

2040 Savage Rd  
Charleston SC 29407

## Chain of Custody/Analysis Request

Page 1 of 1

[illegible]

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 3955 EVENT NAME: Mortandad (Chromium Monitoring) Q4 Watershed Sampling  
 SAMPLE ID: CAMO-12-21742 WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		8/17/12	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		141	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	6SP
LOCATION ID: MCOL-6		↓	FIELD PREP:	F	OK
LOCATION TYPE: MON		↓	FIELD QC TYPE: REG		↓
PORT: SINGLE COMPLETION			SAMPLE USAGE: INV		

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

SAMPLE COMMENTS: see CAMO-12-21734

LOCATION COMMENTS:

FIELD PARAMETERS:

Dissolved Oxygen \_\_\_\_\_ mg/L    Oxidation-Reduction Potential \_\_\_\_\_ MV    pH \_\_\_\_\_ SU  
 Specific Conductance \_\_\_\_\_ uS/cm    Temperature \_\_\_\_\_ deg C    Turbidity \_\_\_\_\_ NTU

COLLECTED BY (PRINT) K. Reice

RELINQUISHED BY (Printed Name) <i>M. Green</i> (Signature) <i>[Signature]</i>	Date/Time 8/17/12 (350)	RECEIVED BY (Printed Name) <i>J. Sheppard</i> (Signature) <i>[Signature]</i>	Date/Time 8/17/12 (130)
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/30/2012

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3955 EVENT NAME: Mortandad (Chromium Monitoring) Q4 Watershed Sampling

SAMPLE ID: CAMO-12-21734 WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED (MM/DD/YYYY):		8/17/12	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1141	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	6SP
LOCATION ID: MCOI-6			FIELD PREP:	UF	NA
LOCATION TYPE: MON			FIELD QC TYPE:	REG	↓
PORT: SINGLE COMPLETION		↓	SAMPLE USAGE:	INV	↓

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

SAMPLE COMMENTS: Sampled within 50 ft of diesel generator

LOCATION COMMENTS: None

## FIELD PARAMETERS:

Dissolved Oxygen 7.16 mg/L      Oxidation-Reduction Potential 104.5 MV      pH 8.32 SU  
 Specific Conductance 594 uS/cm      Temperature 15.97 deg C      Turbidity 0.53 NTU

COLLECTED BY (PRINT) K. Reid

RELINQUISHED BY (Printed Name) <u>M. Egangreen</u> (Signature) <u>[Signature]</u>	Date/Time <u>8/17/12</u> <u>1350</u>	RECEIVED BY (Printed Name) <u>Sherwood</u> (Signature) <u>[Signature]</u>	Date/Time <u>8/17/12</u> <u>1350</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/30/2012

## Data Validation Report

Chain Of Custody No. 12-1509

## 1. Distribution Of Samples In EDD.

	Analytical	Regular	Field	Trip	Field	Equipment
SDG	Method	Samples	Duplicates	Blanks	Blanks	Blanks
309910	EPA:120.1	1				
309910	EPA:150.1	1				
309910	EPA:160.1	1				
309910	EPA:245.2	1				
309910	EPA:300.0	1				
309910	EPA:310.1	1				
309910	EPA:350.1	1				
309910	EPA:351.2	1				
309910	EPA:353.2	1				
309910	EPA:365.4	1				
309910	SM:A2340B	1				
309910	SW-846:6010B	1				
309910	SW-846:6020	1				
309910	SW-846:6850	1				
309910	SW-846:9060	1				

	Analytical	Analysis	Prep	Regular	Field	Trip	Field	Equipment	Method	Matrix	Matrix
SDG	Method	Lot ID	Lot ID	Samples	Duplicates	Blanks	Blanks	Blanks	Blanks	Spikes	Spike Dups
309910	EPA:120.1	1242995	1242995	1							
309910	EPA:150.1	1241830	1241830	1							
309910	EPA:160.1	1240523	1240523	1						1	
309910	EPA:245.2	1243838	1243833	1						1	1
309910	EPA:300.0	1239846	1239846	1						1	
309910	EPA:310.1	1242061	1242061	1						1	2
309910	EPA:350.1	1240583	1240582	1						1	1
309910	EPA:351.2	1240586	1240585	1						1	2
309910	EPA:353.2	1240584	1240584	1						1	
309910	EPA:365.4	1240581	1240580	1						1	2
309910	SM:A2340B	1244727	1244727	1							
309910	SW-846:6010B	1240142	1240141	1						1	1
309910	SW-846:6020	1240139	1240137	1						1	1
309910	SW-846:6850	1241188	1241187	1						1	1
309910	SW-846:9060	1241231	1241231	1						1	

## 2. Distribution Of Analytes In EDD.

Analytical Method	Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spikes	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-12-21742	1202731308	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-12-21742	309910002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1202731309	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-12-21742	1202728425	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-12-21742	309910002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1202728426	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	WTRO-12-23145	1202728424	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-12-21742	1202725255	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-12-21742	309910002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1202725256	LCS	0	0	1	0

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

EPA:160.1	GENERAL CHEMISTRY	MB	1202725254	MB	1	0	0	0
EPA:245.2	INORGANIC	CAMO-12-21742	1202733108	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-12-21742	1202733109	MS	0	0	1	0
EPA:245.2	INORGANIC	CAMO-12-21742	309910002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1202733107	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1202733106	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-12-21742	1202723451	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-12-21742	309910002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1202723453	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1202723450	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-12-21742	309910002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-12-21775	1202729070	DUP	3	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-12-21775	1202729071	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202729069	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202729072	MB	3	0	0	0
EPA:310.1	GENERAL CHEMISTRY	WTRO-12-23137	1202729076	DUP	3	0	0	0
EPA:310.1	GENERAL CHEMISTRY	WTRO-12-23137	1202729077	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-12-21742	309910002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-12-21796	1202725418	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-12-21796	1202725420	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-12-21796	1202725422	MSD	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1202725424	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1202725417	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-12-21734	1202730363	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-12-21734	1202730364	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-12-21734	1202730365	MSD	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-12-21734	309910001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1202725437	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1202725433	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	SWWS46-12-22930	1202725434	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	SWWS46-12-22930	1202725435	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	SWWS46-12-22930	1202725436	MSD	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-12-21742	309910002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-12-21796	1202725426	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1202725432	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1202725425	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-12-21742	309910002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-12-21743	1202725413	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-12-21743	1202725414	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-12-21743	1202725415	MSD	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-12-21744	1202730366	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-12-21744	1202730367	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-12-21744	1202730368	MSD	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1202725416	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1202725412	MB	1	0	0	0
SM:A2340B	INORGANIC	CAMO-12-21742	309910002	REG	1	0	0	0
SW-846:6010B	INORGANIC	Bay-39	1202724302	DUP	22	0	0	0
SW-846:6010B	INORGANIC	Bay-39	1202724303	MS	0	0	22	0
SW-846:6010B	INORGANIC	CAMO-12-21742	309910002	REG	17	0	0	0
SW-846:6010B	INORGANIC	LCS	1202724301	LCS	0	0	22	0
SW-846:6010B	INORGANIC	MB	1202724300	MB	22	0	0	0
SW-846:6020	INORGANIC	Bay-39	1202724294	DUP	13	0	0	0
SW-846:6020	INORGANIC	Bay-39	1202724295	MS	0	0	13	0
SW-846:6020	INORGANIC	CAMO-12-21742	309910002	REG	11	0	0	0



SW-846:6020	INORGANIC	LCS	1202724293	LCS	0	0	13	0
SW-846:6020	INORGANIC	MB	1202724292	MB	13	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-12-21742	309910002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-12-21773	1202726854	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-12-21773	1202726855	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1202726853	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1202726852	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-12-21734	309910001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-12-21779	1202726979	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-12-21643	1202726978	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1202726982	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1202726977	MB	1	0	0	0

**3. Are any analytes missing?**

No.

**4. Were any holding times exceeded?**

No.

**5. Any contaminants in blanks?**

Field	Lab	Type Of	Analytical	Sample	Parameter	Lab	Lab		Lab
Sample ID	Sample ID	Blank	Method	Matrix	Name	Result	Qualifier	Units	Detection Limit
MB	1202724300	METHOD BLANK	SW-846:6010B	W	Potassium	-153		ug/L	150
MB	1202725412	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.0454	J	mg/L	0.05
MB	1202725417	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0359	J	mg/L	0.05
MB	1202733106	METHOD BLANK	EPA:245.2	W	Mercury	-0.085	J	ug/L	0.2

**Any samples affected by the presence of contaminants in blanks?**

Field	Blank Field	Blank Lab	Blank	Analytical	Parameter		Blank	Sample	Lab	Detect	
Sample ID	Sample ID	Sample ID	Type	Method	Name	Units	Result	Result	Qualifier	Limit	Detected
CAMO-12-21742	MB	1202733106	METHOD BLANK	EPA:245.2	Mercury	ug/L	-0.085	0.067	U	0.2	N
CAMO-12-21742	MB	1202725417	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	mg/L	0.0359	0.0265	J	0.05	Y
CAMO-12-21742	MB	1202725412	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	mg/L	0.0454	0.0859		0.05	Y
CAMO-12-21742	MB	1202724300	METHOD BLANK	SW-846:6010B	Potassium	ug/L	-153	882		150	Y

**6. Any surrogate recoveries outside the control limits?**

No.

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

Field	Matrix	Matrix	Analytical	Parameter	Analysis	Analysis	Sample	MS %	MSD %	Upper	Lower
Sample ID	Spike ID	Spike Dup ID	Method	Name	Lot ID	Date	Matrix	Recrvy	Recrvy	Limit	Limit



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

Rejection	RPD
Limit	Limit

CAMO-12-21734	1202730364	1202730365	EPA:351.2	Total Kjeldahl Nitrogen	1240585	9/5/2012	W	85.7	90	110	90
CAMO-12-21734	1202730364	1202730365	EPA:351.2	Total Kjeldahl Nitrogen	1240585	9/5/2012	W	85.7	90	110	90

**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?**

Field	Lab	Lab Duplicate	Analytical	Parameter	Sample	Sample	Dup Sample		Detected	Detected	
Sample ID	SampleID	Sample ID	Method	Name	Matrix	Result	Result	Units	In Sample	In Dup	RPD
CAMO-12-21742	309910002	1202725255	EPA:160.1	Total Dissolved Solids	W	419	377	mg/L	Y	Y	10.4

**11. Any required reporting limits exceeded?**

No.

**12. Additional Validator's Comments.**

None.

**13. Display Flagged Data.**

Location ID	Chain Of Custody No	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detected
MCOI-6	12-1509	CAMO-12-21734	REG	INIT	GENERAL CHEMISTRY	EPA:351.2	Total Kjeldahl Nitrogen	J	J-	I6a	Y
MCOI-6	12-1509	CAMO-12-21742	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N
MCOI-6	12-1509	CAMO-12-21742	REG	INIT	GENERAL CHEMISTRY	EPA:160.1	Total Dissolved Solids		J	I10a	Y
MCOI-6	12-1509	CAMO-12-21742	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N

Reason Code	Description
I10a	The sample and the duplicate sample results were >=5X the RL and the duplicate RPD was >20% for water samples and >35% for soil samples.
I4	the sample result is <5x the concentration of related analyte in the method blank.
I6a	The associated matrix spike recovery was below the lower acceptance limit (LAL) but >10%. Follow the external laboratory limits located within the associated data package.
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.
U_LAB	The analytical laboratory qualified the analyte as not detected.

**14. Useable Result Count.**

Field	Location	Sample	Analytical	No. Unuseable	Total No. Of
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10	4.42	20
10	4.42	20

RPD  
Limit

10

Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent Moisture	Analysis Lot ID	Validation Status Code	Use Flag
0.0945	mg/L	0.0945	mg/L			W	8/17/2012		1240586	VAL	Y
0.0265	mg/L	0.0265	mg/L			W	8/17/2012		1240583	VAL	Y
419	mg/L	419	mg/L			W	8/17/2012		1240523	VAL	Y
0.0859	mg/L	0.0859	mg/L			W	8/17/2012		1240581	VAL	Y

Sample ID	ID	Purpose	Method	Records	Records
CAMO-12-21734	MCOI-6	REG	EPA:351.2	0	1
CAMO-12-21734	MCOI-6	REG	SW-846:9060	0	1
CAMO-12-21742	MCOI-6	REG	EPA:120.1	0	1
CAMO-12-21742	MCOI-6	REG	EPA:150.1	0	1
CAMO-12-21742	MCOI-6	REG	EPA:160.1	0	1
CAMO-12-21742	MCOI-6	REG	EPA:245.2	0	1
CAMO-12-21742	MCOI-6	REG	EPA:300.0	0	4
CAMO-12-21742	MCOI-6	REG	EPA:310.1	0	2
CAMO-12-21742	MCOI-6	REG	EPA:350.1	0	1
CAMO-12-21742	MCOI-6	REG	EPA:353.2	0	1
CAMO-12-21742	MCOI-6	REG	EPA:365.4	0	1
CAMO-12-21742	MCOI-6	REG	SM:A2340B	0	1
CAMO-12-21742	MCOI-6	REG	SW-846:6010B	0	17
CAMO-12-21742	MCOI-6	REG	SW-846:6020	0	11
CAMO-12-21742	MCOI-6	REG	SW-846:6850	0	1



August 29, 2012

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

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

Re: LANL-WQH Water Samples  
Work Order: 309910  
SDG: 12-1509

Dear Keith Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on August 21, 2012, 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

Purchase Order: 63641-10  
Chain of Custody: 12-1509  
Enclosures



**ARS International (63641-10)**  
**LANL-WQH Water Samples**  
**Work Order #: 309910**  
**SDG: 12-1509**

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# Case Narrative



**Case Narrative for  
ARS International (63641-10)  
LANL-WQH Water Samples  
Workorder #: 309910  
SDG # : 12-1509**

**August 29, 2012**

**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 21, 2012 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>
309910001	CAMO-12-21734
309910002	CAMO-12-21742

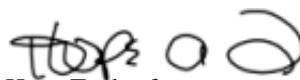
**Case Narrative**

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.



Hope Taylor for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 29 August 2012**

<b>State</b>	<b>Certification</b>
Arizona	AZ0766
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP A2LA ISO 17025	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-09-00191
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA120008
Maryland	270
Massachusetts	M-SC012
Mississippi	SC00012
Nevada	SC000122011-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
South Carolina Chemistry	10120001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-12-7
Utah NELAP	SC00012
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
Wisconsin	999887790

# **Chain of Custody and Supporting Documentation**





## SAMPLE RECEIPT &amp; REVIEW FORM

Client: LANL			SDG/AR/COC/Work Order:12-1509		
Received By: Patricia Dent			Date Received: AUGUST 21, 2012		
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
COC/Samples marked as radioactive?		X	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <b>0CPM</b>		
Classified Radioactive II or III by RSO?		X	If yes, Were swipes taken of sample containers < action levels?		
COC/Samples marked containing PCBs?		X			
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:		
Samples identified as Foreign Soil?		X			

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	X			Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	X			Preservation Method: Ice bags    Blue ice    Dry ice    None    Other (describe) *all temperatures are recorded in Celsius <b>2,3C</b>
2a	Daily check performed and passed on IR temperature gun?	X			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <b>61524646</b>
3	Chain of custody documents included with shipment?	X			
4	Sample containers intact and sealed?	X			Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
5	Samples requiring chemical preservation at proper pH?	X			Sample ID's, containers affected and observed pH: If Preservation added, Lot#
6	VOA vials free of headspace (defined as < 6mm bubble)?		X		Sample ID's and containers affected:
7	Are Encore containers present?			X	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	X			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	X			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	X			Sample ID's affected:
11	Number of containers received match number indicated on COC?	X			Sample ID'S affected:
12	Are sample containers identifiable as GEL provided?			X	CLIENT
13	COC form is properly signed in relinquished/received sections?	X			
14	Carrier and tracking number.	X			Circle Applicable: FedEx Air    FedEx Ground    UPS    Field Services    Courier    Other <b>7209 7856 9157 2C    7209 7856 9168 3C</b> <b>7209 7856 9179 3C</b>

Comments (Use Continuation Form if needed):

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

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 20AUG12  
ACTWGT: 23.0 LB MAN  
CAD: 0014176/CAFE2511

BILL SENDER

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

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 20AUG12  
ACTWGT: 42.0 LB MAN  
CAD: 0014176/CAFE2511

BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171  
REF: MROA002068B0

3c

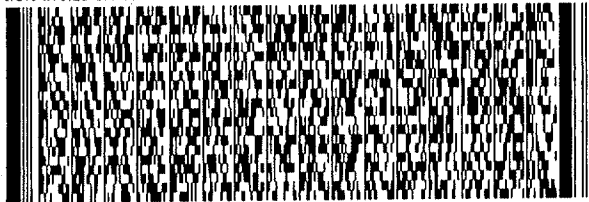
TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171  
REF: MR1A015AGWKO

2c

111131106060125

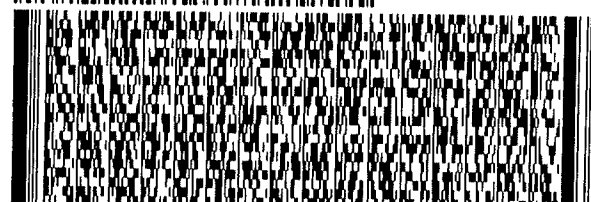


FedEx  
Express



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111131106060125



FedEx  
Express



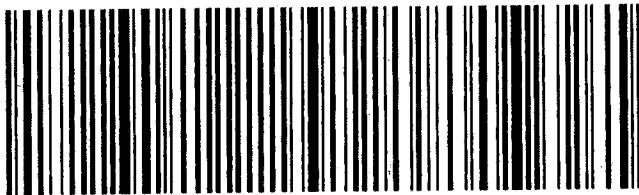
TRK# 7209 7856 9168  
0201

TUE - 21 AUG A1  
PRIORITY OVERNIGHT

XX CHSA

29407  
SC-US CHS

Part # 156148-434 R1T2 10/11



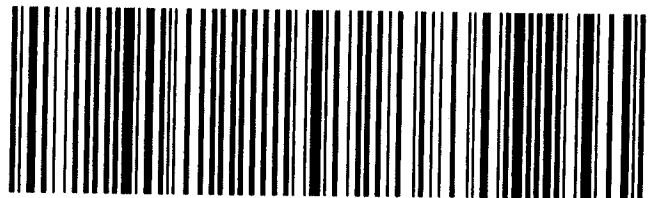
TRK# 7209 7856 9157  
0201

TUE - 21 AUG A1  
PRIORITY OVERNIGHT

XX CHSA

29407  
SC-US CHS

Part # 156148-434 R1T2 10/11



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

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 20AUG12  
ACTWGT: 3.0 LB MAN  
CAD: 0014176/CAFE2511

BILL SENDER

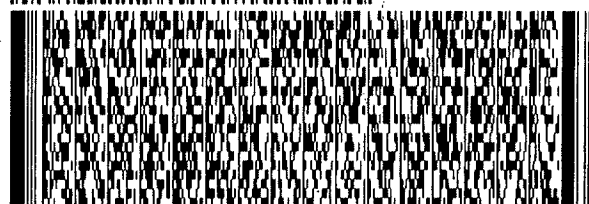
TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171  
REF: MROA00EA5BDO

3

111131106060125



FedEx  
Express



J11131106060125

TRK# 7209 7856 9179  
0201

TUE - 21 AUG A1  
PRIORITY OVERNIGHT

XX CHSA

29407  
SC-US CHS

58DC1/A278/18BC

# **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.



# **Perchlorates by LCMSMS Analysis**

# Case Narrative

**Perchlorate by LC/MSMS  
ARS International (ARSL)  
SDG 12-1509**

**Method/Analysis Information**

<b>Procedure:</b>	<b>Definitive Low Level Perchlorate Analysis Utilizing Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS) by EPA Method 6850 Modified (6850M)</b>
Analytical Method:	SW846 6850 Modified
Prep Method:	SW846 6850 Modified
Analytical Batch Number:	1241188
Prep Batch Number:	1241187

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
309910002	CAMO-12-21742
1202726856	Interference Check Sample (ICS)
1202726852	Method Blank (MB)
1202726853	Laboratory Control Sample (LCS)
1202726854	310180007(CASA-12-21773) Matrix Spike (MS)
1202726855	310180007(CASA-12-21773) 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# 9.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

Due to software constraints, all Initial Calibration Blanks must be designated as IPB001.

**ICV Requirements**

All associated initial calibration verification standards (ICV) met the acceptance criteria.

**CCB Requirements**

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

**CCV Requirements**

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

**Low Level Standard (CRI) Requirements**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Interference Check Sample (ICS)**

The interference check sample (ICS) met all recovery acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**QC Sample Designation**

Client sample 310180007 (CASA-12-21773) from SDG 12-1513 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**

High recoveries for Perchlorate and Perchlorate-101 were observed in MSD (1202726855). The recoveries were 179% and 168%, respectively. The acceptance range is 75-125%. The high recoveries may be the result of the background concentration present in the parent sample, 310180007 (CASA-12-21773). Recoveries in the LCS (1202726853) were acceptable. Data are reported with the appropriate DER.

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

The RPD(s) 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**

Sample309910002 (CAMO-12-21742) was diluted to bring the over range concentration within the calibration range.

Parmname **309910**  
**002**

All 100X

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

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

## **Miscellaneous Information**

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

Data Exception Report 1116450 was generated for this SDG.

High recoveries for Perchlorate and Perchlorate-101 were observed in MSD (1202726855). The recoveries were 179% and 168%, respectively. The acceptance range is 75-125%. The high recoveries may be the result of the background concentration present in the parent sample, 310180007 (CASA-12-21773). Recoveries in the LCS (1202726853) were acceptable.

### **Manual Integrations**

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

### **Method Comments**

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

### **Additional Comments**

The Perchlorate Isotope Ratio on the Form I may differ slightly from the ratio on the corresponding raw data due to rounding rules and/or significant figures or due to software limitations when there are manual integrations, dilutions or other factors. The ratio value of the Form I is the correct value.

The retention time marker, Perchlorate-O (18), is added to all samples, instrument blanks, and standards prior to injection. It is used to verify the retention time of Perchlorate and Perchlorate-101 and to insure an accurate injection occurred.

Due to various anions affecting the recovery of Perchlorate-O (18) and not Perchlorate and Perchlorate-101, the calibration curves of Perchlorate and Perchlorate-101 are not internally corrected for using Perchlorate-O (18). They are external calibrations.

**Perchlorate Isotope Ratio**

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

**System Configuration**

The laboratory utilizes a Waters LC 2795 liquid chromatography instrument for Perchlorate analysis. It is coupled with either a Micromass Quattro Micro Mass Spectrometer/ Mass Spectrometer, or a Micromass Quattro Ultima Mass Spectrometer/ Mass Spectrometer. Each being designated as LCMSMS #1 and LCMSMS #2, respectively. It is fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis.

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

**Electronic Packaging Comment**

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

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

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

**Chromatographic Columns**

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

Dionex: IonPac AG-16 2 x 50 mm.

**Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

ARSL001 ARS International (63641-10)

Client SDG: 12-1509 GEL Work Order: 309910

#### 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: 07 SEP 2012

Title: Group Leader

# **Sample Data Summary**



## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1241187Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-12-21742Date Received: 21-AUG-12GEL Job No (SDG): 12-1509GEL Sample ID: 309910002Date Filtered: 30-AUG-12Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	5	20	60.6	ug/L		100	31-AUG-12 12:50	per0831012a
	Perchlorate Isotope Ratio			3.31			100	31-AUG-12 12:50	per0831012a
14797-73-0	Perchlorate-101	5	20	60.0	ug/L		100	31-AUG-12 12:50	per0831012a
	Perchlorate-O(18)			48.2	ug/L		100	31-AUG-12 12:50	per0831012a

^ 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):** 12-1509

**Extract Batch Code:** 1241187

**Date Filtered:** 30-AUG-12

**Matrix:** WATER

**Sample ID:** 1202726853

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.207	ug/L	104		85 - 115
Perchlorate Isotope Ratio		3.31				-
Perchlorate-101	0.200	.205	ug/L	103		85 - 115
Perchlorate-O(18)		.507	ug/L			-

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

### Perchlorate Spike/Spike Duplicate Summary

**Lab Name:** General Engineering Laboratories

**Lab Code:** GEL

**GEL Job No (SDG):** 12-1509

**Extract Batch Code:** 1241187

**Date Extracted:** 30-AUG-12

**GEL MS/PS ID:** 1202726854

**Client ID:** CASA-12-21773

**GEL MSD/PSD ID:** 1202726855

**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	0.531	ug/L	0.723	95.8	.888	179 *	20.6	30	75 - 125
Perchlorate Isotope Ratio	0	3.27		3.32		3.36		1.06		-
Perchlorate-101	0.200	0.532	ug/L	0.713	90.6	.867	168 *	19.5	30	75 - 125
Perchlorate-O(18)	0	0.526	ug/L	0.528		.532		.903		-

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

# Quality Control Data

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1241187Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 30-AUG-12GEL Job No (SDG): 12-1509GEL Sample ID: 1202726852Date Filtered: 30-AUG-12Injection 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	0.050	ug/L	U	1	30-AUG-12 16:54	per0830012a
	Perchlorate Isotope Ratio						1	30-AUG-12 16:54	per0830012a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	30-AUG-12 16:54	per0830012a
	Perchlorate-O(18)			0.482	ug/L		1	30-AUG-12 16:54	per0830012a

^ 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: 1241187Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 30-AUG-12GEL Job No (SDG): 12-1509GEL Sample ID: 1202726853Date Filtered: 30-AUG-12Injection 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	0.207	ug/L		1	30-AUG-12 17:02	per0830013a
	Perchlorate Isotope Ratio			3.31			1	30-AUG-12 17:02	per0830013a
14797-73-0	Perchlorate-101	.05	.2	0.205	ug/L		1	30-AUG-12 17:02	per0830013a
	Perchlorate-O(18)			0.507	ug/L		1	30-AUG-12 17:02	per0830013a

^ 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: 1241187Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 12-1509GEL Sample ID: 1202726856Date Filtered: 30-AUG-12Injection 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	0.236	ug/L		1	30-AUG-12 17:09	per0830014a
	Perchlorate Isotope Ratio			3.31			1	30-AUG-12 17:09	per0830014a
14797-73-0	Perchlorate-101	.05	.2	0.234	ug/L		1	30-AUG-12 17:09	per0830014a
	Perchlorate-O(18)			0.553	ug/L		1	30-AUG-12 17:09	per0830014a

^ 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: 1241187Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-12-21773MSDate Received: 24-AUG-12GEL Job No (SDG): 12-1509GEL Sample ID: 1202726854Date Filtered: 30-AUG-12Injection 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	0.723	ug/L		1	30-AUG-12 18:40	per0830026a
	Perchlorate Isotope Ratio			3.32			1	30-AUG-12 18:40	per0830026a
14797-73-0	Perchlorate-101	.05	.2	0.713	ug/L		1	30-AUG-12 18:40	per0830026a
	Perchlorate-O(18)			0.528	ug/L		1	30-AUG-12 18:40	per0830026a

^ 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: 1241187Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-12-21773MSDDate Received: 24-AUG-12GEL Job No (SDG): 12-1509GEL Sample ID: 1202726855Date Filtered: 30-AUG-12Injection 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	0.888	ug/L		1	30-AUG-12 18:47	per0830027a
	Perchlorate Isotope Ratio			3.36			1	30-AUG-12 18:47	per0830027a
14797-73-0	Perchlorate-101	.05	.2	0.867	ug/L		1	30-AUG-12 18:47	per0830027a
	Perchlorate-O(18)			0.532	ug/L		1	30-AUG-12 18:47	per0830027a

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

\*Concentration =

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

# Miscellaneous

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 31-AUG-12	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LC-MS/MS	<b>Test / Method:</b> SW846 6850 Modified	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1241188	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 309910(12-1509),309911(12-1508),309996(12-1510),310070(12-1511),310180(12-1513),310243(12-1515) <b>Application Issues:</b> Failed Recovery for MSD/PSD			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. High recoveries for Perchlorate and Perchlorate-101 were observed in MSD (1202726855). The recoveries were 179% and 168%, respectively. The acceptance range is 75-125%.		1. The high recoveries may be the result of the background concentration present in the parent sample, 310180007 (CASA-12-21773). Recoveries in the LCS (1202726853)were acceptable. The data are reported with the appropriate DER.	

**Originator's Name:**  
Charles Wilson      05-SEP-12

**Data Validator/Group Leader:**  
Michael Penny      05-SEP-12

# Metals Analysis

# Case Narrative

**Metals Fractional Narrative  
ARS International (ARSL)  
SDG 12-1509**

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
309910002	CAMO-12-21742
1202724300	Method Blank (MB) <b>ICP</b>
1202724301	Laboratory Control Sample (LCS)
1202724304	309872001(Bay-39L) Serial Dilution (SD)
1202724302	309872001(Bay-39D) Sample Duplicate (DUP)
1202724303	309872001(Bay-39S) Matrix Spike (MS)
1202724292	Method Blank (MB) <b>ICP-MS</b>
1202724293	Laboratory Control Sample (LCS)
1202724296	309872001(Bay-39L) Serial Dilution (SD)
1202724294	309872001(Bay-39D) Sample Duplicate (DUP)
1202724295	309872001(Bay-39S) Matrix Spike (MS)
1202733106	Method Blank (MB) <b>CVAA</b>
1202733107	Laboratory Control Sample (LCS)
1202733112	309910002(CAMO-12-21742L) Serial Dilution (SD)
1202733108	309910002(CAMO-12-21742D) Sample Duplicate (DUP)
1202733109	309910002(CAMO-12-21742S) Matrix Spike (MS)

**Method/Analysis Information**

<b>Analytical Batch:</b>	1240142, 1240139, 1243838 and 1244727
<b>Prep Batch :</b>	1240141, 1240137 and 1243833
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 21, GL-MA-E-006 REV# 9, GL-MA-E-014 REV# 24, GL-MA-E-010 REV# 25 and GL-GC-E-107 REV# 7
<b>Analytical Method:</b>	SW846 3005/6010B, SW846 3005/6020 DOE-AL, 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 PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

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

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

### **Calibration Information**

#### **Instrument Calibration**

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

#### **CRDL Requirements**

All CRDL standard(s) met the referenced advisory control limits with the exception of potassium that recovered outside of the advisory control limits.

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

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

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

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



criteria.

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

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

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

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

The MBs analyzed with this SDG met the acceptance criteria.

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

The LCS spike recoveries met the acceptance limits.

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

The following samples were selected as the quality control (QC) samples for this SDG: 309872001 (Bay-39)-ICP and ICP-MS and 309910002 (CAMO-12-21742)-CVAA.

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

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

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

The relative percent difference (RPD) obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the contract required detection limit (RL), a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements with the exception of iron.

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

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

### **Technical Information**

#### **Holding Time Specifications**

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

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

All procedures were performed as stated in the SOP.

**Sample Dilutions**

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

**Preparation Information**

The samples in this SDG were prepared exactly according to the cited SOP.

**Miscellaneous Information****Electronic Packaging Comment**

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

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

**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: DER ID 1118029. A copy is included in the Miscellaneous Data section of this package.

**Additional Comments**

Additional comments were not required for this SDG.

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

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

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

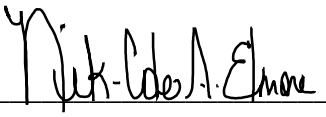
### **Certification Statement**

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

### **Review Validation:**

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

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

Reviewer:  Date: 09.12.12

# **Sample Data Summary**

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

ARSL001 ARS International (63641-10)

Client SDG: 12-1509 GEL Work Order: 309910

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

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

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

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

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

Reviewed by

 09.12.12

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

SDG No: 12-1509

METHOD TYPE: EPA

SAMPLE ID: 309910002

CLIENT ID: CAMO-12-21742

CONTRACT: ESHL00210

MATRIX:W

DATE RECEIVED 21-AUG-12

LEVEL: Low %SOLIDS:

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7439-97-6	Mercury	0.067	ug/L	U		AV	0.067	1	MER536	090712W1-5
7429-90-5	Aluminum	68	ug/L	U		P	68	1	OPTIMA5	090512B-1
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS5	120907-2
7440-38-2	Arsenic	1.7	ug/L	U		MS	1.7	1	ICPMS5	120907-2
7440-39-3	Barium	44.8	ug/L			P	1	1	OPTIMA5	090512B-1
7440-41-7	Beryllium	1	ug/L	U		P	1	1	OPTIMA5	090512B-1
7440-42-8	Boron	50.8	ug/L			P	15	1	OPTIMA5	090512B-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS5	120907-2
7440-70-2	Calcium	67000	ug/L			P	50	1	OPTIMA5	090512B-1
7440-47-3	Chromium	64.6	ug/L			MS	2	1	ICPMS5	120907-2
7440-48-4	Cobalt	1	ug/L	U		P	1	1	OPTIMA5	090512B-1
7440-50-8	Copper	5.52	ug/L	J		P	3	1	OPTIMA5	090512B-1
7439-89-6	Iron	30	ug/L	U		P	30	1	OPTIMA5	090512B-1
7439-92-1	Lead	0.5	ug/L	U		MS	0.5	1	ICPMS5	120911-4
7439-95-4	Magnesium	13500	ug/L			P	110	1	OPTIMA5	090512B-1
7439-96-5	Manganese	3.59	ug/L	J		P	2	1	OPTIMA5	090512B-1
7439-98-7	Molybdenum	1.44	ug/L			MS	0.165	1	ICPMS5	120907-2
7440-02-0	Nickel	40.1	ug/L			MS	0.5	1	ICPMS5	120910-3
7440-09-7	Potassium	882	ug/L			P	50	1	OPTIMA5	090512B-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS5	120907-2
7631-86-9	Silica	64900	ug/L			P	53	1	OPTIMA5	090512B-1
7440-22-4	Silver	0.2	ug/L	U		MS	0.2	1	ICPMS5	120907-2
7440-23-5	Sodium	27400	ug/L			P	100	1	OPTIMA5	090512B-1
7440-24-6	Strontium	322	ug/L			P	1	1	OPTIMA5	090512B-1
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS5	120907-2
7440-31-5	Tin	12.5	ug/L	U		P	12.5	5	OPTIMA5	090512B-1

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

**SDG No:** 12-1509**METHOD TYPE:** EPA**SAMPLE ID:** 309910002**CLIENT ID:** CAMO-12-21742**CONTRACT:** ESHL00210**MATRIX:**W**DATE RECEIVED** 21-AUG-12**LEVEL:** Low **%SOLIDS:**

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<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	1.31	ug/L			MS	0.067	1	ICPMS5	120907-2
7440-62-2	Vanadium	1.53	ug/L	J		P	1	1	OPTIMA5	090512B-1
7440-66-6	Zinc	30.2	ug/L			P	3.3	1	OPTIMA5	090512B-1
	Hardness as CaCO3	223	mg/L				0.453	1	CALC001	

**\*Analytical Methods:**

**MS** SW846 3005/6020 DOE-AL  
**P** SW846 3005/6010B  
**AV** EPA 245.1/245.2  
SM 2340 B

# **Quality Control Summary**



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

**SDG NO.** 12-1509  
**Contract:** ESHL00210  
**Matrix:** W

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Acceptance Window</u>	<u>Conc Qual</u>	<u>M*</u>	<u>MDL</u>	<u>RDL</u>
1202724292	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	1.7	ug/L	+/-5	U	MS	1.7	5
	Cadmium	0.11	ug/L	+/-1	U	MS	0.11	1
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Silver	0.2	ug/L	+/-1	U	MS	0.2	1
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
	Thallium	0.45	ug/L	+/-2	U	MS	0.45	2
	Selenium	1.5	ug/L	+/-5	U	MS	1.5	5
	Molybdenum	0.165	ug/L	+/-0.5	U	MS	0.165	0.5
	Chromium	2	ug/L	+/-10	U	MS	2	10
1202724300	Aluminum	68	ug/L	+/-200	U	P	68	200
	Boron	15	ug/L	+/-50	U	P	15	50
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Iron	30	ug/L	+/-100	U	P	30	100
	Manganese	2	ug/L	+/-10	U	P	2	10
	Silica	53	ug/L	+/-213	U	P	53	213
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Strontium	1	ug/L	+/-5	U	P	1	5
	Sodium	100	ug/L	+/-300	U	P	100	300
	Potassium	-153	ug/L	+/-150		P	50	150
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Copper	3	ug/L	+/-10	U	P	3	10
	Calcium	50	ug/L	+/-200	U	P	50	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Barium	1	ug/L	+/-5	U	P	1	5
1202733106	Mercury	-0.085	ug/L	+/-0.2	J	AV	0.067	0.2

**\*Analytical Methods:**

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

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 12-1509

Client ID: Bay-39S

Contract: LANL00110

Level: Low

Matrix: WATER

% Solids:

Sample ID: 309872001

Spike ID: 1202724295

<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	202		1.8	J	200	100		MS
Arsenic	ug/L	75-125	83		1.7	U	80	102		MS
Cadmium	ug/L		122		110		10	120	N/A	MS
Chromium	ug/L	75-125	74.6		24.5		50	100		MS
Lead	ug/L	75-125	116		77.5		40	97.3		MS
Molybdenum	ug/L	75-125	51.7		0.165	U	50	103		MS
Nickel	ug/L	75-125	61		6.84		50	108		MS
Selenium	ug/L	75-125	25.4		6.1		20	96.6		MS
Silver	ug/L	75-125	52.7		0.2	U	50	105		MS
Thallium	ug/L	75-125	102		0.45	U	100	102		MS
Uranium	ug/L	75-125	51.6		0.071	J	50	103		MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 12-1509

Client ID: Bay-39S

Contract: LANL00110

Level: Low

Matrix: WATER

% Solids:

Sample ID: 309872001

Spike ID: 1202724303

<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	5150		68	U	5000	102		P
Barium	ug/L	75-125	755		258		500	99.4		P
Beryllium	ug/L	75-125	488		1	U	500	97.6		P
Boron	ug/L	75-125	660		157		500	101		P
Calcium	ug/L	75-125	8530		3630		5000	98		P
Cobalt	ug/L	75-125	511		1.86	J	500	102		P
Copper	ug/L	75-125	513		4.85	J	500	102		P
Iron	ug/L	75-125	5300		762		5000	90.8		P
Magnesium	ug/L	75-125	6350		1540		5000	96.2		P
Manganese	ug/L	75-125	586		103		500	96.7		P
Potassium	ug/L	75-125	6580		1440		5000	103		P
Silica	ug/L	75-125	11600		1960		10700	90.1		P
Sodium	ug/L	75-125	5620		513		5000	102		P
Strontium	ug/L	75-125	527		19.3		500	102		P
Tin	ug/L	75-125	494		2.5	U	500	98.8		P
Vanadium	ug/L	75-125	505		1	U	500	101		P
Zinc	ug/L	75-125	916		447		500	93.6		P

\*Analytical Methods:

P SW846 3005/6010B

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 12-1509

Client ID: CAMO-12-21742S

Contract: ESHL00210

Level: Low

Matrix: WATER

% Solids:

Sample ID: 309910002

Spike ID: 1202733109

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<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	2.01		0.067	U	2	100		AV

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## \*Analytical Methods:

AV EPA 245.1/245.2

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

SDG No.: 12-1509

Lab Code: GEL

Contract: ESHL00210

Client ID: Bay-39D

Matrix: LIQUID

Level: Low

Sample ID: 309872001

Duplicate ID: 1202724294

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L	+/-3	1.8 J		1.6 J		12		MS
Arsenic	ug/L		1.7 U		1.7 U				MS
Cadmium	ug/L	+/-20%	110		103		6.99		MS
Chromium	ug/L	+/-10	24.5		23.1		5.95		MS
Lead	ug/L	+/-20%	77.5		74.3		4.26		MS
Molybdenum	ug/L		0.165 U		0.165 U				MS
Nickel	ug/L	+/-2	6.84		6.24		9.15		MS
Selenium	ug/L	+/-5	6.1		5.64		7.72		MS
Silver	ug/L		0.2 U		0.2 U				MS
Thallium	ug/L		0.45 U		0.45 U				MS
Uranium	ug/L		0.071 J		0.067 U		200		MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

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

SDG No.: 12-1509

Lab Code: GEL

Contract: ESHL00210

Client ID: Bay-39D

Matrix: LIQUID

Level: Low

Sample ID: 309872001

Duplicate ID: 1202724302

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%	258		265		2.84		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	157		161		2.42		P
Calcium	ug/L	+/-20%	3630		3720		2.42		P
Cobalt	ug/L	+/-5	1.86 J		1.65 J		12.1		P
Copper	ug/L	+/-10	4.85 J		4.79 J		1.22		P
Iron	ug/L	+/-20%	762		582		26.8	*	P
Magnesium	ug/L	+/-20%	1540		1560		1.58		P
Manganese	ug/L	+/-20%	103		105		1.96		P
Potassium	ug/L	+/-20%	1440		1550		7.26		P
Silica	ug/L	+/-20%	1960		1940		.961		P
Sodium	ug/L	+/-300	513		535		4.15		P
Strontium	ug/L	+/-5	19.3		19.7		1.75		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L		1 U		1 U				P
Zinc	ug/L	+/-20%	447		457		2.12		P

\*Analytical Methods:

P SW846 3005/6010B

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

**SDG No.:** 12-1509**Lab Code:** GEL**Contract:** ESHL00210**Client ID:** CAMO-12-21742D**Matrix:** LIQUID**Level:** Low**Sample ID:** 309910002**Duplicate ID:** 1202733108**Percent Solids for Dup:** N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Mercury	ug/L		0.067	U	0.067	U			AV

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**\*Analytical Methods:**

AV EPA 245.1/245.2

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 12-1509

Contract: ESHL00210

Aqueous LCS Source: O2si

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1202724293								
	Antimony	ug/L	50	49.6		99.2	80-120	MS
	Arsenic	ug/L	50	50.9		102	80-120	MS
	Cadmium	ug/L	50	50.2		100	80-120	MS
	Chromium	ug/L	50	53.7		107	80-120	MS
	Lead	ug/L	50	52.1		104	80-120	MS
	Molybdenum	ug/L	50	48.8		97.7	80-120	MS
	Nickel	ug/L	50	54.3		109	80-120	MS
	Selenium	ug/L	50	50.2		100	80-120	MS
	Silver	ug/L	50	52		104	80-120	MS
	Thallium	ug/L	50	51.1		102	80-120	MS
	Uranium	ug/L	50	52		104	80-120	MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL



## METALS

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## Laboratory Control Sample Summary

SDG NO. 12-1509

Contract: ESHL00210

Aqueous LCS Source:OS2I

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1202724301								
	Aluminum	ug/L	5000	5290		106	80-120	P
	Barium	ug/L	500	520		104	80-120	P
	Beryllium	ug/L	500	515		103	80-120	P
	Boron	ug/L	500	531		106	80-120	P
	Calcium	ug/L	5000	5090		102	80-120	P
	Cobalt	ug/L	500	528		106	80-120	P
	Copper	ug/L	500	526		105	80-120	P
	Iron	ug/L	5000	5010		100	80-120	P
	Magnesium	ug/L	5000	5070		101	80-120	P
	Manganese	ug/L	500	512		102	80-120	P
	Potassium	ug/L	5000	5300		106	80-120	P
	Silica	ug/L	10700	10200		95.6	80-120	P
	Sodium	ug/L	5000	5350		107	80-120	P
	Strontium	ug/L	500	531		106	80-120	P
	Tin	ug/L	500	521		104	80-120	P
	Vanadium	ug/L	500	528		106	80-120	P
	Zinc	ug/L	500	513		103	80-120	P

## \*Analytical Methods:

P SW846 3005/6010B

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 12-1509

Contract: ESHL00210

Aqueous LCS Source: GEL

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1202733107	Mercury	ug/L	2	2.07		103	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Serial Dilution Sample Summary

SDG NO. 12-1509

Client ID: Bay-39L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 309872001

Serial Dilution ID: 1202724296

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1.8	J	5	U	100			MS
Arsenic	1.7	U	8.5	U				MS
Cadmium	110		106		3.43		10	MS
Chromium	24.5		26.3	J	7			MS
Lead	77.5		76.3		1.6		10	MS
Molybdenum	.165	U	.825	U				MS
Nickel	6.84		6.34	J	7.33			MS
Selenium	6.1		7.5	U	100			MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.25	U				MS
Uranium	.071	J	.335	U	100			MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

## METALS

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## Serial Dilution Sample Summary

SDG NO. 12-1509

Client ID: Bay-39L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 309872001

Serial Dilution ID: 1202724304

<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	258		264		2.3		10	P
Beryllium	1	U	5	U				P
Boron	157		168	J	6.54			P
Calcium	3630		3740		3.16		10	P
Cobalt	1.86	J	5	U	100			P
Copper	4.85	J	15	U	100			P
Iron	762		566		25.8			P
Magnesium	1540		1650		7.38			P
Manganese	103		105		2.78		10	P
Potassium	1440		932		35.4			P
Silica	1960		1890		3.25			P
Sodium	513		500	U	100			P
Strontium	19.3		19	J	1.65			P
Tin	2.5	U	12.5	U				P
Vanadium	1	U	5	U				P
Zinc	447		464		3.72		10	P

## \*Analytical Methods:

P SW846 3005/6010B

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 12-1509 **Client ID:** CAMO-12-21742L**Contract:** ESHL00210**Matrix:** LIQUID **Level:** Low**Sample ID:** 309910002 **Serial Dilution ID:** 1202733112

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

## \*Analytical Methods:

AV EPA 245.1/245.2

# Miscellaneous

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 06-SEP-12	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ICP	<b>Test / Method:</b> SW846 3005/6010B	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL, LANL
<b>Batch ID:</b> 1240142	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 309872,309910(12-1509),309911(12-1508)</b> <b>Application Issues:</b> Failed RPD for DUP			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>  1. Failed RPD for DUP: QC   1202724302DUP		1. The sample and sample duplicate % RPD failed outside the control limits for iron due to possible sample non-homogeneity and/or matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.	

**Originator's Name:**  
Jerry Wigfall           06-SEP-12

**Data Validator/Group Leader:**  
Jamie Johnson       07-SEP-12

# **General Chem Analysis**



# Case Narrative

**General Chemistry Narrative  
ARS International (ARSL)  
SDG 12-1509**

**Method/Analysis Information**

**Product:** Carbon, Total Organic

**Analytical Batch:** 1241231

**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>
309910001	CAMO-12-21734
1202726977	Method Blank (MB)
1202726978	309911001(CASA-12-21643) Sample Duplicate (DUP)
1202726979	310243006(CAMO-12-21779) Sample Duplicate (DUP)
1202726980	309911001(CASA-12-21643) Post Spike (PS)
1202726981	310243006(CAMO-12-21779) Post Spike (PS)
1202726982	Laboratory Control Sample (LCS)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-093 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 Carbon analysis was performed on a O-I Analytical Model 1010 Total Organic Carbon Analyzer.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following samples were selected for QC analysis: 309911001 (CASA-12-21643) and 310243006 (CAMO-12-21779).

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The following samples were re-analyzed due to instrument failure: 1202726979 (CAMO-12-21779) and 1202726981 (CAMO-12-21779).

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

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

**Additional Comments**

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

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

**Product:** Specific Conductivity

**Analytical Batch:** 1242995

**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>
309910002	CAMO-12-21742
1202731308	309910002(CAMO-12-21742) Sample Duplicate (DUP)
1202731309	Laboratory Control Sample (LCS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-009 REV# 11.

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

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

### **Calibration Information**

The Conductivity analysis was performed on a Orion 160 Conductivity Meter.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

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

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

The LCS spike recovery met the acceptance limits.

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

The following sample was selected for QC analysis: 309910002 (CAMO-12-21742).

**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:** 1241830 **Method:** EPA 150.1 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>
309910002	CAMO-12-21742
1202728424	309907006(WTRO-12-23145) Sample Duplicate (DUP)
1202728425	309910002(CAMO-12-21742) Sample Duplicate (DUP)
1202728426	Laboratory Control Sample (LCS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-008 REV# 21.

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

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

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

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

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

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following samples were selected for QC analysis: 309907006 (WTRO-12-23145) and 309910002 (CAMO-12-21742).

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

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

**Technical Information**

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

**Holding Times**

The following sample from this sample group was received by the lab outside of the method specified holding time: 309910002 (CAMO-12-21742).

**Sample Re-analysis**

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

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

The following DER was generated for this SDG: 1117658 309910002 (CAMO-12-21742).

**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:** 1239846

**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>
309910002	CAMO-12-21742
1202723450	Method Blank (MB)
1202723451	309910002(CAMO-12-21742) Sample Duplicate (DUP)
1202723452	309910002(CAMO-12-21742) Post Spike (PS)
1202723453	Laboratory Control Sample (LCS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 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 Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

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

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 309910002 (CAMO-12-21742).

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The following samples in this sample group were diluted due to high concentration: 1202723451 (CAMO-12-21742), 1202723452 (CAMO-12-21742) and 309910002 (CAMO-12-21742).

**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**

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202723451 (CAMO-12-21742), 1202723452 (CAMO-12-21742) and 309910002 (CAMO-12-21742).

**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:** 1240583      **Method:** EPA 350.1 Nitrogen and Ammonia L

**Prep Batch :** 1240582      **Method:** EEPA 350.2 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>
309910002	CAMO-12-21742
1202725417	Method Blank (MB)
1202725418	309548008(CAMO-12-21796) Sample Duplicate (DUP)
1202725420	309548008(CAMO-12-21796) Matrix Spike (MS)
1202725422	309548008(CAMO-12-21796) Matrix Spike Duplicate (MSD)
1202725424	Laboratory Control Sample (LCS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-106 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+ 8000 Series.

### **Continuing Calibration Blanks**

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

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

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

### **Y Intercept Rule**

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

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

The LCS spike recovery met the acceptance limits.

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

The following sample was selected for QC analysis: 309548008 (CAMO-12-21796).

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

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

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

The MSD recovery for this sample set was within the required acceptance limits.

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

The RPD between the spike and spike duplicate met the acceptance limits.

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

One or more of the values for the sample and/or duplicate are less than 5 times the Practical Quantitation Limit (PQL), and the difference is within one PQL value; therefore, the RPD is not applicable. 1202725418 (CAMO-12-21796).

#### **Technical Information**

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

##### **Holding Times**

All samples in this SDG met the specified holding time.

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

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

##### **Sample Dilutions**

The samples in this SDG did not require dilutions.

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

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

#### **Miscellaneous Information**

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

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

##### **Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1240586	<b>Method:</b>	Nitrogen and Total Kjeldahl (TKN)
<b>Prep Batch :</b>	1240585	<b>Method:</b>	EEPA 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>
309910001	CAMO-12-21734
1202725433	Method Blank (MB)
1202725434	309791001(SWWS46-12-22930) Sample Duplicate (DUP)
1202725435	309791001(SWWS46-12-22930) Matrix Spike (MS)
1202725436	309791001(SWWS46-12-22930) Matrix Spike Duplicate (MSD)
1202725437	Laboratory Control Sample (LCS)
1202730363	309910001(CAMO-12-21734) Sample Duplicate (DUP)
1202730364	309910001(CAMO-12-21734) Matrix Spike (MS)
1202730365	309910001(CAMO-12-21734) Matrix Spike Duplicate (MSD)

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# 12.

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

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

### **Calibration Information**

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

### **Continuing Calibration Blanks**

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

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

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

acceptance limits.

**Y Intercept Rule**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following samples were selected for QC analysis: 309791001 (SWWS46-12-22930) and 309910001 (CAMO-12-21734).

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

The spike recovery falls outside of the established acceptance limits. Since both the spike duplicate recovery and the RPD between the spike and spike duplicate fall within acceptance limits, the data is reported. 1202730364 (CAMO-12-21734).

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

The MSD recoveries for this sample set were within the required acceptance limits.

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

The RPDs between the spike and spike duplicate met the acceptance limits.

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

The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1202730363 (CAMO-12-21734).

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**



**Data Exception (DER) Documentation**

The following DER was generated for this SDG: 1117440 1202730364 (CAMO-12-21734).

**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:** 1240584

**Method:** EPA 353.2 Nitrogen and Nitrate/Nitrite

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
309910002	CAMO-12-21742
1202725425	Method Blank (MB)
1202725426	309548008(CAMO-12-21796) Sample Duplicate (DUP)
1202725429	309548008(CAMO-12-21796) Post Spike (PS)
1202725432	Laboratory Control Sample (LCS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 7.

### **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**

The following sample was selected for QC analysis: 309548008 (CAMO-12-21796).

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

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

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

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

#### **Technical Information**

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

##### **Holding Times**

All samples in this SDG met the specified holding time.

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

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

##### **Sample Dilutions**

The following sample in this sample group was diluted due to high concentration: 309910002 (CAMO-12-21742).

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

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

#### **Miscellaneous Information**

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

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents.

##### **Additional Comments**

Additional comments were not required for this SDG.

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

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

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1240581	<b>Method:</b>	EPA 365.4 Phosphorus and Total in
<b>Prep Batch :</b>	1240580	<b>Method:</b>	EEPA 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>
309910002	CAMO-12-21742
1202725412	Method Blank (MB)
1202725413	309454002(CAMO-12-21743) Sample Duplicate (DUP)
1202725414	309454002(CAMO-12-21743) Matrix Spike (MS)
1202725415	309454002(CAMO-12-21743) Matrix Spike Duplicate (MSD)
1202725416	Laboratory Control Sample (LCS)
1202730366	309454004(CAMO-12-21744) Sample Duplicate (DUP)
1202730367	309454004(CAMO-12-21744) Matrix Spike (MS)
1202730368	309454004(CAMO-12-21744) Matrix Spike Duplicate (MSD)

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# 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+ 8000 Series.

### **Continuing Calibration Blanks**

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

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

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

acceptance limits.

**Y Intercept Rule**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following samples were selected for QC analysis: 309454002 (CAMO-12-21743) and 309454004 (CAMO-12-21744).

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

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

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

The MSD recoveries for this sample set were within the required acceptance limits.

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

The RPDs between the spike and spike duplicate met the acceptance limits.

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

One or more of the values for the sample and/or duplicate are less than 5 times the Practical Quantitation Limit (PQL), and the difference is within one PQL value; therefore, the RPD is not applicable. 1202730366 (CAMO-12-21744).

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced

SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

**Product:** Solids, Total Dissolved

**Analytical Batch:** 1240523

**Method:** EPA 160.1 Solids and Dissolved-F

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
309910002	CAMO-12-21742
1202725254	Method Blank (MB)
1202725255	309910002(CAMO-12-21742) Sample Duplicate (DUP)
1202725256	Laboratory Control Sample (LCS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-001 REV# 12.

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

The LCS spike recovery met the acceptance limits.

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



The following sample was selected for QC analysis: 309910002 (CAMO-12-21742).

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

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: 1202725255 (CAMO-12-21742).

**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 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**

The following DER was generated for this SDG: 1115749 1202725255 (CAMO-12-21742).

**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:** 1242061      **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>
309910002	CAMO-12-21742
1202729069	Laboratory Control Sample (LCS)
1202729070	309996002(CASA-12-21775) Sample Duplicate (DUP)
1202729071	309996002(CASA-12-21775) Matrix Spike (MS)
1202729076	309907004(WTRO-12-23137) Sample Duplicate (DUP)
1202729077	309907004(WTRO-12-23137) 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# 10.

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

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

### **Calibration Information**

The Titration analysis was performed on a Manually operated buret.

### **Initial Standardization**

The titrant was properly standardized

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

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

The LCS spike recovery met the acceptance limits.

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

The following samples were selected for QC analysis: 309907004 (WTRO-12-23137) and 309996002

(CASA-12-21775).

**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 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**

Less volume was used because limited sample was provided by the client. 1202729076 (WTRO-12-23137) and 1202729077 (WTRO-12-23137).

**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**

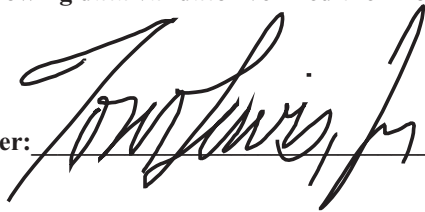
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

**Review Validation:**

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

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

Reviewer:



Date:

17Sep12

# Sample Data Summary

## GEL LABORATORIES LLC

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

### Certificate of Analysis Report for

ARSL001 ARS International (63641-10)

Client SDG: 12-1509 GEL Work Order: 309910

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

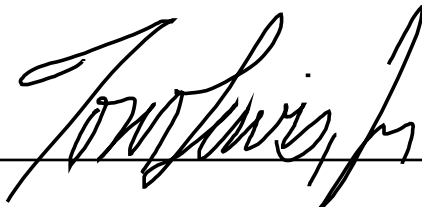
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

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

Reviewed by

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

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: September 17, 2012

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

Client SDG: 12-1509

Client Sample ID: CAMO-12-21734  
Sample ID: 309910001  
Matrix: W  
Collect Date: 17-AUG-12 11:41  
Receive Date: 21-AUG-12  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average		1.29	0.330	1.00	mg/L	1	TSM	08/29/12	1239	1241231	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl	J	0.0945	0.035	0.100	mg/L	1	KLP1	09/05/12	1432	1240586	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	09/04/12	1700	1240585

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 351.2	

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: September 17, 2012

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

Contact: Keith Greene  
Project: LANL-WQH Water Samples

Client SDG: 12-1509

Client Sample ID: CAMO-12-21742  
Sample ID: 309910002  
Matrix: W  
Collect Date: 17-AUG-12 11:41  
Receive Date: 21-AUG-12  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Conductivity Analysis											
EPA120.1 Specific Conductivity "As Received"											
Conductivity		600	1.00	1.00	umhos/cm	1	TXT1	09/04/12	1533	1242995	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 19.3C	H	7.33	0.010	0.100	SU	1	LXA1	08/29/12	1431	1241830	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide		0.633	0.067	0.200	mg/L	1	MAR1	09/05/12	1613	1239846	3
Fluoride		0.503	0.033	0.100	mg/L	1					
Chloride		54.8	0.670	2.00	mg/L	10	MAR1	09/06/12	1102	1239846	4
Sulfate		60.6	1.33	4.00	mg/L	10					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia	J	0.0265	0.017	0.050	mg/L	1	KLP1	08/27/12	1521	1240583	5
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		7.96	0.170	0.500	mg/L	10	KLP1	08/31/12	1026	1240584	6
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P		0.0859	0.017	0.050	mg/L	1	KLP1	09/05/12	1103	1240581	7
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		419	3.40	14.3	mg/L		LYG1	08/23/12	0948	1240523	8
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		97.0	0.725	1.00	mg/L		LXA1	08/29/12	1658	1242061	9
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	08/27/12	1330	1240582
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	09/04/12	1700	1240580



# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: September 17, 2012

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

Contact: Keith Greene  
Project: LANL-WQH Water Samples

Client SDG: 12-1509

Client Sample ID: CAMO-12-21742  
Sample ID: 309910002

Project: ESHL00210  
Client ID: ARSL001

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

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: September 17, 2012

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

Contact: Keith Greene

Workorder: 309910

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1241231										
QC1202726978	309911001	DUP									
Total Organic Carbon Average	J	0.496	J	0.529	mg/L	6.44	^	(+/-1.00)	TSM	08/29/12	13:46
QC1202726979	310243006	DUP									
Total Organic Carbon Average	J	0.605	J	0.610	mg/L	0.823	^	(+/-1.00)		08/30/12	15:39
QC1202726982	LCS										
Total Organic Carbon Average	10.0			10.1	mg/L			101 (85%-115%)		08/29/12	12:31
QC1202726977	MB										
Total Organic Carbon Average			U	ND	mg/L					08/29/12	12:22
QC1202726980	309911001	PS									
Total Organic Carbon Average	10.0	J	0.496	9.97	mg/L			94.7 (65%-120%)		08/29/12	14:06
QC1202726981	310243006	PS									
Total Organic Carbon Average	10.0	J	0.605	8.47	mg/L			78.6 (65%-120%)		08/30/12	15:59
<b>Conductivity Analysis</b>											
Batch	1242995										
QC1202731308	309910002	DUP									
Conductivity		600		601	umhos/cm	0.167		(0%-10%)	TXT1	09/04/12	15:33
QC1202731309	LCS										
Conductivity	1410			1410	umhos/cm			99.7 (95%-105%)		09/04/12	15:29
<b>Electrode Analysis</b>											
Batch	1241830										
QC1202728424	309907006	DUP									
pH		H	6.43	H	6.44	SU	0.155	(0%-10%)	LXA1	08/29/12	14:23
QC1202728425	309910002	DUP									
pH		H	7.33	H	7.39	SU	0.815	(0%-10%)		08/29/12	14:33
QC1202728426	LCS										
pH	7.00			7.01	SU			100 (99%-101%)		08/29/12	14:15
<b>Ion Chromatography</b>											
Batch	1239846										
QC1202723451	309910002	DUP									
Bromide			0.633	0.628	mg/L	0.761	^	(+/-0.200)	MAR1	09/05/12	16:46
Chloride			54.8	54.9	mg/L	0.328		(0%-20%)		09/06/12	11:35
Fluoride			0.503	0.507	mg/L	0.732		(0%-20%)		09/05/12	16:46
Sulfate			60.6	60.3	mg/L	0.531		(0%-20%)		09/06/12	11:35
QC1202723453	LCS										
Bromide	2.50			2.43	mg/L			97.1 (90%-110%)		09/05/12	15:40
Chloride	10.0			9.18	mg/L			91.8 (90%-110%)			
Fluoride	5.00			4.78	mg/L			95.5 (90%-110%)			
Sulfate	20.0			18.2	mg/L			91.2 (90%-110%)			
QC1202723450	MB										
Bromide			U	ND	mg/L					09/05/12	15:07
Chloride			U	ND	mg/L						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1239846										
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L				MAR1	09/05/12	15:07
QC1202723452	309910002	PS									
Bromide	2.50	0.633		2.98	mg/L		94.1	(90%-110%)		09/05/12	17:19
Chloride	10.0	5.48		15.9	mg/L		105	(90%-110%)		09/06/12	12:08
Fluoride	5.00	0.503		5.34	mg/L		96.6	(90%-110%)		09/05/12	17:19
Sulfate	20.0	6.06		25.8	mg/L		98.8	(90%-110%)		09/06/12	12:08
<b>Nutrient Analysis</b>											
Batch	1240581										
QC1202725413	309454002	DUP									
Phosphorus, Total as P	J	0.0443	J	0.0428	mg/L	3.44	^	(+/-0.050)	KLP1	09/05/12	10:51
QC1202730366	309454004	DUP									
Phosphorus, Total as P		0.071	J	0.0419	mg/L	51.6	^	(+/-0.050)		09/05/12	10:55
QC1202725416	LCS										
Phosphorus, Total as P	1.00			1.11	mg/L		111	(84%-122%)		09/05/12	10:50
QC1202725412	MB										
Phosphorus, Total as P			J	0.0454	mg/L					09/05/12	10:49
QC1202725414	309454002	MS									
Phosphorus, Total as P	1.00	J	0.0443	1.07	mg/L		103	(46%-146%)		09/05/12	10:52
QC1202730367	309454004	MS									
Phosphorus, Total as P	1.00		0.071	1.13	mg/L		106	(46%-146%)		09/05/12	10:55
QC1202725415	309454002	MSD									
Phosphorus, Total as P	1.00	J	0.0443	1.10	mg/L	2.76	106	(0%-21%)		09/05/12	10:53
QC1202730368	309454004	MSD									
Phosphorus, Total as P	1.00		0.071	1.11	mg/L	1.79	104	(0%-21%)		09/05/12	10:56
Batch	1240583										
QC1202725418	309548008	DUP									
Nitrogen, Ammonia		0.0846		0.0644	mg/L	27.1	^	(+/-0.050)	KLP1	08/27/12	15:19
QC1202725424	LCS										
Nitrogen, Ammonia	1.00			1.10	mg/L		110	(90%-110%)		08/27/12	15:17
QC1202725417	MB										
Nitrogen, Ammonia			J	0.0359	mg/L					08/27/12	15:16
QC1202725420	309548008	MS									
Nitrogen, Ammonia	1.00		0.0846	1.09	mg/L		101	(90%-110%)		08/27/12	15:20
QC1202725422	309548008	MSD									
Nitrogen, Ammonia	1.00		0.0846	1.05	mg/L	3.74	96.5	(0%-15%)		08/27/12	15:20
Batch	1240584										
QC1202725426	309548008	DUP									
Nitrogen, Nitrate/Nitrite		0.441		0.442	mg/L	0.227		(0%-20%)	KLP1	08/31/12	10:23
QC1202725432	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.02	mg/L		102	(90%-110%)		08/31/12	10:21
QC1202725425	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					08/31/12	10:20
QC1202725429	309548008	PS									
Nitrogen, Nitrate/Nitrite	1.00		0.441	1.44	mg/L		99.9	(90%-110%)		08/31/12	10:25
Batch	1240586										
QC1202725434	309791001	DUP									

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1240586										
Nitrogen, Total Kjeldahl		0.887		0.880	mg/L	0.792		(0%-20%)	KLP1	09/05/12	14:30
QC1202730363 309910001 DUP											
Nitrogen, Total Kjeldahl	J	0.0945	J	0.0605	mg/L	43.9 ^		(+/-0.100)		09/05/12	14:33
QC1202725437 LCS											
Nitrogen, Total Kjeldahl	1.00			0.923	mg/L		92.3	(90%-110%)		09/05/12	14:24
QC1202725433 MB											
Nitrogen, Total Kjeldahl			U	ND	mg/L					09/05/12	14:23
QC1202725435 309791001 MS											
Nitrogen, Total Kjeldahl	1.00	0.887		1.88	mg/L		99.3	(90%-110%)		09/05/12	14:31
QC1202730364 309910001 MS											
Nitrogen, Total Kjeldahl	1.00	J	0.0945	0.951	mg/L		85.7 *	(90%-110%)		09/05/12	14:34
QC1202725436 309791001 MSD											
Nitrogen, Total Kjeldahl	1.00		0.887	1.93	mg/L	2.62	104	(0%-20%)		09/05/12	14:32
QC1202730365 309910001 MSD											
Nitrogen, Total Kjeldahl	1.00	J	0.0945	0.994	mg/L	4.42	90	(0%-20%)		09/05/12	14:35
<b>Solids Analysis</b>											
Batch	1240523										
QC1202725255 309910002 DUP											
Total Dissolved Solids		419		377	mg/L	10.4*		(0%-10%)	LYG1	08/23/12	09:48
QC1202725256 LCS											
Total Dissolved Solids	300			291	mg/L		97.1	(95%-105%)		08/23/12	09:48
QC1202725254 MB											
Total Dissolved Solids			U	ND	mg/L					08/23/12	09:48
<b>Titration Analysis</b>											
Batch	1242061										
QC1202729070 309996002 DUP											
Alkalinity, Total as CaCO3		88.1		88.1	mg/L	0.00		(0%-20%)	LXA1	08/29/12	17:52
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1202729076 309907004 DUP											
Alkalinity, Total as CaCO3		25.2		25.2	mg/L	0.00		(0%-20%)		08/29/12	16:31
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1202729069 LCS											
Alkalinity, Total as CaCO3	50.0			51.4	mg/L		103	(90%-110%)		08/29/12	15:33
QC1202729071 309996002 MS											
Alkalinity, Total as CaCO3	50.0	88.1		140	mg/L		105	(80%-120%)		08/29/12	17:54
QC1202729077 309907004 MS											
Alkalinity, Total as CaCO3	100	25.2		107	mg/L		81.8	(80%-120%)		08/29/12	16:34

Notes:

RER is calculated at the 95% confidence level (2-sigma).

The Qualifiers in this report are defined as follows:

\*\* Analyte is a surrogate compound

< Result is less than value reported

> Result is greater than value reported

A The TIC is a suspected aldol-condensation product

B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
C	Analyte has been confirmed by GC/MS analysis										
D	Results are reported from a diluted aliquot of the sample										
E	General Chemistry--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										
E	Organics--Concentration of the target analyte exceeds the instrument calibration range										
F	Estimated Value										
FB	Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies										
H	Analytical holding time was exceeded										
J	Value is estimated										
M	Matrix Related Failure										
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	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, difference is also <70%										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	QC Samples were not spiked with this compound										
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
d	5-day BOD--The 2:1 depletion requirement was not met for this sample										
h	Preparation or preservation holding time was exceeded										

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

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

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

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

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

# Miscellaneous

DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 30-AUG-12	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> BALANCE	<b>Test / Method:</b> EPA 160.1	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL, FDAN, VVVC
<b>Batch ID:</b> 1240523	<b>Sample Numbers:</b> See below.		
<b>Potentially affected work order(s)(SDG):</b> 309866,309910(12-1509),309911(12-1508),309926,309996(12-1510)			
<b>Application Issues:</b> Failed RPD for DUP			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. Failed RPD for DUP:  QC 1202725255DUP		1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample.	

**Originator's Name:**

Lisa Gregory 30-AUG-12

**Data Validator/Group Leader:**

Julia Hamilton 30-AUG-12



DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 05-SEP-12	<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 351.2	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1240586	<b>Sample Numbers:</b> See below.		
<b>Potentially affected work order(s)(SDG):</b> 309455(12-1482),309791(12-1502),309910(12-1509),309911(12-1508),309996(12-1510),310070(12-1511),310346(12-1519),310348(12-1518) <b>Application Issues:</b> Failed Recovery for MS/PS			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Failed Recovery for MS: QC   1202730364MS		1. The spike recovery falls outside of the established acceptance limits. Since both the spike duplicate recovery and the RPD between the spike and spike duplicate fall within acceptance limits, the data is reported.	

**Originator's Name:**  
Kristen Parson      05-SEP-12

**Data Validator/Group Leader:**  
Julia Hamilton      05-SEP-12

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 06-SEP-12	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ELECTRODE	<b>Test / Method:</b> EPA 150.1	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> CARE, DMAX, ESHL, FDAN
<b>Batch ID:</b> 1241830	<b>Sample Numbers:</b> See below.		
<p><b>Potentially affected work order(s)(SDG):</b> 309907(2012-2212),309908(2012-2210),309910(12-1509),309911(12-1508),309996(12-1510),310070(12-1511),310117,310178(EUI-8995),310180(12-1513),310197(2012-2231),310236</p> <p><b>Application Issues:</b></p> <p>Container scanning event for custody missed</p> <p>Sample received out of holding</p>			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
<p>1. Sample received out of holding:</p> <p>309907 006</p> <p>309908 006,016</p> <p>309910 002</p> <p>309911 002</p> <p>309996 002,005</p> <p>310070 002,005</p> <p>310117 001</p> <p>310178 001</p> <p>310180 003,007,011,015,017</p> <p>310197 006,016,027</p> <p>310236 001</p> <p>2. Container scanning event for custody missed:</p> <p>310178001</p>		<p>1. Samples were received out of holding.</p> <p>2. Sample was not scanned to the analytical batch prior to analysis; however, it was in the analyst's custody at the time of analysis.</p>	

**Originator's Name:**  
Lindsey Jensen 06-SEP-12

**Data Validator/Group Leader:**  
Julia Hamilton 06-SEP-12