

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4303 EVENT NAME: Mortandad/Sandia (Chromium Investigation) MY2013 Q4
 SAMPLE ID: CASA-13-36989 WORK ORDER: NA Watershed Sampling SANDIA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		07/16/2013	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1237	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: R-43 S1		↓	FIELD PREP:	UF	OK
LOCATION TYPE: MON		↓	FIELD QC TYPE: REG		↓
PORT: P1A			SAMPLE USAGE: INV		↓

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-DRO	1 LITER AMBER GLASS	2	ICE	Y	NA
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS:

Sampled within 50' of running diesel generator

LOCATION COMMENTS:

NA

FIELD PARAMETERS:

Dissolved Oxygen 7.01 mg/L Oxidation-Reduction Potential 166.1 MV pH 8.20 SU
 Specific Conductance 183 uS/cm Temperature 20.87 deg C Turbidity 0.30 NTU

COLLECTED BY (PRINT) M. Green

RELINQUISHED BY (Printed Name) <u>M. Green</u> (Signature) <u>[Signature]</u>	Date/Time <u>7/16/13</u> <u>1330</u>	RECEIVED BY (Printed Name) <u>K. Green</u> (Signature) <u>[Signature]</u>	Date/Time <u>7/16/13</u> <u>1130</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/15/2013

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4303 EVENT NAME: Mortandad/Sandia (Chromium Investigation) MY2013 Q4
 SAMPLE ID: CASA-13-36993 WORK ORDER: Watershed Sampling_SANDIA NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		07/16/2013	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1237	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: R-43 S1		↓	FIELD PREP:	F	OK
LOCATION TYPE: MON		↓	FIELD QC TYPE: REG		↓
PORT: P1A		↓	SAMPLE USAGE: INV		↓

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-GENINORG+PerChlorate	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: NA

LOCATION COMMENTS: NA

FIELD PARAMETERS:

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

COLLECTED BY (PRINT) M. Green

RELINQUISHED BY (Printed Name) <u>M. Green</u> (Signature) <u>[Signature]</u>	Date/Time <u>7/16/13</u> <u>1330</u>	RECEIVED BY (Printed Name) <u>M. Green</u> (Signature) <u>[Signature]</u>	Date/Time <u>7/16/13</u> <u>1330</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/15/2013

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4303 EVENT NAME: Mortandad/Sandia (Chromium Investigation) MY2013 Q4 Watershed Sampling SANDIA

SAMPLE ID: CASA-13-39006 WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		07/16/2013	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1057	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: R-43 S1		↓	FIELD PREP:	UF	OK
LOCATION TYPE: MON		↓	FIELD QC TYPE: REG		↓
PORT: PIA		↓	SAMPLE USAGE: INV		↓

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-DRO	1 LITER AMBER GLASS	2	ICE	Y	NA

SAMPLE COMMENTS:

Collect at DP + 1CV

LOCATION COMMENTS:

FIELD PARAMETERS:

Dissolved Oxygen 6.88 mg/L Oxidation-Reduction Potential 162.5 MV pH 8.18 SU

Specific Conductance 176 uS/cm Temperature 19.10 deg C Turbidity 0.30 NTU

COLLECTED BY (PRINT) D. Fellenz

RELINQUISHED BY (Printed Name) <u>M. Green</u> (Signature) <u>[Signature]</u>	Date/Time <u>7/16/13</u> <u>1530</u>	RECEIVED BY (Printed Name) <u>K. Green</u> (Signature) <u>[Signature]</u>	Date/Time <u>7/16/13</u> <u>1530</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/15/2013

Data Validation Report

Chain Of Custody No. 2013-1172

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
	329718 EPA:120.1	1				
	329718 EPA:150.1	1				
	329718 EPA:160.1	1				
	329718 EPA:245.2	1				
	329718 EPA:300.0	1				
	329718 EPA:310.1	1				
	329718 EPA:350.1	1				
	329718 EPA:351.2	1				
	329718 EPA:353.2	1				
	329718 EPA:365.4	1				
	329718 SM:A2340B	1				
	329718 SW-846:6010B	1				
	329718 SW-846:6020	1				
	329718 SW-846:6850	1				
	SW-846:8015M_EXTRACTA					
	329718 BLE	2				
	329718 SW-846:9060	1				

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups
	329718 EPA:120.1	1319860	1319860		1						
	329718 EPA:150.1	1318847	1318847		1						
	329718 EPA:160.1	1316037	1316037		1					1	
	329718 EPA:245.2	1319995	1319994		1					1	1
	329718 EPA:300.0	1316516	1316516		1					1	
	329718 EPA:310.1	1318623	1318623		1					2	1
	329718 EPA:350.1	1317191	1317190		1					1	1
	329718 EPA:351.2	1315708	1315707		1					1	2
	329718 EPA:353.2	1316084	1316084		1					1	
	329718 EPA:365.4	1315711	1315709		1					1	2
	329718 SM:A2340B	1321813	1321813		1						
	329718 SW-846:6010B	1320241	1320234		1					1	1
	329718 SW-846:6020	1320243	1320242		1					1	1
	329718 SW-846:6850	1316483	1316482		1					1	2
	SW-846:8015M_EXTRACTA										
	329718 BLE	1316052	1316051		2					1	1
	329718 SW-846:9060	1315287	1315287		1					1	

2. Distribution Of Analytes In EDD.

Analytical Method	Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spikes	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-13-36986	1202920986	DUP		1	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-13-36993	329718002	REG		1	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1202920985	LCS		0	0	1
EPA:150.1	GENERAL CHEMISTRY	CAMO-13-36971	1202918636	DUP		1	0	0

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

EPA:150.1	GENERAL CHEMISTRY	CASA-13-36993	1202918635	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-13-36993	329718002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1202918637	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CASA-13-36993	1202911591	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-13-36993	329718002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1202911592	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1202911589	MB	1	0	0	0
EPA:245.2	INORGANIC	CASA-13-36993	329718002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1202921285	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1202921284	MB	1	0	0	0
EPA:245.2	INORGANIC	WST16-13-36930	1202921286	DUP	1	0	0	0
EPA:245.2	INORGANIC	WST16-13-36930	1202921287	MS	0	0	1	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-13-36985	1202912901	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-13-36993	329718002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1202912903	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1202912900	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-13-36993	1202918113	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-13-36993	1202918115	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CASA-13-36993	329718002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202918117	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202918118	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202918111	MB	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202918112	MB	2	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-13-36985	1202914647	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-13-36985	1202914648	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CASA-13-36993	329718002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1202914644	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1202914643	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36976	1202911679	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36976	1202911680	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36977	1202910856	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36977	1202910857	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CASA-13-36989	329718001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1202910855	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1202910854	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-13-36993	1202911694	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-13-36993	329718002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1202911698	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1202911691	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-13-37047	1202910859	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-13-37047	1202910861	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-13-36993	329718002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1202910863	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1202910858	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	NP160-13-38789	1202910860	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	NP160-13-38789	1202910862	MS	0	0	1	0
SM-A2340B	INORGANIC	CASA-13-36993	329718002	REG	1	0	0	0
SW-846:6010B	INORGANIC	CASA-13-36993	329718002	REG	17	0	0	0
SW-846:6010B	INORGANIC	CASA-13-37019	1202921921	DUP	17	0	0	0
SW-846:6010B	INORGANIC	CASA-13-37019	1202921922	MS	0	0	17	0
SW-846:6010B	INORGANIC	LCS	1202921920	LCS	0	0	17	0
SW-846:6010B	INORGANIC	MB	1202921919	MB	17	0	0	0
SW-846:6020	INORGANIC	CASA-13-36993	329718002	REG	11	0	0	0
SW-846:6020	INORGANIC	CASA-13-37019	1202921926	DUP	11	0	0	0
SW-846:6020	INORGANIC	CASA-13-37019	1202921927	MS	0	0	11	0
SW-846:6020	INORGANIC	LCS	1202921925	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1202921924	MB	11	0	0	0

SW-846:6850	LCMS/MS PERCHLORATE	BDDRIO-13-34203	1202912820	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	BDDRIO-13-34203	1202912821	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-13-37670	1202912822	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-13-37670	1202912823	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-13-36993	329718002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1202912819	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1202912818	MB	1	0	0	0
SW-846:8015M_EXTRACTABLE	DRO	CAMO-13-36978	1202911614	MS	0	1	1	0
SW-846:8015M_EXTRACTABLE	DRO	CASA-13-36989	329718001	REG	1	1	0	0
SW-846:8015M_EXTRACTABLE	DRO	CASA-13-39006	329718003	REG	1	1	0	0
SW-846:8015M_EXTRACTABLE	DRO	LCS	1202911613	LCS	0	1	1	0
SW-846:8015M_EXTRACTABLE	DRO	LCSD	1202911616	LCSD	0	1	1	0
SW-846:8015M_EXTRACTABLE	DRO	MB	1202911612	MB	1	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-13-36975	1202909879	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-13-36989	329718001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1202909881	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1202909878	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	WTLAP-13-39037	1202910591	DUP	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Field	Lab	Type Of	Analytical	Sample	Parameter	Lab	Lab		Lab
Sample ID	Sample ID	Blank	Method	Matrix	Name	Result	Qualifier	Units	Detection Limit
MB	1202910854	METHOD BLANK	EPA:351.2	W	Total Kjeldahl Nitrogen	0.0554	J	mg/L	0.1
MB	1202914643	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0331	J	mg/L	0.05
MB	1202921919	METHOD BLANK	SW-846:6010B	W	Potassium	-82.1	J	ug/L	150
MB	1202921924	METHOD BLANK	SW-846:6020	W	Antimony	-1.7	J	ug/L	3

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
CASA-13-36993	MB	1202914643	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	mg/L	0.0331	0.0561		0.05	Y
CASA-13-36989	MB	1202910854	METHOD BLANK	EPA:351.2	Total Kjeldahl Nitrogen	mg/L	0.0554	0.0797	J	0.1	Y
CASA-13-36993	MB	1202921919	METHOD BLANK	SW-846:6010B	Potassium	ug/L	-82.1	1270		150	Y
CASA-13-36993	MB	1202921924	METHOD BLANK	SW-846:6020	Antimony	ug/L	-1.7	3	U	3	N

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	Recvry	Recvry	Limit	Limit
CAMO-13-36977	1202910857		EPA:351.2	Total Kjeldahl Nitrogen	1315707	8/6/2013	W	132		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?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

None.

13. Display Flagged Data.

Location ID	Chain Of Custody No	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detected
R-43 S1	2013-1172	CASA-13-36989	REG	INIT	GENERAL CHEMISTRY	EPA:351.2	Total Kjeldahl Nitrogen	J	U	I4	N
R-43 S1	2013-1172	CASA-13-36993	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N

Reason Code

I4

Description

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

J_LAB

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

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

Rejection Limit	RPD	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
0.0797	mg/L	0.0797	mg/L			W	7/16/2013		1315708	VAL	Y
0.0561	mg/L	0.0561	mg/L			W	7/16/2013		1317191	VAL	Y

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
CASA-13-36989	R-43 S1	REG	EPA:351.2	0	1
CASA-13-36989	R-43 S1	REG	SW-846:8015M_EXTRACTABLE	0	1
CASA-13-36989	R-43 S1	REG	SW-846:9060	0	1
CASA-13-36993	R-43 S1	REG	EPA:120.1	0	1
CASA-13-36993	R-43 S1	REG	EPA:150.1	0	1
CASA-13-36993	R-43 S1	REG	EPA:160.1	0	1
CASA-13-36993	R-43 S1	REG	EPA:245.2	0	1
CASA-13-36993	R-43 S1	REG	EPA:300.0	0	4
CASA-13-36993	R-43 S1	REG	EPA:310.1	0	2
CASA-13-36993	R-43 S1	REG	EPA:350.1	0	1
CASA-13-36993	R-43 S1	REG	EPA:353.2	0	1
CASA-13-36993	R-43 S1	REG	EPA:365.4	0	1
CASA-13-36993	R-43 S1	REG	SM:A2340B	0	1
CASA-13-36993	R-43 S1	REG	SW-846:6010B	0	17
CASA-13-36993	R-43 S1	REG	SW-846:6020	0	11
CASA-13-36993	R-43 S1	REG	SW-846:6850	0	1
CASA-13-39006	R-43 S1	REG	SW-846:8015M_EXTRACTABLE	0	1



August 14, 2013

www.gel.com

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

Re: LANL-WQH Water Samples
Work Order: 329718
SDG: 2013-1172

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on July 18, 2013, and analyzed for Diesel Range Organics, General Chemistry, Metals and Perchlorates by LCMSMS. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4485.

Sincerely,

Valerie Davis
Project Manager

Purchase Order: 63641-10
Chain of Custody: 2013-1172
Enclosures



ARS International (63641-10)
LANL-WQH Water Samples
Work Order #: 329718
SDG: 2013-1172

Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	4
Data Review Qualifier Flag Definition Sheet.....	12
Perchlorates by LCMSMS Analysis.....	15
Case Narrative.....	16
Sample Data Summary.....	22
Quality Control Summary.....	24
Quality Control Data.....	27
Miscellaneous.....	33
FID Diesel Range Organics Analysis.....	35
Case Narrative.....	36
Sample Data Summary.....	41
Quality Control Summary.....	44
Quality Control Data.....	50
Metals Analysis.....	54
Case Narrative.....	55
Sample Data Summary.....	61
Quality Control Summary.....	66
Miscellaneous.....	80
General Chem Analysis.....	82

Case Narrative.....	83
Sample Data Summary.....	111
Quality Control Summary.....	116
Miscellaneous.....	122

Case Narrative

**Case Narrative for
ARS International (63641-10)
LANL-WQH Water Samples
Workorder #: 329718
SDG # : 2013-1172**

August 14, 2013

Laboratory Identification:

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

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on July 18, 2013 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
329718001	CASA-13-36989
329718002	CASA-13-36993
329718003	CASA-13-39006

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: Diesel Range Organics, General Chemistry, Metals and Perchlorates by LCMSMS.

I certify that this data report is in compliance with the terms and conditions of the subcontract and task order, both technically and for completeness, for other than the conditions detailed in the attached case narrative.

*Top a2
for*

Valerie Davis
Project Manager

List of current GEL Certifications as of 14 August 2013

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

Chain of Custody and Supporting Documentation

32978

COC/Lab Request #:

2013-1172

Page 1 of 1

[illegible]

SAMPLE RECEIPT & REVIEW FORM

Client: <u>LAASL</u>		SDG/AR/COC/Work Order: <u>2013-172</u>	
Received By: <u>A. Taylor</u>		Date Received: <u>07/18/13</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>00cpm</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>51080004</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected: <u>See continuation</u>
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Carrier and tracking number.	<input checked="" type="checkbox"/>			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>5462-9833 1784-4</u> <u>5462 9833 1762-20</u> <u>5462 9833 1795-4</u> <u>5462 9833 1820-3</u> <u>5426 9833 1832-5</u> <u>5426 9833 1173-4</u> <u>5426 9833 1810-5</u> <u>5426 9833 1821-4</u>

Comments (Use Continuation Form if needed):

Client: LANL Received By: H. Taylor Date Received: 07/18/13 SDG/AR/COC/Work Order: _____

RN 2013-1173

*WST60-13-39078 received 2 containers
1 container has 3 labels on it the other
has 2 labels on it with all requested
analysis. Chain indicates 9 containers

RN 2013-1175

*WTESR-13-32795 received 1 container for HEXP
*WTESR-13-32885 received 1 container for ISOLO/AM241
*WTESR-13-32929 received 1 container for SR90

RN 2013-1176

*WT-IPC-13-32040 received 3 HEXP containers and
2 Ra226/228 containers
*WT-IPC-13-32259 received 2 containers for Ra226/Ra228

RN 2013-1176

*WTLAP-13-39021 and 39050 received 2 containers
*WTLAP-13-39054 received 1 container

RN 2013-1195

WTMSGP-13-29859 received two containers

RN 2013-1207

~~PC WTMSGP-13-39172~~ HA

WTMSGP-13-39172 received two containers and no
original chains.

SHIP DATE: 17 JUL 13
ACTWGT: 19.0 LB MAN
CAD: 0014176/CAFE2511

ORIGIN ID: SAFA (505) 665-9966

KEITH GREENE
LOS ALAMOS NATL LAB
TA00 BLDG 1237 DPU 03

BILL SENDER

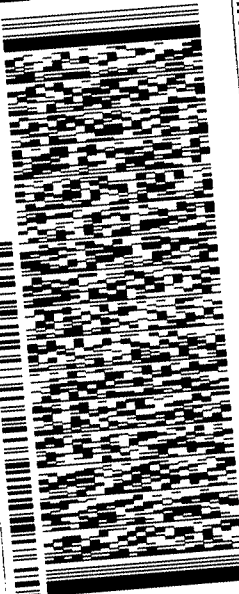
LOS ALAMOS, NM 87545
UNITED STATES US

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171
REF: MR000EC5Y00

FedEx
Express



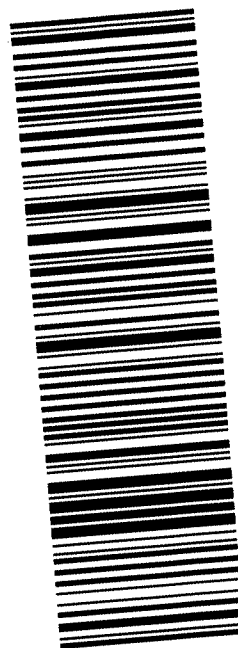
THU - 18 JUL 10:30A
PRIORITY OVERNIGHT

2 of 2
MPS# 5462 9833 1800

Mstr# 5462 9833 1795

XX CHSA

29407
SC-US CHS



Part # 156148-434 RIT2 08/10 **

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

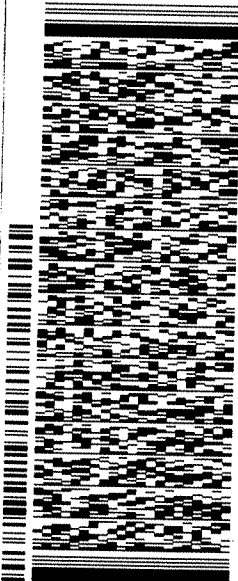
LOS ALAMOS, NM 87545
UNITED STATES US

TO VALERIE DAVIS
GENERAL ENGINEERING I
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171
REF: MR1A015AGWKO

FedEx
Express



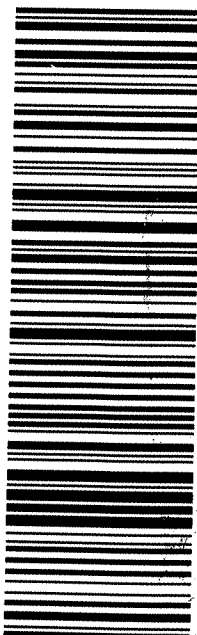
THU - 18 JUL 10:30A
PRIORITY OVERNIGHT

2 of 2
MPS# 5462 9833 1773

Mstr# 5462 9833 1762

XX CHSA

29407
SC-US CHS



Part # 156148-434 RIT2 08/10 **

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

LOS ALAMOS, NM 87545
UNITED STATES US

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(843) 556-8171
REF: MR000EC5Y00

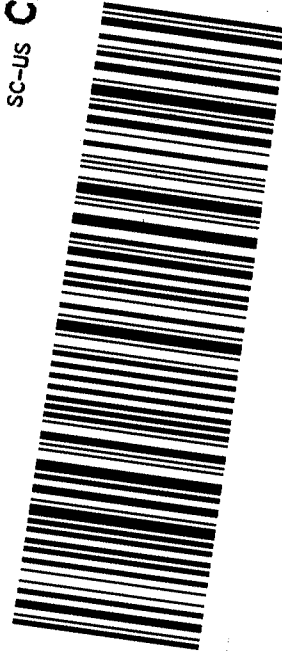


1 of 2
TRK# 5462 9833 1795
HH MASTER HH

THU - 18 JUL 10:30A
PRIORITY OVERNIGHT

XX CHSA

29407
SC-US CHS



Part # 156148-434 RIT2 08/10

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

LOS ALAMOS, NM 87545
UNITED STATES US

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(843) 556-8171
REF: WE991155W300

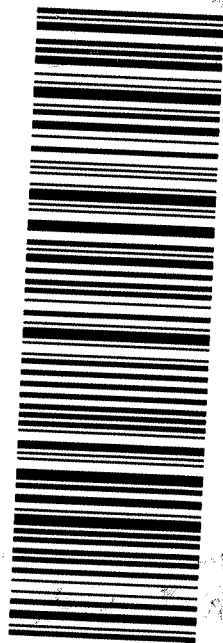


TRK# 5462 9833 1784
[0201]

THU - 18 JUL 10:30A
PRIORITY OVERNIGHT

XX CHSA

29407
SC-US CHS



Part # 156148-434 RIT2 08/10

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

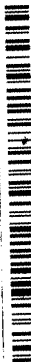
SHIP DATE: 17 JUL 13
ACTWGT: 42.0 LB
CAD: 0014176/CAFE

BILL SENDER

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

CHARLESTON SC 29407

(843) 556-8171
REF: MR3A02244M00



FedEx
Express



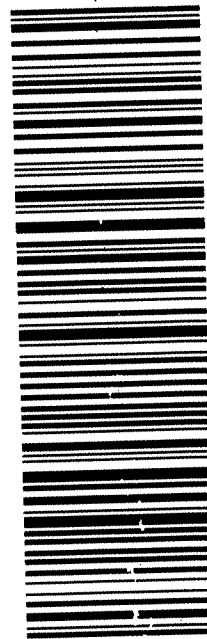
THU - 18 JUL 10:30A
PRIORITY OVERNIGHT

TRK# 5462 9833 1832

0201

XX CHSA

29407
SC-US CHS



Part # 156148-434 RIT2 08/10 **

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

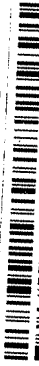
SHIP DATE: 17 JUL 13
ACTWGT: 46.0 LB
CAD: 0014176/CAFE2511

BILL SENDER

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

CHARLESTON SC 29407

(843) 556-8171
REF: MR0A002068B0



FedEx
Express

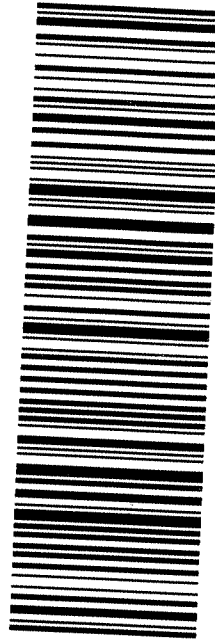


THU - 18 JUL 10:30A
PRIORITY OVERNIGHT

TRK# 5462 9833 1810
0201
MASTER #

XX CHSA

29407
SC-US CHS



Part # 156148-434 RIT2 08/10 **

580C1/AR04/188C

J1131106060125

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: 17 JUL 13
ACTGCT: 46.0 LB MGN
CAD: 0014176/CAFE2511

BILL SENDER

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

CHARLESTON SC 29407
(843) 556-8171
REF: MR0A00206880



FedEx
Express

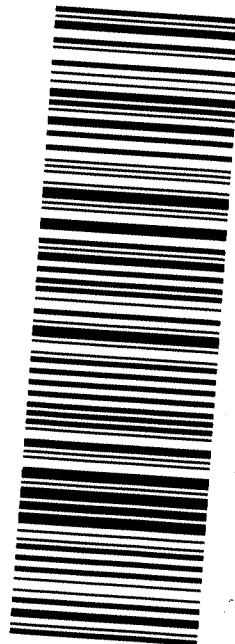


THU - 18 JUL 10:30A
PRIORITY OVERNIGHT

MPS# 5462 9833 1821
Mstr# 5462 9833 1810

XX CHSA

29407
SC-US CHS



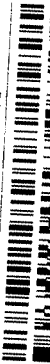
ORIGIN ID: SAFA (505) 665-9966
KEITH GREENE
LOS ALAMOS NATL LAB
TA00 BLDG 1237 DPU 03
LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 17 JUL 13
ACTGCT: 40.0 LB MGN
CAD: 0014176/CAFE2511

BILL SENDER

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

CHARLESTON SC 29407
(843) 556-8171
REF: MR1A015AGWKO



FedEx
Express

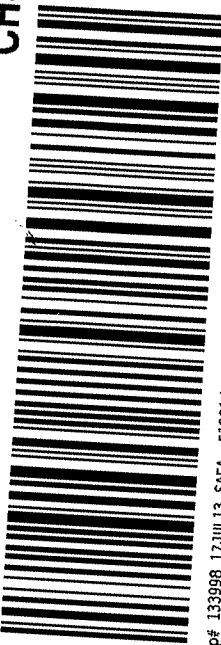


THU - 18 JUL 10:30A
PRIORITY OVERNIGHT

1 of 2
FedEx
TRK# 5462 9833 1762

XX CHSA

29407
SC-US CHS



Emp# 133998 17JUL13 SAFA 519C1/A004/03AB

Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

Qualifier	Explanation
-----------	-------------

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

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.
For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorate by LC-MS/MS
ARS International (ARSL)
SDG 2013-1172**

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: 1316483

Prep Batch Number: 1316482

Sample Analysis

Sample ID	Client ID
329718002	CASA-13-36993
1202912824	Interference Check Sample (ICS)
1202912818	Method Blank (MB)
1202912819	Laboratory Control Sample (LCS)
1202912822	329643002(CAMO-13-37670) Matrix Spike (MS)
1202912823	329643002(CAMO-13-37670) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP).

The data discussed in this narrative has been analyzed in accordance with GL-OA-E-067 REV# 10.

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this SDG.

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

ICV Requirements

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

CCB Requirements

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

CCV Requirements

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

Low Level Standard (CRI) Requirements

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

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

The MB analyzed with this SDG met the acceptance criteria.

Interference Check Sample (ICS)

The ICS met all recovery acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Client sample 329643002 (CAMO-13-37670) from SDG 2013-1149 was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS (1202912822) did not meet spike recovery limits for Perchlorate at -91.2%, and Perchlorate-101 at -163%. The recovery limits are 75-125%. The noted exceptions can be attributed to the background concentrations found in the parent sample, 329643002. Both the LCS and ICS met acceptance criteria, therefore the data are reported with the appropriate DER.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD (1202912823) did not meet spike recovery limits for Perchlorate at 136%, and Perchlorate-101 at 35.9%. The recovery limits are 75-125%. The noted exceptions can be attributed to the background concentrations found in the parent sample, 329643002. Both the LCS and ICS met acceptance criteria, therefore the data are reported with the appropriate DER.

MS/MSD Relative Percent Difference (RPD) Statement

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

Retention Time Standard Area Acceptance

The retention time standard areas were within the required acceptance criteria for all samples and QC.

Retention Time

During the analysis of Perchlorate by LC/MS/MS, retention time shifts are commonly observed. These retention time shifts, which are caused by fouling of the column by the sample matrices, are problematic when the retention time is used as one of the criterion for confirmation. To overcome this problem, a known amount of O(18) labeled Perchlorate was added to each sample as a retention time standard.

The presence of Perchlorate was confirmed by the relative retention time (RRT) of the Perchlorate peak and the O(18) standard. A RRT window of 0.98 to 1.02, as required by Method 332.0, has been used.

In addition to the isotopic ratio, the presence of Perchlorate in the samples associated with this data package have been confirmed using the relative retention criteria stated above, not the absolute retention time.

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Sample 329718002 (CASA-13-36993) and QC samples 1202912822 (CAMO-13-37670) and 1202912823 (CAMO-13-37670) were diluted to bring the over range concentrations within the calibration range.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

Data Exception Report 1205305 was generated for this SDG.

The MS (1202912822) did not meet spike recovery limits for Perchlorate at -91.2%, and Perchlorate-101 at -163%. The recovery limits are 75-125%. The noted exceptions can be attributed to the background concentrations found in the parent sample, 329643002. Both the LCS and ICS met acceptance criteria, therefore the data are reported with the appropriate DER.

The MSD (1202912823) did not meet spike recovery limits for Perchlorate at 136%, and Perchlorate-101 at 35.9%. The recovery limits are 75-125%. The noted exceptions can be attributed to the background concentrations found in the parent sample, 329643002. Both the LCS and ICS met acceptance criteria, therefore the data are reported with the appropriate DER.

Manual Integrations

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

Method Comments

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

Additional Comments

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

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

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

Perchlorate Isotope Ratio

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

System Configuration

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

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

Electronic Packaging Comment

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

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

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

Chromatographic Columns

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

Dionex: IonPac AG-16 2 x 50 mm.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

ARSL001 ARS International (63641-10)

Client SDG: 2013-1172 GEL Work Order: 329718

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 01 AUG 2013

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1316482Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-13-36993Date Received: 18-JUL-13GEL Job No (SDG): 2013-1172GEL Sample ID: 329718002Date Filtered: 23-JUL-13Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.1	.4	0.903	ug/L		2	24-JUL-13 20:10	per0724048a
	Perchlorate Isotope Ratio			3.13			2	24-JUL-13 20:10	per0724048a
14797-73-0	Perchlorate-101	.1	.4	0.886	ug/L		2	24-JUL-13 20:10	per0724048a
	Perchlorate-O(18)			0.981	ug/L		2	24-JUL-13 20:10	per0724048a

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

*Concentration =

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

Quality Control Summary

Perchlorate Laboratory Control Sample

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No. (SDG): 2013-1172

Extract Batch Code: 1316482

Date Filtered: 23-JUL-13

Matrix: STORM WATER

Sample ID: 1202912819

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.194	ug/L	97.1		85 - 115
Perchlorate Isotope Ratio		3.07				-
Perchlorate-101	0.200	.194	ug/L	97.1		85 - 115
Perchlorate-O(18)		.508	ug/L			-

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

Perchlorate Spike/Spike Duplicate Summary

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No (SDG): 2013-1172

Extract Batch Code: 1316482

Date Extracted: 23-JUL-13

GEL MS/PS ID: 1202912822

Client ID: CAMO-13-37670

GEL MSD/PSD ID: 1202912823

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	7.85	ug/L	7.67	-91.2 *	8.12	136 *	5.75	30	75 - 125
Perchlorate Isotope Ratio	0	3.06		3.12		3.14		.634		-
Perchlorate-101	0.200	7.88	ug/L	7.56	-163 *	7.95	35.9 *	5.12	30	75 - 125
Perchlorate-O(18)	0	10.4	ug/L	9.85		10.2		3.08		-

^ 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: STORM WATERExtraction Batch ID: 1316482Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 23-JUL-13GEL Job No (SDG): 2013-1172GEL Sample ID: 1202912818Date Filtered: 23-JUL-13Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.200	ug/L	U	1	24-JUL-13 15:41	per0724012a
	Perchlorate Isotope Ratio						1	24-JUL-13 15:41	per0724012a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	24-JUL-13 15:41	per0724012a
	Perchlorate-O(18)			0.501	ug/L		1	24-JUL-13 15:41	per0724012a

^ 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: STORM WATERExtraction Batch ID: 1316482Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 23-JUL-13GEL Job No (SDG): 2013-1172GEL Sample ID: 1202912819Date Filtered: 23-JUL-13Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.194	ug/L	J	1	24-JUL-13 15:48	per0724013a
	Perchlorate Isotope Ratio			3.07			1	24-JUL-13 15:48	per0724013a
14797-73-0	Perchlorate-101	.05	.2	0.194	ug/L	J	1	24-JUL-13 15:48	per0724013a
	Perchlorate-O(18)			0.508	ug/L		1	24-JUL-13 15:48	per0724013a

^ 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: 1316482Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2013-1172GEL Sample ID: 1202912824Date Filtered: 23-JUL-13Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.206	ug/L		1	24-JUL-13 15:56	per0724014a
	Perchlorate Isotope Ratio			3.1			1	24-JUL-13 15:56	per0724014a
14797-73-0	Perchlorate-101	.05	.2	0.205	ug/L		1	24-JUL-13 15:56	per0724014a
	Perchlorate-O(18)			0.511	ug/L		1	24-JUL-13 15:56	per0724014a

^ 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: 1316482Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-13-37670MSDate Received: 17-JUL-13GEL Job No (SDG): 2013-1172GEL Sample ID: 1202912822Date Filtered: 23-JUL-13Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	1	4	7.67	ug/L		20	24-JUL-13 19:40	per0724044a
	Perchlorate Isotope Ratio			3.12			20	24-JUL-13 19:40	per0724044a
14797-73-0	Perchlorate-101	1	4	7.56	ug/L		20	24-JUL-13 19:40	per0724044a
	Perchlorate-O(18)			9.85	ug/L		20	24-JUL-13 19:40	per0724044a

^ 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: 1316482Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-13-37670MSDDate Received: 17-JUL-13GEL Job No (SDG): 2013-1172GEL Sample ID: 1202912823Date Filtered: 23-JUL-13Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	1	4	8.12	ug/L		20	24-JUL-13 19:47	per0724045a
	Perchlorate Isotope Ratio			3.14			20	24-JUL-13 19:47	per0724045a
14797-73-0	Perchlorate-101	1	4	7.95	ug/L		20	24-JUL-13 19:47	per0724045a
	Perchlorate-O(18)			10.2	ug/L		20	24-JUL-13 19:47	per0724045a

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

*Concentration =

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

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 25-JUL-13	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: LC-MS/MS	Test / Method: SW846 6850 Modified	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1316483	Sample Numbers: 1202912822, 1202912823		
<p>Potentially affected work order(s)(SDG): 329643(2013-1149),329653(2013-1150),329718(2013-1172),329759(2013-1178),329767(2013-1181),329854(2013-1217),329862(2013-1223),329865(2013-1224),329939(2013-1276),329960(2013-1238)</p> <p>Application Issues:</p> <p>Failed Recovery for MS/PS Failed Recovery for MSD/PSD</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. The MS (1202912822) did not meet spike recovery limits for Perchlorate at -91.2%, and Perchlorate-101 at -163%. The recovery limits are 75-125%.</p> <p>2. The MSD (1202912823) did not meet spike recovery limits for Perchlorate at 136%, and Perchlorate-101 at 35.9%. The recovery limits are 75-125%.</p>		<p>1. & 2. The noted exceptions can be attributed to the background concentrations found in the parent sample, 329643002. Both the LCS and ICS met acceptance criteria, therefore the data are reported with the appropriate DER. The discrepancies are noted in the case narrative.</p>	

Originator's Name:

Michael Penny 25-JUL-13

Data Validator/Group Leader:

Charles Wilson 31-JUL-13

FID Diesel Range Organics Analysis

Case Narrative

**FID Diesel Range Organics
ARS International (ARSL)
SDG 2013-1172**

Method/Analysis Information

Procedure: Analysis of Diesel Range Organics by Flame Ionization Detector

Analytical Method: SW846 3535A/8015B

Prep Method: SW846 3535A

Analytical Batch Number: 1316052

Prep Batch Number: 1316051

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3535A/8015B:

Sample ID	Client ID
329718001	CASA-13-36989
329718003	CASA-13-39006
1202911612	Method Blank (MB)
1202911613	Laboratory Control Sample (LCS)
1202911614	329767001(CAMO-13-36978) Matrix Spike (MS)
1202911616	Laboratory Control Sample Duplicate (LCSD)

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-003 REV# 23.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

Initial Calibration

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

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria. Analyte peaks eluted within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Laboratory Control Sample Duplicate (LCSD) Recovery

The LCSD spike recoveries met the acceptance limits.

LCS/LCSD Relative Percent Difference (RPD) Statement

The RPD between the LCS and LCSD met the acceptance limits.

QC Sample Designation

An ARSL sample of similar matrix in SDG 2013-1181 was selected for the matrix spike analysis. The matrix spike duplicate analysis was not performed due to limited sample volume. The LCS and LCSD analysis was performed to measure the precision and accuracy for the batch.

Matrix Spike (MS) Recovery Statement

The MS recovery was within the established acceptance limits.

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. Analyte peaks eluted within the established retention time windows for this method.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions were not required in this SDG.

Miscellaneous Information

Electronic Package Comment

This package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually 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 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

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The additional comments were not required.

System Configuration

The Diesel Range Organics analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
FID7.I	Agilent Gas Chromatograph	Agilent 6890N GC/FID	DB-5MS	30m x 0.25mm, 0.25um(J&W)

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

ARSL001 ARS International (63641-10)

Client SDG: 2013-1172 GEL Work Order: 329718

The Qualifiers in this report are defined as follows:

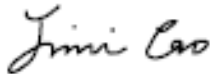
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
-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

Date: 14 AUG 2013

Title: Data Validator

Sample Data Summary

FID Diesel Range Organics

Page 1 of 1

Certificate of Analysis

Sample Summary

SDG Number: 2013-1172

Lab Sample ID: 329718001

Date Collected: 07/16/2013 12:37

Date Received: 07/18/2013 08:45

Matrix: W

Client: ARSL001

Project: ESHL00210

Method: SW846 3535A/8015B

SOP Ref: GL-OA-E-003

Client ID: CASA-13-36989

Batch ID: 1316052

Inst: FID7.I

Dilution: 1

Run Date: 07/24/2013 11:59

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 07/23/2013 09:50

Aliquot: 910 mL

Final Volume: 1 mL

Data File: 072413DR\7g2409.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
DRO	Diesel Range Organics	U	0.220	mg/L	0.0549	0.220
Surrogate/Tracer recovery		Result	Nominal		Recovery%	Acceptable Limits
o-Terphenyl		0.0133	0.022	mg/L	60.5	(25%-131%)

FID Diesel Range Organics

Page 1 of 1

Certificate of Analysis

Sample Summary

SDG Number: 2013-1172

Lab Sample ID: 329718003

Date Collected: 07/16/2013 10:57

Date Received: 07/18/2013 08:45

Matrix: W

Client: ARSL001

Project: ESHL00210

Client ID: CASA-13-39006

Method: SW846 3535A/8015B

SOP Ref: GL-OA-E-003

Batch ID: 1316052

Inst: FID7.I

Dilution: 1

Run Date: 07/24/2013 12:36

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 07/23/2013 09:50

Aliquot: 970 mL

Final Volume: 1 mL

Data File: 072413DR\7g2410.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
DRO	Diesel Range Organics	U	0.206	mg/L	0.0515	0.206
Surrogate/Tracer recovery		Result	Nominal		Recovery%	Acceptable Limits
o-Terphenyl		0.00981	0.0206	mg/L	47.6	(25%-131%)

Quality Control Summary

FID Diesel Range Organics
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2013-1172

Matrix Type: LIQUID

Sample ID	Client ID	OTP %REC
1202911612	MB for batch 1316051	56
1202911613	LCS for batch 1316051	75
1202911616	LCSD for batch 1316051	71
329718001	CASA-13-36989	61
329718003	CASA-13-39006	48
1202911614	CAMO-13-36978MS	72

Surrogate**Acceptance Limits**

OTP = o-Terphenyl

(25%-131%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

FID Diesel Range Organics
Quality Control Summary
Spike Recovery Report

Page 1 of 2

SDG Number: 2013-1172**Sample Type:** Laboratory Control Sample**Client ID:** LCS for batch 1316051**Matrix:** WATER**Lab Sample ID** 1202911613**Instrument:** FID7.I**Analysis Date:** 07/24/2013 10:45**Dilution:** 1**Analyst:** JMB3**Prep Batch ID:** 1316051**Inj. Vol:** 1 uL**Batch ID:** 1316052

CAS No	Parmname	Amount Added mg/L	Sample Conc. mg/L	Spike Conc. mg/L	Recovery %	Acceptance Limits
DRO	LCS Diesel Range Organics	1.00	0.0	0.679	68	45-110

FID Diesel Range Organics
Quality Control Summary
Spike Recovery Report

Page 2 of 2

SDG Number: 2013-1172

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 1316051

Matrix: WATER

Lab Sample ID 1202911616

Instrument: FID7.I

Analysis Date: 07/24/2013 11:22

Dilution: 1

Analyst: JMB3

Prep Batch ID:1316051

Inj. Vol: 1 uL

Batch ID: 1316052

CAS No	Parmname	Amount Added mg/L	Sample Conc. mg/L	Spike Conc. mg/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
DRO	LCSD Diesel Range Organics	1.00	0.0	0.720	72	45-110	6	0-32

FID Diesel Range Organics
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2013-1172

Sample Type: Matrix Spike

Client ID: CAMO-13-36978MS

Matrix: W

Lab Sample ID 1202911614

Instrument: FID7.I

Analysis Date: 07/25/2013 10:55

Dilution: 1

Analyst: BYT1

Prep Batch ID:1316051

Inj. Vol: 1 uL

Batch ID: 1316052

CAS No	Parmname	Amount Added mg/L	Sample Conc. mg/L	Spike Conc. mg/L	Recovery %	Acceptance Limits
DRO	MS Diesel Range Organics	1.02	0.0922 J	0.692	59	45-124

Method Blank Summary

Page 1 of 1

SDG Number:	2013-1172	Client:	ARSL001	Matrix:	WATER
Client ID:	MB for batch 1316051	Instrument ID:	FID7.I	Data File:	072413DR\f7g2405.D
Lab Sample ID:	1202911612	Prep Date:	07/23/2013 09:50	Analyzed:	07/24/13 09:31
Column:	DB-5ms				

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1316051	1202911613	072413DR\f7g2407.D	07/24/13	1045
02 LCSD for batch 1316051	1202911616	072413DR\f7g2408.D	07/24/13	1122
03 CASA-13-36989	329718001	072413DR\f7g2409.D	07/24/13	1159
04 CASA-13-39006	329718003	072413DR\f7g2410.D	07/24/13	1236
05 CAMO-13-36978MS	1202911614	072513DR\f7g2506.D	07/25/13	1055

Quality Control Data

**FID Diesel Range Organics
Certificate of Analysis
Sample Summary**

Page 1 of 1

SDG Number: 2013-1172

Lab Sample ID: 1202911612

Client Sample: QC for batch 1316051

Client ID: MB for batch 1316051

Batch ID: 1316052

Run Date: 07/24/2013 09:31

Prep Date: 07/23/2013 09:50

Data File: 072413DR\17g2405.D

Matrix: WATER

Client: ARSL001

Method: SW846 3535A/8015B

Inst: FID7.I

Analyst: JMB3

Aliquot: 1000 mL

Column: DB-5ms

Project: QC

SOP Ref: GL-OA-E-003

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
DRO	Diesel Range Organics	U	0.200	mg/L	0.050	0.200
Surrogate/Tracer recovery		Result	Nominal		Recovery%	Acceptable Limits
o-Terphenyl		0.0112	0.020	mg/L	55.8	(25%-131%)

**FID Diesel Range Organics
Certificate of Analysis
Sample Summary**

Page 1 of 1

SDG Number: 2013-1172

Lab Sample ID: 1202911613

Client Sample: QC for batch 1316051

Client ID: LCS for batch 1316051

Batch ID: 1316052

Run Date: 07/24/2013 10:45

Prep Date: 07/23/2013 09:50

Data File: 072413DR\7g2407.D

Matrix: WATER

Client: ARSL001

Method: SW846 3535A/8015B

Inst: FID7.I

Analyst: JMB3

Aliquot: 1000 mL

Column: DB-5ms

Project: QC

SOP Ref: GL-OA-E-003

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
DRO	Diesel Range Organics		0.679	mg/L	0.050	0.200
Surrogate/Tracer recovery		Result	Nominal		Recovery%	Acceptable Limits
o-Terphenyl		0.0149	0.020	mg/L	74.6	(25%-131%)

**FID Diesel Range Organics
Certificate of Analysis
Sample Summary**

Page 1 of 1

SDG Number: 2013-1172

Lab Sample ID: 1202911616

Client Sample: QC for batch 1316051

Client ID: LCSD for batch 1316051

Batch ID: 1316052

Run Date: 07/24/2013 11:22

Prep Date: 07/23/2013 09:50

Data File: 072413DR\17g2408.D

Matrix: WATER

Client: ARSL001

Method: SW846 3535A/8015B

Inst: FID7.I

Analyst: JMB3

Aliquot: 1000 mL

Column: DB-5ms

Project: QC

SOP Ref: GL-OA-E-003

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
DRO	Diesel Range Organics		0.720	mg/L	0.050	0.200
Surrogate/Tracer recovery		Result	Nominal		Recovery%	Acceptable Limits
o-Terphenyl		0.0142	0.020	mg/L	71.2	(25%-131%)

Metals Analysis

Case Narrative

**Metals Fractional Narrative
ARS International (ARSL)
SDG 2013-1172**

Sample Analysis

Sample ID	Client ID
329718002	CASA-13-36993
1202921919	Method Blank (MB) ICP
1202921920	Laboratory Control Sample (LCS)
1202921923	330090002(CASA-13-37019L) Serial Dilution (SD)
1202921921	330090002(CASA-13-37019D) Sample Duplicate (DUP)
1202921922	330090002(CASA-13-37019S) Matrix Spike (MS)
1202921924	Method Blank (MB) ICP-MS
1202921925	Laboratory Control Sample (LCS)
1202921928	330090002(CASA-13-37019L) Serial Dilution (SD)
1202921926	330090002(CASA-13-37019D) Sample Duplicate (DUP)
1202921927	330090002(CASA-13-37019S) Matrix Spike (MS)
1202921284	Method Blank (MB) CVAA
1202921285	Laboratory Control Sample (LCS)
1202921288	330751001(WST16-13-36930L) Serial Dilution (SD)
1202921286	330751001(WST16-13-36930D) Sample Duplicate (DUP)
1202921287	330751001(WST16-13-36930S) Matrix Spike (MS)

Method/Analysis Information

Analytical Batch:	1320241, 1320243, 1319995 and 1321813
Prep Batch :	1320234, 1320242 and 1319994
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-006 REV# 9, GL-MA-E-014 REV# 25, GL-MA-E-010 REV# 26 and GL-GC-E-107 REV# 8
Analytical Method:	SW846 3005/6010B, SW846 3005/6020 DOE-AL, EPA 245.1/245.2 and SM 2340 B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

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

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

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 6100E 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 - 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: 330090002 (CASA-13-37019)-ICP and ICP-MS and 330751001 (WST16-13-36930)-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 nickel.

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instruments. Sample 329718002 required a dilution for tin in order to minimize suppression due to matrix interferences.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: 1210109. 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.

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:  Date: 08/12/13

Sample Data Summary

GEL LABORATORIES LLC

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

Qualifier Definition Report for

ARSL001 ARS International (63641-10)

Client SDG: 2013-1172 GEL Work Order: 329718

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

J Value is estimated

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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

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

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

Reviewed by



08/12/13

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2013-1172**CONTRACT:** ESHL00210**METHOD TYPE:** EPA**SAMPLE ID:** 329718002**BASIS:** As Received**DATE COLLECTED** 16-JUL-13**CLIENT ID:** CASA-13-36993**LEVEL:** Low**DATE RECEIVED** 18-JUL-13**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	NOR1	08/07/13 11:06	080713W1-5	1319995

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2013-1172

CONTRACT: ESHL00210

METHOD TYPE: SW846

SAMPLE ID: 329718002

BASIS: As Received

DATE COLLECTED 16-JUL-13

CLIENT ID: CASA-13-36993

LEVEL: Low

DATE RECEIVED 18-JUL-13

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	08/09/13 13:27	130809-3	1320243
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	BAJ	08/08/13 17:03	130808-2	1320243
7440-39-3	Barium	22.8	ug/L		1	5	5	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7440-42-8	Boron	27.3	ug/L	J	15	50	50	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	BAJ	08/08/13 17:03	130808-2	1320243
7440-70-2	Calcium	17800	ug/L		50	200	200	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7440-47-3	Chromium	55.7	ug/L		2	10	10	1	MS	BAJ	08/08/13 17:03	130808-2	1320243
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	08/08/13 17:03	130808-2	1320243
7439-95-4	Magnesium	3910	ug/L		110	300	300	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7439-98-7	Molybdenum	1.19	ug/L		0.165	0.5	0.5	1	MS	SKJ	08/09/13 11:50	130809-4	1320243
7440-02-0	Nickel	2.99	ug/L		0.5	2	2	1	MS	BAJ	08/08/13 17:03	130808-2	1320243
7440-09-7	Potassium	1270	ug/L		50	150	150	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7782-49-2	Selenium	1.95	ug/L	J	1.5	5	5	1	MS	BAJ	08/08/13 17:03	130808-2	1320243
7631-86-9	Silica	75200	ug/L		53	213	213	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	BAJ	08/08/13 17:03	130808-2	1320243
7440-23-5	Sodium	10300	ug/L		100	300	300	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7440-24-6	Strontium	69.8	ug/L		1	5	5	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	BAJ	08/08/13 17:03	130808-2	1320243
7440-31-5	Tin	100	ug/L	U	25	100	100	10	P	HSC	08/09/13 09:08	080913A-1	1320241
7440-61-1	Uranium	0.119	ug/L	J	0.067	0.2	0.2	1	MS	SKJ	08/09/13 11:50	130809-4	1320243
7440-62-2	Vanadium	6.61	ug/L		1	5	5	1	P	HSC	08/09/13 07:57	080913A-1	1320241
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	08/09/13 07:57	080913A-1	1320241

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2013-1172**CONTRACT:** ESHL00210**METHOD TYPE:****SAMPLE ID:** 329718002 **BASIS:** As Received **DATE COLLECTED** 16-JUL-13**CLIENT ID:** CASA-13-36993 **LEVEL:** Low **DATE RECEIVED** 18-JUL-13**MATRIX:** W **%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	60.4	mg/L		0.453	1.24	1.24	1		AXH3	08/12/13 12:25		1321813

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1319995	1319994	EPA 245.1/245.2 Prep	20	mL	20	mL	08/05/13	AXS5
1320241	1320234	SW846 3005A	50	mL	50	mL	08/08/13	AXG2
1320243	1320242	SW846 3005A	50	mL	50	mL	08/07/13	AXG2

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

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2013-1172

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>
1202921284	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2
1202921919	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	-82.1	ug/L	+/-150	J	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1202921924	Antimony	-1.7	ug/L	+/-3	J	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

*Analytical Methods:

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

METALS

-5a-

Matrix Spike Summary

SDG NO. 2013-1172 **Client ID:** WST16-13-36930S**Contract:** ESHL00210 **Level:** Low**Matrix:** GROUND WATER **% Solids:****Sample ID:** 330751001 **Spike ID:** 1202921287

<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	2.11		0.067	U	2	105		AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-5a-

Matrix Spike Summary

SDG NO. 2013-1172 Client ID: CASA-13-37019S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 330090002 Spike ID: 1202921922

<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	5320		68	U	5000	106		P
Barium	ug/L	75-125	541		13.8		500	105		P
Beryllium	ug/L	75-125	547		1	U	500	109		P
Boron	ug/L	75-125	567		53.3		500	103		P
Calcium	ug/L	75-125	23900		18600		5000	106		P
Cobalt	ug/L	75-125	534		1	U	500	107		P
Copper	ug/L	75-125	551		3	U	500	110		P
Iron	ug/L	75-125	5430		30	U	5000	109		P
Magnesium	ug/L	75-125	9300		3860		5000	109		P
Manganese	ug/L	75-125	548		31.2		500	103		P
Potassium	ug/L	75-125	7650		2340		5000	106		P
Silica	ug/L		59300		50400		10700	83.6	N/A	P
Sodium	ug/L	75-125	15000		10300		5000	93.9		P
Strontium	ug/L	75-125	605		74.5		500	106		P
Tin	ug/L	75-125	632		25	U	500	125		P
Vanadium	ug/L	75-125	543		3.94	J	500	108		P
Zinc	ug/L	75-125	527		3.3	U	500	105		P

*Analytical Methods:

P SW846 3005/6010B

METALS

-5a-

Matrix Spike Summary

SDG NO. 2013-1172 Client ID: CASA-13-37019S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 330090002 Spike ID: 1202921927

<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>
Lead	ug/L	75-125	48.2		0.5	U	50	96.4		MS
Molybdenum	ug/L	75-125	51.9		1.5		50	101		MS
Nickel	ug/L	75-125	47.7		3.8		50	87.7		MS
Selenium	ug/L	75-125	52.1		1.5	U	50	102		MS
Silver	ug/L	75-125	49.3		0.2	U	50	98.6		MS
Thallium	ug/L	75-125	43.2		0.45	U	50	86.2		MS
Uranium	ug/L	75-125	53.4		0.453		50	106		MS
Antimony	ug/L	75-125	50.2		1	U	50	100		MS
Arsenic	ug/L	75-125	49.5		1.7	U	50	96.8		MS
Cadmium	ug/L	75-125	49.1		0.11	U	50	98.2		MS
Chromium	ug/L	75-125	47.6		2	U	50	93.6		MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

Metals
–6–
Duplicate Sample Summary

SDG No.: 2013–1172**Lab Code:** GEL**Contract:** ESHL00210**Client ID:** WST16–13–36930D**Matrix:** LIQUID**Level:** Low**Sample ID:** 330751001**Duplicate ID:** 1202921286**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.: 2013-1172

Lab Code: GEL

Contract: ESHL00210

Client ID: CASA-13-37019D

Matrix: LIQUID

Level: Low

Sample ID: 330090002

Duplicate ID: 1202921921

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-5	13.8		13.7		.502		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	53.3		43.5 J		20.3		P
Calcium	ug/L	+/-20%	18600		18600		.113		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%	3860		3860		.0622		P
Manganese	ug/L	+/-10	31.2		31		.708		P
Potassium	ug/L	+/-20%	2340		2390		1.98		P
Silica	ug/L	+/-20%	50400		50400		.0278		P
Sodium	ug/L	+/-20%	10300		10200		.4		P
Strontium	ug/L	+/-20%	74.5		73.9		.876		P
Tin	ug/L		25 U		25 U				P
Vanadium	ug/L	+/-5	3.94 J		4 J		1.53		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005/6010B

Metals
–6–
Duplicate Sample Summary

SDG No.: 2013–1172

Lab Code: GEL

Contract: ESHL00210

Client ID: CASA–13–37019D

Matrix: LIQUID

Level: Low

Sample ID: 330090002

Duplicate ID: 1202921926

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	1.5		1.52		.861		MS
Nickel	ug/L	+/- 2	3.8		0.5 U		165	*	MS
Selenium	ug/L		1.5 U		1.5 U				MS
Silver	ug/L		0.2 U		0.2 U				MS
Thallium	ug/L		0.45 U		0.45 U				MS
Uranium	ug/L	+/- .2	0.453		0.46		1.53		MS

*Analytical Methods:

MS SW846 3005/6020 DOE–AL

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2013-1172

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>
1202921285	Mercury	ug/L	2	2.07		103	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2013-1172

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>
1202921920								
	Aluminum	ug/L	5000	5470		109	80-120	P
	Barium	ug/L	500	546		109	80-120	P
	Beryllium	ug/L	500	549		110	80-120	P
	Boron	ug/L	500	540		108	80-120	P
	Calcium	ug/L	5000	5500		110	80-120	P
	Cobalt	ug/L	500	552		110	80-120	P
	Copper	ug/L	500	551		110	80-120	P
	Iron	ug/L	5000	5500		110	80-120	P
	Magnesium	ug/L	5000	5580		112	80-120	P
	Manganese	ug/L	500	542		108	80-120	P
	Potassium	ug/L	5000	5420		108	80-120	P
	Silica	ug/L	10700	11400		106	80-120	P
	Sodium	ug/L	5000	5360		107	80-120	P
	Strontium	ug/L	500	545		109	80-120	P
	Tin	ug/L	500	553		111	80-120	P
	Vanadium	ug/L	500	550		110	80-120	P
	Zinc	ug/L	500	541		108	80-120	P

*Analytical Methods:

P SW846 3005/6010B

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2013-1172

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>
1202921925								
	Antimony	ug/L	50	49.1		98.3	80-120	MS
	Arsenic	ug/L	50	51.2		102	80-120	MS
	Cadmium	ug/L	50	51		102	80-120	MS
	Chromium	ug/L	50	49.3		98.7	80-120	MS
	Lead	ug/L	50	50.7		101	80-120	MS
	Molybdenum	ug/L	50	50.1		100	80-120	MS
	Nickel	ug/L	50	52.4		105	80-120	MS
	Selenium	ug/L	50	53.8		108	80-120	MS
	Silver	ug/L	50	51.1		102	80-120	MS
	Thallium	ug/L	50	48.1		96.3	80-120	MS
	Uranium	ug/L	50	52.4		105	80-120	MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2013-1172 **Client ID:** WST16-13-36930L**Contract:** ESHL00210**Matrix:** LIQUID **Level:** Low**Sample ID:** 330751001 **Serial Dilution ID:** 1202921288

<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

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2013-1172 Client ID: CASA-13-37019L

Contract: ESHL00210

Matrix: LIQUID Level: Low

Sample ID: 330090002 Serial Dilution ID: 1202921923

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	13.8		13.8	J	.102			P
Beryllium	1	U	5	U				P
Boron	53.3		106	J	99.2			P
Calcium	18600		18400		.874		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3860		3720		3.68			P
Manganese	31.2		30	J	3.75			P
Potassium	2340		2620		11.9			P
Silica	50400		49200		2.38		10	P
Sodium	10300		9710		5.42		10	P
Strontium	74.5		73		2		10	P
Tin	2.5	U	12.5	U				P
Vanadium	3.94	J	5	U	100			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005/6010B

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2013-1172

Client ID: CASA-13-37019L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 330090002

Serial Dilution ID: 1202921928

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	1.7	U	8.5	U				MS
Cadmium	.11	U	.55	U				MS
Chromium	2	U	10	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.5		1.84	J	22.1			MS
Nickel	3.8		3.98	J	4.61			MS
Selenium	1.5	U	7.5	U				MS
Silver	.2	U	1	U				MS
Thallium	.45	U	3.79	J				MS
Uranium	.453		.5	J	10.4			MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 09-AUG-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP/MS	Test / Method: SW846 3005/6020 DOE-AL	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1320243	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 329718(2013-1172),329767(2013-1181),329854(2013-1217),329859(2013-1221),329862(2013-1223),329865(2013-1224),329960(2013-1238),330006(2013-1260),330076(2013-1241),330089(2013-1293),330090(2013-1294)</p> <p>Application Issues:</p> <p>Failed RPD for DUP</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed RPD for DUP:</p> <p>QC 1202921926DUP</p>		<p>The sample and sample duplicate % RPD failed outside the control limits for Ni 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.</p>	

Originator's Name:
Elizabeth Janssen 09-AUG-13

Data Validator/Group Leader:
Samantha Jacobs 09-AUG-13

General Chem Analysis

Case Narrative

**General Chemistry Narrative
ARS International (ARSL)
SDG 2013-1172**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1315287

Method: SW 9060 Total Organic Carbon

Sample Analysis

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

Sample ID	Client ID
329718001	CASA-13-36989
1202909878	Method Blank (MB)
1202909879	329250001(CAMO-13-36975) Sample Duplicate (DUP)
1202909880	329250001(CAMO-13-36975) Post Spike (PS)
1202909881	Laboratory Control Sample (LCS)
1202910591	329748007(WTLAP-13-39037) Sample Duplicate (DUP)
1202910592	329748007(WTLAP-13-39037) Post Spike (PS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-093 REV# 12.

Preparation/Analytical Method Verification

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

Calibration Information

The Carbon analysis was performed on a O-I Analytical Model 1010 Total Organic Carbon Analyzer.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

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

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1319860

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
329718002	CASA-13-36993
1202920985	Laboratory Control Sample (LCS)
1202920986	329767002(CAMO-13-36986) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329767002 (CAMO-13-36986).

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: 1318847 **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
329718002	CASA-13-36993
1202918635	329718002(CASA-13-36993) Sample Duplicate (DUP)
1202918636	330006004(CAMO-13-36971) Sample Duplicate (DUP)
1202918637	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: 329718002 (CASA-13-36993) and 330006004 (CAMO-13-36971).

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 samples from this sample group were received by the lab outside of the method specified holding time: 1202918635 (CASA-13-36993), 1202918636 (CAMO-13-36971) and 329718002 (CASA-13-36993).

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: 1206839 1202918635 (CASA-13-36993), 1202918636 (CAMO-13-36971) and 329718002 (CASA-13-36993).

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: 1316516

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
329718002	CASA-13-36993
1202912900	Method Blank (MB)
1202912901	329653002(CAMO-13-36985) Sample Duplicate (DUP)
1202912902	329653002(CAMO-13-36985) Post Spike (PS)
1202912903	Laboratory Control Sample (LCS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 22.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329653002 (CAMO-13-36985).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Manual Integrations

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202912901 (CAMO-13-36985), 1202912902 (CAMO-13-36985) and 329718002 (CASA-13-36993).

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: 1317191 **Method:** EPA 350.1 Nitrogen and Ammonia L

Prep Batch : 1317190 **Method:** EEPA 350.2 Prep

Sample Analysis

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

Sample ID	Client ID
329718002	CASA-13-36993
1202914643	Method Blank (MB)
1202914644	Laboratory Control Sample (LCS)
1202914647	329653002(CAMO-13-36985) Sample Duplicate (DUP)
1202914648	329653002(CAMO-13-36985) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329653002 (CAMO-13-36985).

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 Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: 1202914647 (CAMO-13-36985).

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The following sample was re-analyzed due to instrument failure: 1202914643 (MB).

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

The following DER was generated for this SDG: 1206647 1202914647 (CAMO-13-36985).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1315708	Method:	Nitrogen and Total Kjeldahl (TKN)
Prep Batch :	1315707	Method:	EEPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
329718001	CASA-13-36989
1202910854	Method Blank (MB)
1202910855	Laboratory Control Sample (LCS)
1202910856	329653001(CAMO-13-36977) Sample Duplicate (DUP)
1202910857	329653001(CAMO-13-36977) Matrix Spike (MS)
1202911679	329377001(CAMO-13-36976) Sample Duplicate (DUP)
1202911680	329377001(CAMO-13-36976) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

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: 329377001 (CAMO-13-36976) and 329653001 (CAMO-13-36977).

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

The spike recovery falls outside of the established acceptance limits due to matrix interference: 1202910857 (CAMO-13-36977).

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. 1202910856 (CAMO-13-36977) and 1202911679 (CAMO-13-36976).

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: 1208720 1202910857 (CAMO-13-36977).

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:	1316084	Method:	EPA 353.2 Nitrogen and Nitrate/Nitrite

Sample Analysis

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

Sample ID	Client ID
329718002	CASA-13-36993
1202911691	Method Blank (MB)
1202911694	329718002(CASA-13-36993) Sample Duplicate (DUP)
1202911697	329718002(CASA-13-36993) Post Spike (PS)
1202911698	Laboratory Control Sample (LCS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329718002 (CASA-13-36993).

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

The spike recovery falls outside of the GEL acceptance limits but within the client specified limits. 1202911697 (CASA-13-36993).

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The following samples in this sample group were diluted due to high concentration: 1202911694 (CASA-13-36993), 1202911697 (CASA-13-36993) and 329718002 (CASA-13-36993).

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: 1208574 1202911697 (CASA-13-36993).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1315711	Method:	EPA 365.4 Phosphorus and Total in
Prep Batch :	1315709	Method:	EEPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
329718002	CASA-13-36993
1202910858	Method Blank (MB)
1202910859	329545002(CAMO-13-37047) Sample Duplicate (DUP)
1202910860	329663001(NP160-13-38789) Sample Duplicate (DUP)
1202910861	329545002(CAMO-13-37047) Matrix Spike (MS)
1202910862	329663001(NP160-13-38789) Matrix Spike (MS)
1202910863	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-103 REV# 10.

Preparation/Analytical Method Verification

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

Calibration Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 329545002 (CAMO-13-37047) and 329663001 (NP160-13-38789).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1316037

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
329718002	CASA-13-36993
1202911589	Method Blank (MB)
1202911591	329718002(CASA-13-36993) Sample Duplicate (DUP)
1202911592	Laboratory Control Sample (LCS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-001 REV# 13.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329718002 (CASA-13-36993).

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Sample Aliquot

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Analytical Batch: 1318623 **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
329718002	CASA-13-36993
1202918113	329718002(CASA-13-36993) Sample Duplicate (DUP)
1202918115	329718002(CASA-13-36993) Matrix Spike (MS)
1202918118	Laboratory Control Sample (LCS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 10.

Preparation/Analytical Method Verification

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

Calibration Information

The Titration analysis was performed on a manually operated buret.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329718002 (CASA-13-36993).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

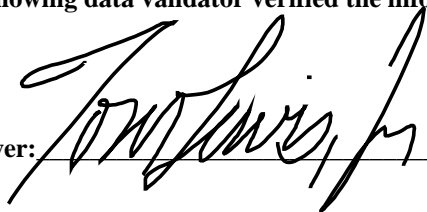
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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:

13Aug13

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: 2013-1172 GEL Work Order: 329718

The Qualifiers in this report are defined as follows:

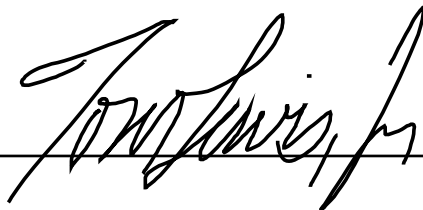
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- ** Analyte is a surrogate compound
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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

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

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

Reviewed by



GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 9, 2013

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

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

Client SDG: 2013-1172

Client Sample ID: CASA-13-36989
Sample ID: 329718001
Matrix: W
Collect Date: 16-JUL-13 12:37
Receive Date: 18-JUL-13
Collector: Client

Project: ESHL00210
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average	J	0.657	0.330	1.00	mg/L	1	TSM	07/19/13	1941	1315287	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl	J	0.0797	0.033	0.100	mg/L	1	KLP1	08/06/13	1456	1315708	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	08/05/13	1700	1315707

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 351.2	

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 9, 2013

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

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

Client SDG: 2013-1172

Client Sample ID: CASA-13-36993
Sample ID: 329718002
Matrix: W
Collect Date: 16-JUL-13 12:37
Receive Date: 18-JUL-13
Collector: Client

Project: ESHL00210
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Conductivity Analysis											
EPA120.1 Specific Conductivity "As Received"											
Conductivity		182	1.00	1.00	umhos/cm	1	LXA1	08/03/13	1443	1319860	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 13.5C	H	7.69	0.010	0.100	SU	1	LYG1	07/31/13	0833	1318847	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	J	0.0944	0.067	0.200	mg/L	1	MAR1	08/02/13	0326	1316516	3
Chloride		6.81	0.067	0.200	mg/L	1					
Fluoride		0.351	0.033	0.100	mg/L	1					
Sulfate		12.8	0.133	0.400	mg/L	1					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia		0.0561	0.017	0.050	mg/L	1	KLP1	07/30/13	1442	1317191	4
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		5.35	0.085	0.250	mg/L	5	KLP1	08/05/13	1448	1316084	5
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P	U	ND	0.017	0.050	mg/L	1	KLP1	07/24/13	1615	1315711	6
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		171	3.40	14.3	mg/L		LYG1	07/19/13	0858	1316037	7
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		42.6	0.725	1.00	mg/L		LXA1	07/30/13	1505	1318623	8
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	07/30/13	1300	1317190
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	07/24/13	1515	1315709

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 9, 2013

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

Client SDG: 2013-1172

Client Sample ID: CASA-13-36993
Sample ID: 329718002

Project: ESHL00210
Client ID: ARSL001

The following Analytical Methods were performed:

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

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: August 9, 2013

Page 1 of 5

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

Contact: Mr. Keith Greene

Workorder: 329718

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1315287										
QC1202909879	329250001	DUP									
Total Organic Carbon Average		1.16		1.12	mg/L	3.51	^	(+/-1.00)	TSM	07/19/13	16:07
QC1202910591	329748007	DUP									
Total Organic Carbon Average		5.23		5.26	mg/L	0.553		(0%-20%)		07/19/13	20:49
QC1202909881	LCS										
Total Organic Carbon Average	10.0			9.79	mg/L			(85%-115%)		07/19/13	14:51
QC1202909878	MB										
Total Organic Carbon Average			U	ND	mg/L					07/19/13	14:42
QC1202909880	329250001	PS									
Total Organic Carbon Average	10.0	1.16		11.0	mg/L			(65%-120%)		07/19/13	16:27
QC1202910592	329748007	PS									
Total Organic Carbon Average	10.0	5.23		14.9	mg/L			(65%-120%)		07/19/13	21:08
Conductivity Analysis											
Batch	1319860										
QC1202920986	329767002	DUP									
Conductivity		167		171	umhos/cm	2.54		(0%-10%)	LXA1	08/03/13	14:46
QC1202920985	LCS										
Conductivity	1410			1420	umhos/cm			(95%-105%)		08/03/13	14:04
Electrode Analysis											
Batch	1318847										
QC1202918635	329718002	DUP									
pH		H	7.69	H	7.69	SU	0.00	(0%-10%)	LYG1	07/31/13	08:33
QC1202918636	330006004	DUP									
pH		H	8.37	H	8.37	SU	0.00	(0%-10%)		07/31/13	09:11
QC1202918637	LCS										
pH	7.00			6.95	SU			(99%-101%)		07/31/13	08:30
Ion Chromatography											
Batch	1316516										
QC1202912901	329653002	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MAR1	08/02/13	02:20

GEL LABORATORIES LLC

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

QC Summary

Workorder: 329718

Page 2 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1316516										
Chloride		3.05		3.05	mg/L	0.226		(0%-20%)			
Fluoride		0.427		0.420	mg/L	1.65	^	(+/-0.100)	MAR1	08/02/13	02:20
Sulfate		5.21		5.17	mg/L	0.715		(0%-20%)			
QC1202912903	LCS										
Bromide	1.25			1.22	mg/L		97.6	(90%-110%)		08/02/13	01:14
Chloride	5.00			4.90	mg/L		98	(90%-110%)			
Fluoride	2.50			2.53	mg/L		101	(90%-110%)			
Sulfate	10.0			10.0	mg/L		100	(90%-110%)			
QC1202912900	MB										
Bromide			U	ND	mg/L					08/02/13	00:41
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1202912902	329653002 PS										
Bromide	1.25	U	ND	1.25	mg/L		95.9	(90%-110%)		08/02/13	02:53
Chloride	5.00		3.05	8.03	mg/L		99.6	(90%-110%)			
Fluoride	2.50		0.427	2.82	mg/L		95.8	(90%-110%)			
Sulfate	10.0		5.21	14.9	mg/L		97.3	(90%-110%)			
Nutrient Analysis											
Batch	1315708										
QC1202910856	329653001 DUP										
Nitrogen, Total Kjeldahl		U	ND	J	0.0756	mg/L	N/A		KLP1	08/06/13	14:50
QC1202911679	329377001 DUP										
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A			08/06/13	14:45
QC1202910855	LCS										
Nitrogen, Total Kjeldahl	1.00			0.990	mg/L		99	(90%-110%)		08/06/13	14:44
QC1202910854	MB										
Nitrogen, Total Kjeldahl			J	0.0554	mg/L					08/06/13	14:43

GEL LABORATORIES LLC

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

QC Summary

Workorder: 329718

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1315708										
QC1202910857	329653001	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.32	mg/L		132 *	(90%-110%)	KLP1	08/06/13	14:51
QC1202911680	329377001	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	0.919	mg/L		91.9	(90%-110%)		08/06/13	14:46
Batch	1315711										
QC1202910859	329545002	DUP									
Phosphorus, Total as P		J	0.0349	J	0.0387	mg/L	10.3 ^	(+/-0.050)	KLP1	07/24/13	16:06
QC1202910860	329663001	DUP									
Phosphorus, Total as P		J	0.0179	U	ND	mg/L	N/A ^			07/24/13	16:14
QC1202910863	LCS										
Phosphorus, Total as P	1.00			1.06	mg/L		106	(76%-120%)		07/24/13	16:02
QC1202910858	MB										
Phosphorus, Total as P			U	ND	mg/L					07/24/13	16:01
QC1202910861	329545002	MS									
Phosphorus, Total as P	1.00	J	0.0349	0.787	mg/L		75.2	(62%-139%)		07/24/13	16:06
QC1202910862	329663001	MS									
Phosphorus, Total as P	1.00	J	0.0179	1.06	mg/L		104	(62%-139%)		07/24/13	16:15
Batch	1316084										
QC1202911694	329718002	DUP									
Nitrogen, Nitrate/Nitrite			5.35	5.30	mg/L	0.939		(0%-20%)	KLP1	08/05/13	14:49
QC1202911698	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.02	mg/L		102	(90%-110%)		08/05/13	14:40
QC1202911691	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					08/05/13	14:38
QC1202911697	329718002	PS									
Nitrogen, Nitrate/Nitrite	1.00		1.07	2.23	mg/L		116 *	(90%-110%)		08/05/13	14:55
Batch	1317191										
QC1202914647	329653002	DUP									
Nitrogen, Ammonia			0.0886	J	0.0331	mg/L	91.2*^	(+/-0.050)	KLP1	07/30/13	14:32
QC1202914644	LCS										
Nitrogen, Ammonia	1.00			0.979	mg/L		97.9	(90%-110%)		07/30/13	14:31
QC1202914643	MB										

GEL LABORATORIES LLC

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

QC Summary

Workorder: 329718

Page 4 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1317191										
Nitrogen, Ammonia			J	0.0331	mg/L				KLP1	07/30/13	14:42
QC1202914648 329653002 MS											
Nitrogen, Ammonia	1.00	0.0886		1.01	mg/L		92.1	(90%-110%)		07/30/13	14:33
Solids Analysis											
Batch	1316037										
QC1202911591 329718002 DUP											
Total Dissolved Solids		171		171	mg/L	0.00		(0%-10%)	LYG1	07/19/13	08:58
QC1202911592 LCS											
Total Dissolved Solids	300			286	mg/L		95.2	(95%-105%)		07/19/13	08:58
QC1202911589 MB											
Total Dissolved Solids			U	ND	mg/L					07/19/13	08:58
Titration Analysis											
Batch	1318623										
QC1202918113 329718002 DUP											
Alkalinity, Total as CaCO3		42.6		43.2	mg/L	1.21		(0%-20%)	LXA1	07/30/13	15:12
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1202918118 LCS											
Alkalinity, Total as CaCO3	50.0			51.5	mg/L		103	(90%-110%)		07/30/13	15:03
QC1202918115 329718002 MS											
Alkalinity, Total as CaCO3	50.0	42.6		93.6	mg/L		102	(80%-120%)		07/30/13	15:14

Notes:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J Value is estimated
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.

GEL LABORATORIES LLC

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

QC Summary

Workorder: 329718

Page 5 of 5

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

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

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

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

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

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

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 30-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 350.1, EPA 350.1 SC	Matrix Type: Liquid	Client Code: SNLS, ALBR, DPNT, ESHL,
Batch ID: 1317191	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 329653(2013-1150),329660,329691,329718(2013-1172),329767(2013-1181),329854(2013-1217),329903,330187(2013-1309),330225,330240,330245,330289,330299(2013-1331),330301(2013-1334) Application Issues: Failed Recovery for MS/PS Failed RPD for DUP			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed Recovery for MS: QC 1202914650MS 2. Failed RPD for DUP: QC 1202914647DUP		1. The spike recovery falls outside of the GEL acceptance limits but within the client specified limits. 2. 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:

Kristen Parson 30-JUL-13

Data Validator/Group Leader:

Julia Hamilton 31-JUL-13

DATA EXCEPTION REPORT			
Mo.Day Yr. 31-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: EPA 150.1	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1318847	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 329718(2013-1172),329748(2013-1177),329767(2013-1181),329854(2013-1217),329855(2013-1218),329857(2013-1219),329862(2013-1223),329865(2013-1224),329960(2013-1238),329961(2013-1239),329963(2013-1242),329965(2013-1245),329966(2013-1247),330006(2013-1260) Application Issues: Sample received out of holding			
Specification and Requirements Exception Description:		DER Disposition:	
1. Sample received out of holding: 329718 002 329748 014 329767 002 329854 002,004,007 329855 001 329857 001 329862 002 329865 002 329960 002 329961 002,004,007,009 329963 007 329965 007 329966 007 330006 002,004 QC 1202918635DUP,1202918636DUP		1. Sample received out of holding	

Originator's Name:

Lisa Gregory 31-JUL-13

Data Validator/Group Leader:

Jamie Johnson 07-AUG-13

DATA EXCEPTION REPORT			
Mo.Day Yr. 06-AUG-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 353.2	Matrix Type: Liquid	Client Code: ESHL, INEL, NEVA, SNLS
Batch ID: 1316084	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 329541,329718(2013-1172),329767(2013-1181),329807(39363-04_WCH),329818(V3872C),329854(2013-1217),329862(2013-1223),329865(2013-1224) Application Issues: Failed Recovery for MS/PS			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed Recovery for MS: QC 1202911695PS (SNLS), QC 1202911696PS (INEL), QC 1202911697PS (ESHL) 2. QC 1202911696PS		1. The spike recoveries fall outside of the GEL acceptance limits but within the client specified limits. 2. The spike recovery falls outside of the established acceptance limits due to matrix interference.	

Originator's Name:
Kristen Parson 06-AUG-13

Data Validator/Group Leader:
Julia Hamilton 07-AUG-13

DATA EXCEPTION REPORT

Mo.Day Yr. 06-AUG-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 351.2	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1315708	Sample Numbers: See below.		
<p>Potentially affected work order(s)(SDG): 329377(2013-1101),329545(2013-1128),329546(2013-1129),329653(2013-1150),329718(2013-1172),329767(2013-1181),329854(2013-1217),329862(2013-1223),329865(2013-1224),329903,329960(2013-1238),330006(2013-1260),330074,330087(2013-1292),330089(2013-1293),330090(2013-1294),330453(2013-1370)</p> <p>Application Issues:</p> <p>Failed Recovery for MS/PS</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS:</p> <p>QC 1202910857MS</p>		<p>1. The spike recovery falls outside of the established acceptance limits due to matrix interference.</p>	

Originator's Name:

Kristen Parson 06-AUG-13

Data Validator/Group Leader:

Julia Hamilton 06-AUG-13