

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3855 EVENT NAME: Pajarito (General Surveillance)
 Q3 Watershed Sampling
 SAMPLE ID: CAPA-12-13290 WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		04/27/2012	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):		1323	MEDIA:	WGA	
PRS ID:		ok	SAMPLE TECH CODE:	UA	BP
LOCATION ID: PCAO-8		↓	FIELD PREP:	F	
LOCATION TYPE: MON		↓	FIELD QC TYPE:	REG	
PORT: SINGLE COMPLETION		↓	SAMPLE USAGE:	INV	↓

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

SAMPLE COMMENTS:
 N/A

LOCATION COMMENTS:
 N/A

FIELD PARAMETERS:
 Dissolved Oxygen 6.21 mg/L Oxidation-Reduction Potential 235.8 MV pH 6.37 SU
 Specific Conductance 577 μS/cm Temperature 13.23 deg C Turbidity 6.21 NTU

COLLECTED BY (PRINT) *f. Stocker*

RELINQUISHED BY (Printed Name) <i>Andrew Stocker</i> (Signature) <i>[Signature]</i>	Date/Time 4/27/12 1415	RECEIVED BY <i>L. G. ...</i> (Printed Name) <i>[Signature]</i> (Signature)	Date/Time 4/27/12 2:15
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Data Validation Report

Chain Of Custody No. 12-1253

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
303488	EPA:120.1		1			
303488	EPA:150.1		1			
303488	EPA:160.1		1			
303488	EPA:245.2		1			
303488	EPA:300.0		1			
303488	EPA:310.1		1			
303488	SM:A2340B		1			
303488	SW-846:6010B		1			
303488	SW-846:6020		1			
303488	SW-846:6850		1			

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups
303488	EPA:120.1	1210920	1210920		1						
303488	EPA:150.1	1208900	1208900		1						
303488	EPA:160.1	1209153	1209153		1					1	
303488	EPA:245.2	1208500	1208499		1					1	1
303488	EPA:300.0	1207431	1207431		1					1	
303488	EPA:310.1	1210449	1210449		1					1	1
303488	SM:A2340B	1214284	1214284		1						
303488	SW-846:6010B	1208720	1208719		1					1	1
303488	SW-846:6020	1208718	1208717		1					1	1
303488	SW-846:6850	1208033	1208032		1					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	CAPA-12-13290	1202653384	DUP		1	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-12-13290	303488001	REG		1	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1202653382	LCS		0	0	1
EPA:150.1	GENERAL CHEMISTRY	CAPA-12-13288	1202648411	DUP		1	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-12-13290	303488001	REG		1	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-12-13290	303488001	REG		1	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-12-13345	1202648998	DUP		1	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1202648999	LCS		0	0	1
EPA:160.1	GENERAL CHEMISTRY	MB	1202648997	MB		1	0	0
EPA:245.2	INORGANIC	CAPA-12-13287	1202647539	DUP		1	0	0
EPA:245.2	INORGANIC	CAPA-12-13287	1202647540	MS		0	0	1
EPA:245.2	INORGANIC	CAPA-12-13290	303488001	REG		1	0	0
EPA:245.2	INORGANIC	LCS	1202647538	LCS		0	0	1
EPA:245.2	INORGANIC	MB	1202647537	MB		1	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-12-13287	1202644915	DUP		4	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-12-13290	303488001	REG		4	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1202644917	LCS		0	0	4
EPA:300.0	GENERAL CHEMISTRY	MB	1202644914	MB		4	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-12-13290	303488001	REG		2	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-12-13345	1202652186	DUP		2	0	0

EPA:310.1	GENERAL CHEMISTRY	CAPA-12-13345	1202652190	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202652192	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202652183	MB	3	0	0	0
SM:A2340B	INORGANIC	CAPA-12-13290	303488001	REG	1	0	0	0
SW-846:6010B	INORGANIC	CAPA-12-13290	1202648017	DUP	17	0	0	0
SW-846:6010B	INORGANIC	CAPA-12-13290	1202648018	MS	0	0	17	0
SW-846:6010B	INORGANIC	CAPA-12-13290	303488001	REG	17	0	0	0
SW-846:6010B	INORGANIC	LCS	1202648016	LCS	0	0	17	0
SW-846:6010B	INORGANIC	MB	1202648015	MB	17	0	0	0
SW-846:6020	INORGANIC	CAPA-12-13290	1202648012	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAPA-12-13290	1202648013	MS	0	0	11	0
SW-846:6020	INORGANIC	CAPA-12-13290	303488001	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1202648011	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1202648010	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-12-13287	1202646393	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-12-13287	1202646394	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-12-13290	303488001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1202646392	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1202646391	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

No.

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
CAPA-12-13290	MB	1202647537	METHOD BLANK	EPA:245.2	Mercury	ug/L	-0.094	0.2	U	0.2	N

6. Any surrogate recoveries outside the control limits?

No.

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

No.

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

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

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

None.

13. Display Flagged Data.

No.

Reason Code Description

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

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
Sample ID	ID	Purpose	Method	Records	Records
CAPA-12-13290	PCAO-8	REG	EPA:120.1	0	1
CAPA-12-13290	PCAO-8	REG	EPA:150.1	0	1
CAPA-12-13290	PCAO-8	REG	EPA:160.1	0	1
CAPA-12-13290	PCAO-8	REG	EPA:245.2	0	1
CAPA-12-13290	PCAO-8	REG	EPA:300.0	0	4
CAPA-12-13290	PCAO-8	REG	EPA:310.1	0	2
CAPA-12-13290	PCAO-8	REG	SM:A2340B	0	1
CAPA-12-13290	PCAO-8	REG	SW-846:6010B	0	17
CAPA-12-13290	PCAO-8	REG	SW-846:6020	0	11
CAPA-12-13290	PCAO-8	REG	SW-846:6850	0	1



May 22, 2012

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: 303488
SDG: 12-1253

Dear Keith Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on May 01, 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: 12-1253
Enclosures



ARS International (63641-10)
LANL-WQH Water Samples
Work Order #: 303488
SDG: 12-1253

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Case Narrative

**Case Narrative for
ARS International (63641-10)
LANL-WQH Water Samples
Workorder #: 303488
SDG # : 12-1253**

May 22, 2012

Laboratory Identification:

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

Summary

Sample receipt The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on May 01, 2012 for analysis. The sample was 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 temperature was checked, documented, and within specifications. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

<u>Laboratory ID</u>	<u>Client ID</u>
303488001	CAPA-12-13290

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 22 May 2012

State	Certification
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

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

Chain of Custody/Analysis Request

COC/Lab Request #:
 12-1253

Page 1 of 1

303488

Client Contact:

Lab Agreement # : 126310011

Project Number :

Analysis Turnaround Time:

- 24 Hour - Other -
- 7 Day -
- 14 Day -
- 21 Day -
- 28 Day -

Site Name: Los Alamos National Laboratory

WSP-GENINORG 1
 WSP-Met+B+SN+SR+U 1

Rad Screening Info:

Yes, Below Background

Field Sample ID

CAPA-12-12580

Sample Date
 Apr 27 2012

Sample Time
 13:23

Sample Matrix
 W

Special Instructions:

Special Instructions:

Relinquished by:

Melissa Montoya

Relinquished by:

[Signature]

Date/Time:
 4/20/12 3:00

Date/Time:

Received by:

[Signature]

Received by:

5-1-12 @ 9:15

Relinquished by:

Date/Time:

Received by:



SAMPLE RECEIPT & REVIEW FORM

Client: LANL		SDG/AR/COC/Work Order: 12-1253	
Received By: SHANTA WHITLOCK		Date Received: May 1, 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): 0
Classified Radioactive II or III by RSO?		X	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		X	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		X	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		X	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ deg. C)?*	X			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) 5C *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	X			Temperature Device Serial #: 51050004 Secondary Temperature Device Serial # (If Applicable):
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	
13 COC form is properly signed in relinquished/received sections?	X			
14 Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7209 7856 6000

Comments (Use Continuation Form if needed):

ORIGIN ID: SAFA (505) 665-9968
JOYLENE VALDEZ
LOS ALAMOS NATL LAB
TA00 BLDG 1237 DPU 03

SHIP DATE: 30APR12
ACTWGT: 49.0 LB MAN
CAD: 0014176/CAFE2511

LOS ALAMOS, NM 87545
UNITED STATES US

BILL SENDER

VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

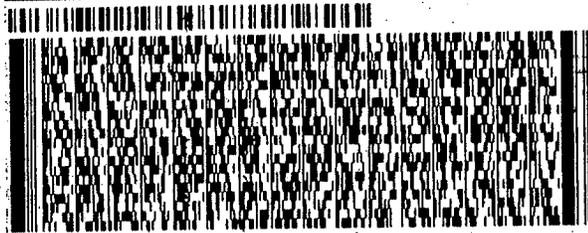
CHARLESTON SC 29407

(843) 558-8171

REF: MR1A013AGWFO

5c

590C3/61M/1BSC



FedEx
Express



J1113118680125

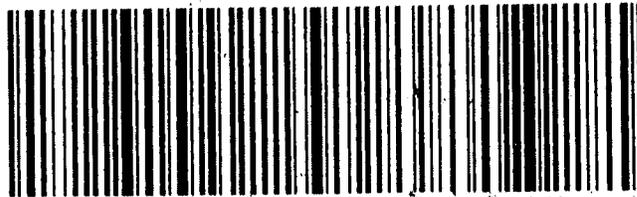
TRK# 7209 7856 6000
0201

TUE - 01 MAY A1
PRIORITY OVERNIGHT

XX CHSA

29407
SC-US CHS

Part # 156148-434 NRT V3 09-09



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 12-1253**

Method/Analysis Information

Procedure: **Definitive Low Level Perchlorate Analysis Utilizing Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS) by EPA Method 6850 Modified (6850M)**

Analytical Method: SW846 6850 Modified

Prep Method: SW846 6850 Modified

Analytical Batch Number: 1208033

Prep Batch Number: 1208032

Sample Analysis

Sample ID	Client ID
303488001	CAPA-12-13290
1202646395	Interference Check Sample (ICS)
1202646391	Method Blank (MB)
1202646392	Laboratory Control Sample (LCS)
1202646393	303221003(CAPA-12-13287) Matrix Spike (MS)
1202646394	303221003(CAPA-12-13287) 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.

CCV Requirements

All associated calibration verification standard(s) (ICV or CCV) 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(s) 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

Sample 303221003 (CAPA-12-13287) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The 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

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

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: 12-1253 GEL Work Order: 303488

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Patricia Steele

Date: 23 MAY 2012

Title: Data Validator

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

CAPA-12-13290Lab Code: GELDate Received: 01-MAY-12Instrument: LCMSMSGEL Job No (SDG): 12-1253Method: SW846 6850 ModifiedGEL Sample ID: 303488001Matrix: WATERDate Filtered: 14-MAY-12Extraction Batch ID: 1208032Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids: .

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.371	ug/L		1	14-MAY-12 19:27	per0514025a
	Perchlorate Isotope Ratio			3.1			1	14-MAY-12 19:27	per0514025a
14797-73-0	Perchlorate-101	.05	.2	0.378	ug/L		1	14-MAY-12 19:27	per0514025a
	Perchlorate-O(18)			0.560	ug/L		1	14-MAY-12 19:27	per0514025a

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

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

Quality Control Summary

Perchlorate Laboratory Control Sample

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No. (SDG): 12-1253

Extract Batch Code: 1208032

Date Filtered: 14-MAY-12

Matrix: WATER

Sample ID: 1202646392

Analyte [^]	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.186	ug/L	93.2		85 - 115
Perchlorate Isotope Ratio		3.08				-
Perchlorate-101	0.200	.191	ug/L	95.4		85 - 115
Perchlorate-O(18)		.48	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): 12-1253

Extract Batch Code: 1208032

Date Extracted: 14-MAY-12

GEL MS/PS ID: 1202646393

Client ID: CAPA-12-13287

GEL MSD/PSD ID: 1202646394

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	0.265	ug/L	0.482	108	.511	123	5.74	30	75 - 125
Perchlorate Isotope Ratio	0	3.16		3.12		3.19		2.23		-
Perchlorate-101	0.200	0.265	ug/L	0.487	111	.504	120	3.51	30	75 - 125
Perchlorate-O(18)	0	0.581	ug/L	0.579		.6		3.68		-

^ 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: 1208032Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 14-MAY-12GEL Job No (SDG): 12-1253GEL Sample ID: 1202646391Date Filtered: 14-MAY-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	14-MAY-12 18:04	per0514014a
	Perchlorate Isotope Ratio						1	14-MAY-12 18:04	per0514014a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	14-MAY-12 18:04	per0514014a
	Perchlorate-O(18)			0.517	ug/L		1	14-MAY-12 18:04	per0514014a

^ 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: 1208032Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 14-MAY-12GEL Job No (SDG): 12-1253GEL Sample ID: 1202646392Date Filtered: 14-MAY-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	0.186	ug/L	J	1	14-MAY-12 18:12	per0514015a
	Perchlorate Isotope Ratio			3.08			1	14-MAY-12 18:12	per0514015a
14797-73-0	Perchlorate-101	.05	.2	0.191	ug/L	J	1	14-MAY-12 18:12	per0514015a
	Perchlorate-O(18)			0.480	ug/L		1	14-MAY-12 18:12	per0514015a

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

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1208032Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 12-1253GEL Sample ID: 1202646395Date Filtered: 14-MAY-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	0.226	ug/L		1	14-MAY-12 18:19	per0514016a
	Perchlorate Isotope Ratio			3.24			1	14-MAY-12 18:19	per0514016a
14797-73-0	Perchlorate-101	.05	.2	0.221	ug/L		1	14-MAY-12 18:19	per0514016a
	Perchlorate-O(18)			0.558	ug/L		1	14-MAY-12 18:19	per0514016a

^ 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 LLC

Client Sample No.

CAPA-12-13287MSLab Code: GELDate Received: 25-APR-12Instrument: LCMSMSGEL Job No (SDG): 12-1253Method: SW846 6850 ModifiedGEL Sample ID: 1202646393Matrix: WATERDate Filtered: 14-MAY-12Extraction Batch ID: 1208032Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids: .

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.482	ug/L		1	14-MAY-12 18:34	per0514018a
	Perchlorate Isotope Ratio			3.12			1	14-MAY-12 18:34	per0514018a
14797-73-0	Perchlorate-101	.05	.2	0.487	ug/L		1	14-MAY-12 18:34	per0514018a
	Perchlorate-O(18)			0.579	ug/L		1	14-MAY-12 18:34	per0514018a

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

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

CAPA-12-13287MSDLab Code: GELDate Received: 25-APR-12Instrument: LCMSMSGEL Job No (SDG): 12-1253Method: SW846 6850 ModifiedGEL Sample ID: 1202646394Matrix: WATERDate Filtered: 14-MAY-12Extraction Batch ID: 1208032Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids: .

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.511	ug/L		1	14-MAY-12 18:42	per0514019a
	Perchlorate Isotope Ratio			3.19			1	14-MAY-12 18:42	per0514019a
14797-73-0	Perchlorate-101	.05	.2	0.504	ug/L		1	14-MAY-12 18:42	per0514019a
	Perchlorate-O(18)			0.600	ug/L		1	14-MAY-12 18:42	per0514019a

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

*Concentration =

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

Metals Analysis

Case Narrative

**Metals Fractional Narrative
ARS International (ARSL)
SDG 12-1253**

Sample Analysis

Sample ID	Client ID
303488001	CAPA-12-13290
1202648015	Method Blank (MB) ICP
1202648016	Laboratory Control Sample (LCS)
1202648019	303488001(CAPA-12-13290L) Serial Dilution (SD)
1202648017	303488001(CAPA-12-13290D) Sample Duplicate (DUP)
1202648018	303488001(CAPA-12-13290S) Matrix Spike (MS)
1202648010	Method Blank (MB) ICP-MS
1202648011	Laboratory Control Sample (LCS)
1202648014	303488001(CAPA-12-13290L) Serial Dilution (SD)
1202648012	303488001(CAPA-12-13290D) Sample Duplicate (DUP)
1202648013	303488001(CAPA-12-13290S) Matrix Spike (MS)
1202647537	Method Blank (MB) CVAA
1202647538	Laboratory Control Sample (LCS)
1202647541	303221003(CAPA-12-13287L) Serial Dilution (SD)
1202647539	303221003(CAPA-12-13287D) Sample Duplicate (DUP)
1202647540	303221003(CAPA-12-13287S) Matrix Spike (MS)

Method/Analysis Information

Analytical Batch:	1208720, 1208718, 1208500 and 1214284
Prep Batch :	1208719, 1208717 and 1208499
Standard Operating Procedures:	GL-MA-E-013 REV# 20, 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
Analytical Method:	SW846 3005/6010B, SW846 3005/6020 DOE-AL, EPA 245.1/245.2 and SM 2340 B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

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

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

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

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

Calibration Information

Instrument Calibration

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

CRDL Requirements

All CRDL standard(s) met the referenced advisory control limits.

ICSA/ICSAB Statement

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

Continuing Calibration Blank (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 303488001 (CAPA-12-13290)-ICP and ICP-MS and 303221003 (CAPA-12-13287)-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 RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements.

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in

hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instruments. 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 (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Additional Comments

Additional comments were not required for this SDG.

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

Hardness = 2.497 (Ca) + 4.118 (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: Deule Date: 05/25/12

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: 12-1253 GEL Work Order: 303488

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



05/25/12

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 12-1253

METHOD TYPE: EPA

SAMPLE ID: 303488001

CLIENT ID: CAPA-12-13290

CONTRACT: ESHL00210

MATRIX:W

DATE RECEIVED 01-MAY-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	051512W1-4
7631-86-9	Silica	40.5	mg/L			P	0.053	1	OPTIMA3	051112A-1
7429-90-5	Aluminum	72.2	ug/L	J		P	68	1	OPTIMA3	051112A-1
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS6	120511-3
7440-38-2	Arsenic	1.7	ug/L	U		MS	1.7	1	ICPMS6	120511-3
7440-39-3	Barium	273	ug/L			P	1	1	OPTIMA3	051112A-1
7440-41-7	Beryllium	1	ug/L	U		P	1	1	OPTIMA3	051112A-1
7440-42-8	Boron	18.2	ug/L	J		P	15	1	OPTIMA3	051112A-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS6	120511-3
7440-70-2	Calcium	46200	ug/L			P	50	1	OPTIMA3	051112A-1
7440-47-3	Chromium	2	ug/L	U		MS	2	1	ICPMS6	120511-3
7440-48-4	Cobalt	1	ug/L	U		P	1	1	OPTIMA3	051112A-1
7440-50-8	Copper	3	ug/L	U		P	3	1	OPTIMA3	051112A-1
7439-89-6	Iron	30	ug/L	U		P	30	1	OPTIMA3	051112A-1
7439-92-1	Lead	0.5	ug/L	U		MS	0.5	1	ICPMS6	120511-3
7439-95-4	Magnesium	14900	ug/L			P	110	1	OPTIMA3	051112A-1
7439-96-5	Manganese	2	ug/L	U		P	2	1	OPTIMA3	051112A-1
7439-98-7	Molybdenum	0.539	ug/L			MS	0.165	1	ICPMS6	120511-3
7440-02-0	Nickel	1.62	ug/L	J		MS	0.5	1	ICPMS6	120511-3
7440-09-7	Potassium	5990	ug/L			P	50	1	OPTIMA3	051112A-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS6	120511-3
7440-22-4	Silver	0.2	ug/L	U		MS	0.2	1	ICPMS6	120511-3
7440-23-5	Sodium	31200	ug/L			P	100	1	OPTIMA3	051112A-1
7440-24-6	Strontium	358	ug/L			P	1	1	OPTIMA3	051112A-1
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS6	120511-3
7440-31-5	Tin	12.5	ug/L	U		P	12.5	5	OPTIMA3	051112A-1

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 12-1253

METHOD TYPE: EPA

SAMPLE ID: 303488001

CLIENT ID: CAPA-12-13290

CONTRACT: ESHL00210

MATRIX:W

DATE RECEIVED 01-MAY-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>
7440-61-1	Uranium	0.067	ug/L	U		MS	0.067	1	ICPMS6	120511-2
7440-62-2	Vanadium	1	ug/L	U		P	1	1	OPTIMA3	051112A-1
7440-66-6	Zinc	5.06	ug/L	J		P	3.3	1	OPTIMA3	051112A-1
	Hardness as CaCO3	177	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. 12-1253
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>
1202647537	Mercury	-0.094	ug/L	+/-0.2	J	AV	0.067	0.2
1202648010	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
	Chromium	2	ug/L	+/-10	U	MS	2	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.165	ug/L	+/-0.5	U	MS	0.165	0.5
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Selenium	1.5	ug/L	+/-5	U	MS	1.5	5
	Silver	0.2	ug/L	+/-1	U	MS	0.2	1
	Thallium	0.45	ug/L	+/-2	U	MS	0.45	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1202648015	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	0.053	mg/L	+/-0.213	U	P	0.053	0.213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10

*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. 12-1253 Client ID: CAPA-12-13287S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 303221003 Spike ID: 1202647540

<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	1.99		0.067	U	2	99.3		AV

*Analytical Methods:
 AV EPA 245.1/245.2

METALS

-5a-

Matrix Spike Summary

SDG NO. 12-1253 Client ID: CAPA-12-13290S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 303488001 Spike ID: 1202648013

<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	200		1	U	200	100		MS
Arsenic	ug/L	75-125	78.2		1.7	U	80	97.8		MS
Cadmium	ug/L	75-125	11.1		0.11	U	10	111		MS
Chromium	ug/L	75-125	49.3		2	U	50	94.7		MS
Lead	ug/L	75-125	39.8		0.5	U	40	99.5		MS
Molybdenum	ug/L	75-125	52.6		0.539		50	104		MS
Nickel	ug/L	75-125	47.8		1.62	J	50	92.3		MS
Selenium	ug/L	75-125	20.3		1.5	U	20	102		MS
Silver	ug/L	75-125	53.3		0.2	U	50	106		MS
Thallium	ug/L	75-125	92.4		0.45	U	100	92.2		MS
Uranium	ug/L	75-125	52.7		0.067	U	50	105		MS

*Analytical Methods:
MS SW846 3005/6020 DOE-AL

METALS

-5a-

Matrix Spike Summary

SDG NO. 12-1253 Client ID: CAPA-12-13290S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 303488001 Spike ID: 1202648018

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Aluminum	ug/L	75-125	4870		72.2	J	5000	96		P
Barium	ug/L	75-125	750		273		500	95.4		P
Beryllium	ug/L	75-125	484		1	U	500	96.8		P
Boron	ug/L	75-125	513		18.2	J	500	99		P
Calcium	ug/L		51300		46200		5000	104	N/A	P
Cobalt	ug/L	75-125	464		1	U	500	92.6		P
Copper	ug/L	75-125	484		3	U	500	96.7		P
Iron	ug/L	75-125	4900		30	U	5000	97.8		P
Magnesium	ug/L	75-125	20000		14900		5000	103		P
Manganese	ug/L	75-125	466		2	U	500	93		P
Potassium	ug/L	75-125	10600		5990		5000	92		P
Silica	mg/L	75-125	50.4		40.5		10.7	92.5		P
Sodium	ug/L		36500		31200		5000	106	N/A	P
Strontium	ug/L	75-125	830		358		500	94.5		P
Tin	ug/L	75-125	489		12.5	U	500	97.8		P
Vanadium	ug/L	75-125	492		1	U	500	98.3		P
Zinc	ug/L	75-125	464		5.06	J	500	91.8		P

*Analytical Methods:
P SW846 3005/6010B

Metals
-6-
Duplicate Sample Summary

SDG No.: 12-1253

Lab Code: GEL

Contract: ESHL00210

Client ID: CAPA-12-13287D

Matrix: LIQUID

Level: Low

Sample ID: 303221003

Duplicate ID: 1202647539

Percent Solids for Dup: N/A

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

***Analytical Methods:**
 AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 12-1253

Lab Code: GEL

Contract: ESHL00210

Client ID: CAPA-12-13290D

Matrix: LIQUID

Level: Low

Sample ID: 303488001

Duplicate ID: 1202648012

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		1.7 U		1.7 U				MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L		2 U		2 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.539		0.48 J		11.6		MS
Nickel	ug/L	+/- 2	1.62 J		1.73 J		6.39		MS
Selenium	ug/L		1.5 U		1.5 U				MS
Silver	ug/L		0.2 U		0.2 U				MS
Thallium	ug/L		0.45 U		0.45 U				MS
Uranium	ug/L		0.067 U		0.067 U				MS

***Analytical Methods:**

MS SW846 3005/6020 DOE-AL

Metals
-6-
Duplicate Sample Summary

SDG No.: 12-1253

Lab Code: GEL

Contract: ESHL00210

Client ID: CAPA-12-13290D

Matrix: LIQUID

Level: Low

Sample ID: 303488001

Duplicate ID: 1202648017

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		72.2 J		68 U		200		P
Barium	ug/L	+/-20%	273		265		2.68		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	18.2 J		17.5 J		3.88		P
Calcium	ug/L	+/-20%	46200		45400		1.69		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	14900		14600		2.36		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	5990		5830		2.7		P
Silica	mg/L	+/-20%	40.5		39.5		2.59		P
Sodium	ug/L	+/-20%	31200		30700		1.71		P
Strontium	ug/L	+/-20%	358		350		2.22		P
Tin	ug/L		12.5 U		12.5 U				P
Vanadium	ug/L		1 U		1 U				P
Zinc	ug/L	+/-10	5.06 J		5.17 J		2.15		P

*Analytical Methods:

P SW846 3005/6010B

METALS

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Laboratory Control Sample Summary

SDG NO. 12-1253

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>
1202647538	Mercury	ug/L	2	2.02		101	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 12-1253

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>
1202648011								
	Antimony	ug/L	50	50.6		101	80-120	MS
	Arsenic	ug/L	50	51.4		103	80-120	MS
	Cadmium	ug/L	50	53.1		106	80-120	MS
	Chromium	ug/L	50	49.5		99.1	80-120	MS
	Lead	ug/L	50	50.9		102	80-120	MS
	Molybdenum	ug/L	50	51.4		103	80-120	MS
	Nickel	ug/L	50	50.1		100	80-120	MS
	Selenium	ug/L	50	52.8		106	80-120	MS
	Silver	ug/L	50	55.2		110	80-120	MS
	Thallium	ug/L	50	49.3		98.7	80-120	MS
	Uranium	ug/L	50	50.9		102	80-120	MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 12-1253

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>
1202648016								
	Aluminum	ug/L	5000	4860		97.3	80-120	P
	Barium	ug/L	500	486		97.2	80-120	P
	Beryllium	ug/L	500	477		95.4	80-120	P
	Boron	ug/L	500	477		95.4	80-120	P
	Calcium	ug/L	5000	4880		97.7	80-120	P
	Cobalt	ug/L	500	478		95.5	80-120	P
	Copper	ug/L	500	480		96.1	80-120	P
	Iron	ug/L	5000	4950		98.9	80-120	P
	Magnesium	ug/L	5000	5060		101	80-120	P
	Manganese	ug/L	500	475		95	80-120	P
	Potassium	ug/L	5000	4970		99.3	80-120	P
	Silica	mg/L	10.7	10.2		95.2	80-120	P
	Sodium	ug/L	5000	4890		97.7	80-120	P
	Strontium	ug/L	500	484		96.9	80-120	P
	Tin	ug/L	500	485		97	80-120	P
	Vanadium	ug/L	500	482		96.3	80-120	P
	Zinc	ug/L	500	462		92.4	80-120	P

*Analytical Methods:

P SW846 3005/6010B

METALS

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Serial Dilution Sample Summary

SDG NO. 12-1253 Client ID: CAPA-12-13287L

Contract: ESHL00210

Matrix: LIQUID Level: Low

Sample ID: 303221003 Serial Dilution ID: 1202647541

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

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 12-1253 Client ID: CAPA-12-13290L

Contract: ESHL00210

Matrix: LIQUID Level: Low

Sample ID: 303488001 Serial Dilution ID: 1202648014

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	1.7	U	8.5	U				MS
Cadmium	.11	U	.55	U				MS
Chromium	2	U	10	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	.539		.825	U	100			MS
Nickel	1.62	J	2.5	U	100			MS
Selenium	1.5	U	7.5	U				MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.25	U				MS
Uranium	.067	U	.335	U				MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 12-1253 Client ID: CAPA-12-13290L

Contract: ESHL00210

Matrix: LIQUID Level: Low

Sample ID: 303488001 Serial Dilution ID: 1202648019

<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	72.2	J	340	U	100			P
Barium	273		265		2.8		10	P
Beryllium	1	U	5	U				P
Boron	18.2	J	75	U	100			P
Calcium	46200		46900		1.51		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	14900		15600		4.56		10	P
Manganese	2	U	10	U				P
Potassium	5990		6400		6.83		10	P
Silica	40500		40000		1.18		10	P
Sodium	31200		32100		2.64		10	P
Strontium	358		364		1.67		10	P
Tin	2.5	U	12.5	U				P
Vanadium	1	U	5	U				P
Zinc	5.06	J	16.5	U	100			P

*Analytical Methods:

P SW846 3005/6010B

General Chem Analysis

Case Narrative

**General Chemistry Narrative
ARS International (ARSL)
SDG 12-1253**

Method/Analysis Information

Product: Specific Conductivity
Analytical Batch: 1210920 **Method:** EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
303488001	CAPA-12-13290
1202653382	Laboratory Control Sample (LCS)
1202653384	303488001(CAPA-12-13290) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-009 REV# 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 Conductivity analysis was performed on a Orion Star A212 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: 303488001 (CAPA-12-13290).

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**

A DER was not required 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: 1208900 **Method:** EPA 150.1 pH

Sample Analysis

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

Sample ID	Client ID
303488001	CAPA-12-13290
1202648410	Laboratory Control Sample (LCS)
1202648411	303489002(CAPA-12-13288) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-008 REV# 20.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information (CCV)

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

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 303489002 (CAPA-12-13288).

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: 303488001 (CAPA-12-13290).

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: 1075256 303488001 (CAPA-12-13290).

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: 1207431 **Method:** EPA 300.0 Anions Liquid 28 day

Sample Analysis

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

Sample ID	Client ID
303488001	CAPA-12-13290
1202644914	Method Blank (MB)
1202644915	303221003(CAPA-12-13287) Sample Duplicate (DUP)
1202644916	303221003(CAPA-12-13287) Post Spike (PS)
1202644917	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: 303221003 (CAPA-12-13287).

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

The spike recovery falls outside of the established acceptance limits due to matrix interference: 1202644916 (CAPA-12-13287).

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: 1202644915 (CAPA-12-13287), 1202644916 (CAPA-12-13287) and 303488001 (CAPA-12-13290).

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: 1076964 1202644916 (CAPA-12-13287).

Manual Integrations

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202644915 (CAPA-12-13287), 1202644916 (CAPA-12-13287), 1202644917 (LCS) and 303488001 (CAPA-12-13290).

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: 1209153 **Method:** EPA 160.1 Solids and Dissolved-F

Sample Analysis

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

Sample ID	Client ID
303488001	CAPA-12-13290
1202648997	Method Blank (MB)
1202648998	303443003(CAPA-12-13345) Sample Duplicate (DUP)
1202648999	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# 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 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: 303443003 (CAPA-12-13345).

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. 1202648998 (CAPA-12-13345).

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: 1077517 303488001 (CAPA-12-13290).

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: 1210449 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
303488001	CAPA-12-13290
1202652186	303443003(CAPA-12-13345) Sample Duplicate (DUP)
1202652190	303443003(CAPA-12-13345) Matrix Spike (MS)
1202652192	Laboratory Control Sample (LCS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 9.

Preparation/Analytical Method Verification

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

Calibration Information

The Titration analysis was performed on a manually operated buret.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 303443003 (CAPA-12-13345).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

A DER was not required for this SDG.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

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: 25May12

Sample Data Summary

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Certificate of Analysis Report for

ARSL001 ARS International (63641-10)

Client SDG: 12-1253 GEL Work Order: 303488

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



GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: May 24, 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: 12-1253

Client Sample ID: CAPA-12-13290
 Sample ID: 303488001
 Matrix: W
 Collect Date: 27-APR-12 13:23
 Receive Date: 01-MAY-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		569	1.00	1.00	umhos/cm	1	TXT1	05/09/12	1222	1210920	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 16.1C	H	6.70	0.010	0.100	SU	1	LXA1	05/02/12	1507	1208900	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	J	0.0909	0.067	0.200	mg/L	1	MAR1	05/08/12	0402	1207431	3
Fluoride		0.113	0.033	0.100	mg/L	1					
Sulfate		16.1	0.133	0.400	mg/L	1					
Chloride		128	0.670	2.00	mg/L	10	MAR1	05/08/12	2127	1207431	4
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		351	3.40	14.3	mg/L		LYG1	05/03/12	1019	1209153	5
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		52.1	0.725	1.00	mg/L		LXA1	05/08/12	1725	1210449	6
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						

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 160.1	
6	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: May 24, 2012
Page 1 of 3

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

Contact: Keith Greene

Workorder: 303488

Paramname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Conductivity Analysis											
Batch	1210920										
QC1202653384	303488001	DUP									
Conductivity		569		569	umhos/cm	0.00		(0%-10%)	TXT1	05/09/12	12:24
QC1202653382	LCS										
Conductivity	1410			1420	umhos/cm		100	(95%-105%)		05/09/12	12:17
Electrode Analysis											
Batch	1208900										
QC1202648411	303489002	DUP									
pH	H	6.78	H	6.79	SU	0.147		(0%-10%)	LXA1	05/02/12	15:13
QC1202648410	LCS										
pH				7.03	SU			(99%-101%)		05/02/12	15:06
Ion Chromatography											
Batch	1207431										
QC1202644915	303221003	DUP									
Bromide	U	ND	U	ND	mg/L	N/A			MAR1	05/08/12	01:51
Chloride		130		130	mg/L	0.110		(0%-20%)		05/08/12	20:21
Fluoride		0.133		0.134	mg/L	1.12 ^		(+/-0.100)		05/08/12	01:51
Sulfate		13.3		13.8	mg/L	4.10		(0%-20%)			
QC1202644917	LCS										
Bromide	2.50			2.60	mg/L		104	(90%-110%)		05/08/12	00:45
Chloride	10.0			9.73	mg/L		97.3	(90%-110%)			
Fluoride	5.00			5.09	mg/L		102	(90%-110%)			
Sulfate	20.0			20.0	mg/L		99.8	(90%-110%)			
QC1202644914	MB										
Bromide			U	ND	mg/L					05/08/12	00:12
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1202644916	303221003	PS									
Bromide	2.50	U	ND	2.64	mg/L		103	(90%-110%)		05/08/12	02:24
Chloride	10.0			24.6	mg/L		116 *	(90%-110%)		05/08/12	20:54
Fluoride	5.00		0.133	5.13	mg/L		99.9	(90%-110%)		05/08/12	02:24
Sulfate	20.0		13.3	35.5	mg/L		111 *	(90%-110%)			
Solids Analysis											
Batch	1209153										
QC1202648998	303443003	DUP									
Total Dissolved Solids	U	ND	U	ND	mg/L	N/A			LYG1	05/03/12	10:19
QC1202648999	LCS										
Total Dissolved Solids	300			300	mg/L		100	(95%-105%)		05/03/12	10:19
QC1202648997	MB										
Total Dissolved Solids			U	ND	mg/L					05/03/12	10:19

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QC Summary

Workorder: 303488

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration Analysis											
Batch	1210449										
QC1202652186	303443003	DUP									
Alkalinity, Total as CaCO3	U	ND	U	ND	mg/L	N/A			LXA1	05/08/12	16:41
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1202652192	LCS										
Alkalinity, Total as CaCO3	50.0			51.1	mg/L		102	(90%-110%)		05/08/12	15:35
QC1202652190	303443003	MS									
Alkalinity, Total as CaCO3	50.0	U	ND	51.6	mg/L		102	(80%-120%)		05/08/12	16:46

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.
- 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

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QC Summary

Workorder: 303488

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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

Mo.Day Yr. 03-MAY-12	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: EPA 150.1	Matrix Type: Liquid	Client Code: ESHL, PAES
Batch ID: 1208900	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 303488(12-1253),303489(12-1254),303565			
Application Issues: Sample received out of holding			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Sample received out of holding:</p> <p>303488 001</p> <p>303489 002</p> <p>303565 001</p>		<p>1. Samples were received out of holding.</p>	

Originator's Name:
Lindsey Jensen 03-MAY-12

Data Validator/Group Leader:
Julia Hamilton 11-MAY-12

DATA EXCEPTION REPORT

Mo.Day Yr. 09-MAY-12	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: IC	Test / Method: EPA 300.0	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1207431	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 303221(12-1236),303234(12-1241),303443(12-1249),303488(12-1253),303489(12-1254)			
Application Issues: Failed Recovery for MS/PS			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS:</p> <p>QC 1202644916PS</p>		<p>1. The MS/PS failed required acceptance limits for chloride and sulfate due to matrix interference. Of the remaining anions in the MS/PS, all except Orthophosphate required acceptance limits. This failure is attributed to the matrix of the sample because the successful recovery of the other compounds indicate that the laboratory process was in control. This variance is judged to have no negative impact on the data. The deviation is noted in the Case Narrative and DER, and the data has been reported.</p>	

Originator's Name:
Mary Sherwood 09-MAY-12

Data Validator/Group Leader:
Virginia Winger 09-MAY-12

DATA EXCEPTION REPORT

Mo.Day Yr. 10-MAY-12	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: BALANCE	Test / Method: SM 2540C	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1209153	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 303353,303443(12-1249),303488(12-1253),303489(12-1254),303596,303613(12-1268)			
Application Issues: Other			
Specification and Requirements Exception Description:		DER Disposition:	
1. Consecutive weight check criteria not met: 303488001 and 303489002		1. In order to meet consecutive weight check criteria, weight events must be within 0.0005g of each other. After initial weight checks failed this criteria, the analyst performed two additional weight events for Total Dissolved Solids. After four weight events, the analyst was unable to get the samples to conform to the criteria. The failure to meet weighback criteria is attributed to the matrix of the samples.	

Originator's Name:

Lisa Gregory 10-MAY-12

Data Validator/Group Leader:

Julia Hamilton 11-MAY-12