitrogen, Ammonia 1203374765 (CASA-15-102650MS) [118* (90%-110%)].</p>	

**Originator's Name:**

Kristen Mizzell 20-AUG-15

**Data Validator/Group Leader:**

Aubrey Kingsbury 20-AUG-15