

[illegible]

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 10309

EVENT NAME: Mortandad/Sandia (Chromium and General Surveillance)
MY2015 Q4 Watershed Sampling_Sandia

SAMPLE ID: CASA-15-102636

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	08/10/2015	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1250		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	UA	LSP
LOCATION ID:	R-35a		FIELD PREP:	UF	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	
TOP DEPTH:	NA		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	NA		EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS: NA

LOCATION COMMENTS:

sampled w/in 50' of ^{8/10/15} running diesel generator
& highway

FIELD PARAMETERS:

Dissolved Oxygen	4.76	mg/L	Flow (in gpm)	4.0	GPM	Oxidation-Reduction Potential	117.0	mV
pH	7.91	SU	Specific Conductance	271	uS/cm	Temperature	24.95	deg C
Turbidity	0.5	NTU						

COLLECTED BY (PRINT):

M. Shendo

RELINQUISHED BY (Printed Name) Maurice Shendo (Signature) <i>Maurice Shendo</i>	Date/Time 1345 8/10/15	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>S. Sherwood</i>	Date/Time 1345 8/10/15
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 07/31/2015

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 10309

EVENT NAME: Mortandad/Sandia (Chromium and General Surveillance)
MY2015 Q4 Watershed Sampling_Sandia

SAMPLE ID: CASA-15-102650

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	08/10/2015	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1250		MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-35a		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	NA	↓	EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) Maurice Shendo (Signature) <i>[Signature]</i>	Date/Time 1345 8/10/15	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>[Signature]</i>	Date/Time 1345 8/10/15
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 07/31/2015

DATA VALIDATION REPORT

Chain Of Custody No. 2015-2125

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
379148	EPA:120.1	1				
379148	EPA:150.1	1				
379148	EPA:160.1	1				
379148	EPA:245.2	2				
379148	EPA:310.1	1				
379148	EPA:335.4	1				
379148	EPA:350.1	1				
379148	EPA:351.2	1				
379148	EPA:353.2	1				
379148	EPA:365.4	1				
379148	SM:A2340B	1				
379148	SW-846:6010C	1				
379148	SW-846:6020	1				
379148	SW-846:6850	1				
379148	SW-846:9060	1				

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
379148	EPA:120.1	1501375	1501375	1										1			2				
379148	EPA:150.1	1501372	1501372	1										1			2				
379148	EPA:160.1	1500913	1500913	1					1					1			1				
379148	EPA:245.2	1503572	1503571	2					1	2				1			2				
379148	EPA:300.0	1500060	1500060						1					1			1				
379148	EPA:310.1	1502700	1502700	1					1	1				1			1				
379148	EPA:335.4	1500478	1500477	1					1	2				1			2				
379148	EPA:350.1	1500587	1500585	1					1	2				1			2				
379148	EPA:351.2	1500575	1500574	1					1	1				1			1				

DATA VALIDATION REPORT

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
379148	EPA:353.2	1501200	1501200	1					1					1			2				
379148	EPA:365.4	1499655	1499654	1					1	2				1			2				
379148	SM:A2340B	1501953	1501953	1																	
379148	SW-846:6010C	1500739	1500737	1					1	1				1			1				
379148	SW-846:6020	1500862	1500861	1					1	1				1			1				
379148	SW-846:6850	1502487	1502486	1					1	1	1			1							
379148	SW-846:9060	1500883	1500883	1					1					1			1				

2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-15-102607	1203376811	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-15-102650	379148002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-15-102657	1203376810	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203376809	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-15-102607	1203376805	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102650	379148002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102657	1203376806	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203376804	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CASA-15-102650	1203375600	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-15-102650	379148002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203375599	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203375598	MB	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102636	379148001	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102643	1203382650	DUP	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102643	1203382652	MS	0	0	1	0
EPA:245.2	INORGANIC	CASA-15-102650	379148002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203382648	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203382647	MB	1	0	0	0
EPA:245.2	INORGANIC	WTESR-15-97804	1203382649	DUP	1	0	0	0
EPA:245.2	INORGANIC	WTESR-15-97804	1203382651	MS	0	0	1	0
EPA:300.0	GENERAL CHEMISTRY	CASA-15-102650	1203373274	DUP	2	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203373273	LCS	0	0	2	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:300.0	GENERAL CHEMISTRY	MB	1203373272	MB	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102650	1203380452	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102650	1203380453	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102650	379148002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203380451	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1203380450	MB	2	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-15-102575	1203374459	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-15-102575	1203374461	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102636	1203375613	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102636	1203375615	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102636	379148001	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203374458	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203374457	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-15-102598	1203374764	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-15-102598	1203374766	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102650	1203374763	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102650	1203374765	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102650	379148002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203374762	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203374761	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-15-102738	1203374726	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-15-102738	1203374727	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CASA-15-102636	379148001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203374725	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203374724	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-15-102603	1203376388	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102650	1203376385	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102650	379148002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203376384	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203376383	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102647	1203372235	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102647	1203372236	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102650	1203375689	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102650	1203375690	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102650	379148002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203372234	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203372233	MB	1	0	0	0
SM:A2340B	INORGANIC	CASA-15-102650	379148002	REG	1	0	0	0
SW-846:6010C	INORGANIC	CASA-15-102650	1203375423	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CASA-15-102650	1203375424	MS	0	0	17	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6010C	INORGANIC	CASA-15-102650	379148002	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203375422	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203375421	MB	17	0	0	0
SW-846:6020	INORGANIC	CASA-15-102650	1203375448	DUP	11	0	0	0
SW-846:6020	INORGANIC	CASA-15-102650	1203375449	MS	0	0	11	0
SW-846:6020	INORGANIC	CASA-15-102650	379148002	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203375447	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203375446	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-15-102600	1203379718	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-15-102600	1203379719	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-15-102650	379148002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203379717	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203379716	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-15-102583	1203375544	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-15-102636	379148001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203375542	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203375541	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

No.

6. Any surrogate recoveries outside the control limits?

No.

DATA VALIDATION REPORT

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

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

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
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DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-35a	2015-2125	CASA-15-102650	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J+	I6b		Y	0.083	mg/L	0.083	mg/L			W	08/10/2015		1500587	VAL	Y

Reason Code

Description

I6b

The associated matrix spike recovery was above the Upper Acceptance Limit (UAL). Follow the external laboratory limits located within the associated data package.

J_LAB

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

NQ

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

U_LAB

The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CASA-15-102636	R-35a	REG	EPA:245.2	0	1
CASA-15-102636	R-35a	REG	EPA:335.4	0	1
CASA-15-102636	R-35a	REG	EPA:351.2	0	1
CASA-15-102636	R-35a	REG	SW-846:9060	0	1
CASA-15-102650	R-35a	REG	EPA:120.1	0	1
CASA-15-102650	R-35a	REG	EPA:150.1	0	1
CASA-15-102650	R-35a	REG	EPA:160.1	0	1
CASA-15-102650	R-35a	REG	EPA:245.2	0	1
CASA-15-102650	R-35a	REG	EPA:310.1	0	2
CASA-15-102650	R-35a	REG	EPA:350.1	0	1
CASA-15-102650	R-35a	REG	EPA:353.2	0	1
CASA-15-102650	R-35a	REG	EPA:365.4	0	1
CASA-15-102650	R-35a	REG	SM:A2340B	0	1
CASA-15-102650	R-35a	REG	SW-846:6010C	0	17
CASA-15-102650	R-35a	REG	SW-846:6020	0	11
CASA-15-102650	R-35a	REG	SW-846:6850	0	1

September 03, 2015

gel.com

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

Re: LANL- WQH Water Samples
Work Order: 379148
SDG: 2015-2125

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on August 12, 2015, and analyzed for General Chemistry, Metals and Perchlorates by LCMSMS. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Hope Taylor for
Valerie Davis
Project Manager

Chain of Custody: 2015-2125
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 379148
SDG: 2015-2125

Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	5
Data Review Qualifier Flag Definition Sheet.....	10
Perchlorates by LCMSMS Analysis.....	13
Case Narrative.....	14
Sample Data Summary.....	20
Quality Control Summary.....	22
Quality Control Data.....	25
Metals Analysis.....	31
Case Narrative.....	32
Sample Data Summary.....	37
Quality Control Summary.....	42
General Chem Analysis.....	56
Case Narrative.....	57
Sample Data Summary.....	85
Quality Control Summary.....	88
Miscellaneous.....	93

Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 379148
SDG # : 2015-2125**

September 03, 2015

Laboratory Identification:

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

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on August 12, 2015 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
379148001	CASA-15-102636
379148002	CASA-15-102650

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: General Chemistry, Metals and Perchlorates by LCMSMS.

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

top a d

Hope Taylor for
Valerie Davis
Project Manager

List of current GEL Certifications as of 03 September 2015

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122015-18
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Chain of Custody and Supporting Documentation

379148

[illegible]



SAMPLE RECEIPT & REVIEW FORM

Client: <u>LANL</u>		SDG/AR/COC/Work Order: <u>2015-2125</u>	
Received By: <u>Brielle Luthman</u>		Date Received: <u>8/12/15 0855</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>0</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 ≤ deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags <u>Blue ice</u> Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <u>E5082015835</u>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples (EPA 6850) have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
8 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
9 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
10 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
11 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Are sample containers identifiable as GEL provided?		<input checked="" type="checkbox"/>		
14 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
15 Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>5908 1779 3131</u> <u>5908 1779 3120</u>

Comments (Use Continuation Form if needed):

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

SHIP DATE: 11AUG15
ACTGMT: 40.0 LB TAN
CAD: 0014176/CAFE2807

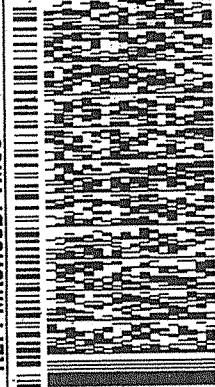
BILL SENDER

10 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

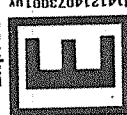
CHARLESTON SC 29407

(843) 556-8171

REF: MRCH08FYMC0



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Express



WED - 12 AUG 10:30A
PRIORITY OVERNIGHT

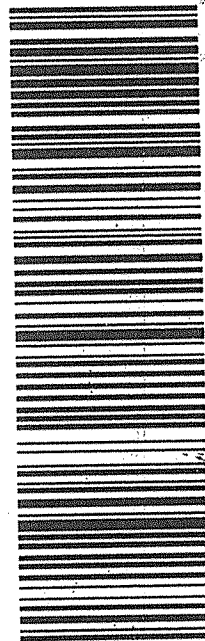
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0201

X7 CHSA

4

29407
SC-US CHS



Part # 156148-434 RIT2 10/11

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

SHIP DATE: 11AUG15
ACTGMT: 55.0 LB TAN
CAD: 0014176/CAFE2807

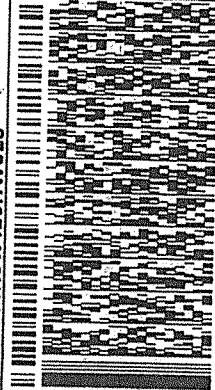
BILL SENDER

10 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

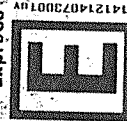
CHARLESTON SC 29407

(843) 556-8171

REF: MRSW12CHWCE0



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Express



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PRIORITY OVERNIGHT

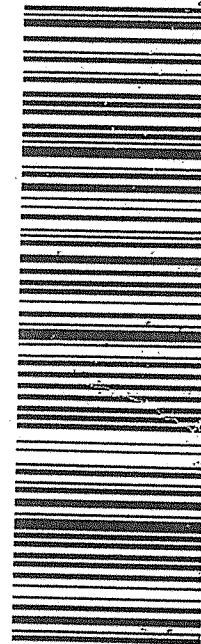
TRK# 5908 1779 3131

0201

X7 CHSA

2

29407
SC-US CHS



Part # 156148-434 RIT2 10/11

ORIGIN ID:SAFA (505) 665-9966

KEITH GREENE
LOS ALAMOS NATL LAB
TA00 BLDG 1237 DPU 03

SHIP DATE: 11AUG15
ACTWGT: 41.0 LB MAN
CAD: 0014176/CAFE2807

LOS ALAMOS, NM 87545
UNITED STATES US

BILL SENDER

TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

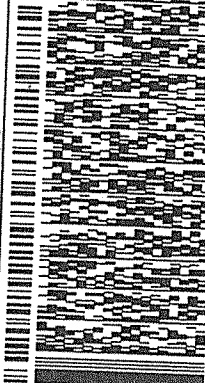
CHARLESTON SC 29407

(843) 556-8171

REF: MRSW12CHWCE0

521C1/FECA/6F03

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Express



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PRIORITY OVERNIGHT

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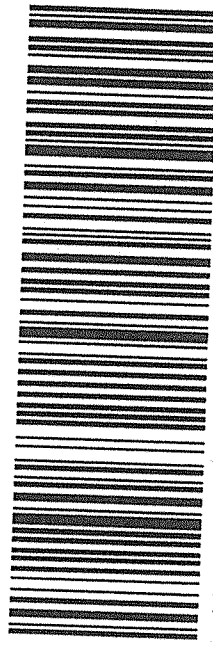
0201

X7 CHSA

29407

SC-US

CHS



Part # 156148-434 R1T2 10/11 88

ORIGIN ID:SAFA (505) 665-9966

KEITH GREENE
LOS ALAMOS NATL LAB
TA00 BLDG 1237 DPU 03

SHIP DATE: 11AUG15
ACTWGT: 32.0 LB MAN
CAD: 0014176/CAFE2807

LOS ALAMOS, NM 87545
UNITED STATES US

BILL SENDER

TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

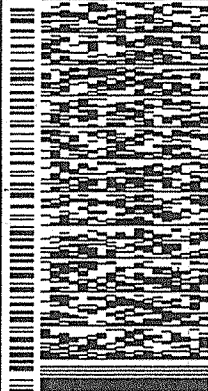
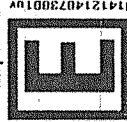
CHARLESTON SC 29407

(843) 556-8171

REF: MRGW04BAGWE0

521C1/FECA/6F03

FedEx
Express



WED - 12 AUG 10:30A
PRIORITY OVERNIGHT

TRK# 5908 1779 3110

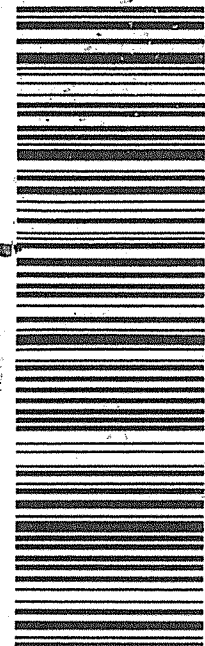
0201

X7 CHSA

29407

SC-US

CHS



Part # 156148-434 R1T2 10/11 88

Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

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

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

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

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

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2015-2125
Work Order #: 379148**

Method/Analysis Information

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

Analytical Method: SW846 6850 Modified

Prep Method: SW846 6850 Modified

Analytical Batch Number: 1502487

Prep Batch Number: 1502486

Sample Analysis

Sample ID	Client ID
379148002	CASA-15-102650
1203379720	Interference Check Sample (ICS)
1203379716	Method Blank (MB)
1203379717	Laboratory Control Sample (LCS)
1203379718	379726005(CAMO-15-102600) Matrix Spike (MS)
1203379719	379726005(CAMO-15-102600) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-067 REV# 12.

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this SDG. Due to software constraints, all Initial Calibration Blanks must be designated as IPB001.

ICV Requirements

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

CCB Requirements

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

CCV Requirements

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

Low Level Standard (CRI) Requirements

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

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

The MB analyzed with this SDG met the acceptance criteria.

Interference Check Sample (ICS)

The ICS spike recoveries met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

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

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

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

Retention Time Standard Area Acceptance

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

Retention Time

During the analysis of Perchlorate by LC/MS/MS, retention time shifts are commonly observed. These retention time shifts, which are caused by fouling of the column by the sample matrices, are problematic when the retention time is used as one of the criterion for confirmation. To overcome this problem, a known amount of O(18) labeled Perchlorate was added to each sample as a retention time standard. The presence of Perchlorate was confirmed by the relative retention time (RRT) of the Perchlorate peak and the O(18) standard. A RRT window of 0.98 to 1.02, as required by Method 332.0, has been used. In addition to the isotopic ratio, the presence of Perchlorate in the samples associated with this data package have been confirmed using the relative retention criteria stated above, not the absolute retention time.

Technical Information**Holding Time Specifications**

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

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

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

Manual Integrations

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

Method Comments

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

Additional Comments

The Perchlorate Isotope Ratio on the Form I may differ slightly from the ratio on the corresponding raw data due to rounding rules and/or significant figures or due to software limitations when there are manual integrations, dilutions or other factors. The ratio value of the Form I is the correct value. The retention time marker, Perchlorate-O (18), is added to all samples, instrument blanks, and standards prior to injection. It is used to verify the retention time of Perchlorate and Perchlorate-101 and to insure an accurate injection occurred. Due to various anions affecting the recovery of Perchlorate-O (18) and not Perchlorate and Perchlorate-101, the calibration curves of Perchlorate and Perchlorate-101 are not internally corrected for using Perchlorate-O (18). They are external calibrations.

Perchlorate Isotope Ratio

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

System Configuration

The laboratory utilizes a Waters LC 2795 liquid chromatography instrument for Perchlorate analysis. It is coupled with a Micromass Quattro Ultima Mass Spectrometer/Mass Spectrometer. It is designated as LCMSMS #2. It is fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis. The laboratory may also utilize an Agilent 1100 liquid chromatography instrument for Perchlorate analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/Mass Spectrometer, designated as LCMSMS #3 or LCMSMS #4. It is also fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis.

Electronic Packaging Comment

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

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

Chromatographic Columns

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

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

Dionex: IonPac AG-16 2 x 50 mm.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2015-2125 GEL Work Order: 379148

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 02 SEP 2015

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: STORM WATERExtraction Batch ID: 1502486Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-15-102650Date Received: 12-AUG-15GEL Job No (SDG): 2015-2125GEL Sample ID: 379148002Date Filtered: 26-AUG-15Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.422	ug/L		1	27-AUG-15 13:05	per0827025a
	Perchlorate Isotope Ratio			2.99			1	27-AUG-15 13:05	per0827025a
14797-73-0	Perchlorate-101	.05	.2	0.437	ug/L		1	27-AUG-15 13:05	per0827025a
	Perchlorate-O(18)			0.518	ug/L		1	27-AUG-15 13:05	per0827025a

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

*Concentration =

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

Quality Control Summary

Perchlorate Laboratory Control Sample

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No. (SDG): 2015-2125

Extract Batch Code: 1502486

Date Filtered: 26-AUG-15

Matrix: WATER

Sample ID: 1203379717

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

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

Perchlorate Spike/Spike Duplicate Summary

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No (SDG): 2015-2125

Extract Batch Code: 1502486

Date Extracted: 26-AUG-15

GEL MS/PS ID: 1203379718

Client ID: CAMO-15-102600

GEL MSD/PSD ID: 1203379719

QC Type: MS

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

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

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1502486Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 26-AUG-15GEL Job No (SDG): 2015-2125GEL Sample ID: 1203379716Date Filtered: 26-AUG-15Injection Volume (uL): 20%Solids:

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

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1502486Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 26-AUG-15GEL Job No (SDG): 2015-2125GEL Sample ID: 1203379717Date Filtered: 26-AUG-15Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.209	ug/L		1	27-AUG-15 12:17	per0827020a
	Perchlorate Isotope Ratio			3.08			1	27-AUG-15 12:17	per0827020a
14797-73-0	Perchlorate-101	.05	.2	0.210	ug/L		1	27-AUG-15 12:17	per0827020a
	Perchlorate-O(18)			0.523	ug/L		1	27-AUG-15 12:17	per0827020a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: STORM WATERExtraction Batch ID: 1502486Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2015-2125GEL Sample ID: 1203379720Date Filtered: 26-AUG-15Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.234	ug/L		1	27-AUG-15 12:27	per0827021a
	Perchlorate Isotope Ratio			3.15			1	27-AUG-15 12:27	per0827021a
14797-73-0	Perchlorate-101	.05	.2	0.230	ug/L		1	27-AUG-15 12:27	per0827021a
	Perchlorate-O(18)			0.551	ug/L		1	27-AUG-15 12:27	per0827021a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1502486Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-15-102600MSDate Received: 21-AUG-15GEL Job No (SDG): 2015-2125GEL Sample ID: 1203379718Date Filtered: 26-AUG-15Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.655	ug/L		1	27-AUG-15 15:55	per0827043a
	Perchlorate Isotope Ratio			3.08			1	27-AUG-15 15:55	per0827043a
14797-73-0	Perchlorate-101	.05	.2	0.659	ug/L		1	27-AUG-15 15:55	per0827043a
	Perchlorate-O(18)			0.526	ug/L		1	27-AUG-15 15:55	per0827043a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1502486Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-15-102600MSDDate Received: 21-AUG-15GEL Job No (SDG): 2015-2125GEL Sample ID: 1203379719Date Filtered: 26-AUG-15Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.656	ug/L		1	27-AUG-15 16:05	per0827044a
	Perchlorate Isotope Ratio			3.12			1	27-AUG-15 16:05	per0827044a
14797-73-0	Perchlorate-101	.05	.2	0.652	ug/L		1	27-AUG-15 16:05	per0827044a
	Perchlorate-O(18)			0.514	ug/L		1	27-AUG-15 16:05	per0827044a

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

*Concentration =

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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2015-2125
Work Order #: 379148

Sample ID	Client ID
379148001	CASA-15-102636
379148002	CASA-15-102650
1203375421	Method Blank (MB) ICP
1203375422	Laboratory Control Sample (LCS)
1203375425	379148002(CASA-15-102650L) Serial Dilution (SD)
1203375423	379148002(CASA-15-102650D) Sample Duplicate (DUP)
1203375424	379148002(CASA-15-102650S) Matrix Spike (MS)
1203375446	Method Blank (MB) ICP-MS
1203375447	Laboratory Control Sample (LCS)
1203375450	379148002(CASA-15-102650L) Serial Dilution (SD)
1203375448	379148002(CASA-15-102650D) Sample Duplicate (DUP)
1203375449	379148002(CASA-15-102650S) Matrix Spike (MS)
1203382647	Method Blank (MB) CVAA
1203382648	Laboratory Control Sample (LCS)
1203382653	379110004(WTESR-15-97804L) Serial Dilution (SD)
1203382649	379110004(WTESR-15-97804D) Sample Duplicate (DUP)
1203382651	379110004(WTESR-15-97804S) Matrix Spike (MS)

Sample Analysis

Method/Analysis Information

Analytical Batch:	1500739, 1500862, 1503572 and 1501953
Prep Batch :	1500737, 1500861 and 1503571
Standard Operating Procedures:	GL-MA-E-013 REV# 24, GL-MA-E-006 REV# 12, GL-MA-E-014 REV# 26, GL-MA-E-010 REV# 30 and GL-GC-E-107 REV# 9
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, 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 an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 300X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

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

ICSA/ICSAB Statement

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

Continuing Calibration Blanks (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 379148002 (CASA-15-102650)-ICP and ICP-MS and 379110004 (WTESR-15-97804)-CVAA.

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

A data exception report was not required for this SDG.

Additional Comments

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

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2015-2125 GEL Work Order: 379148

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:



Name: Nik-Cole Elmore

Date: 08 SEP 2015

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2125**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 379148001**BASIS:** As Received**DATE COLLECTED** 10-AUG-15**CLIENT ID:** CASA-15-102636**LEVEL:** Low**DATE RECEIVED** 12-AUG-15**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	08/27/15 16:06	082715W1-7	1503572

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
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1503572	1503571	EPA 245.1/245.2 Prep	20	mL	20	mL	08/27/15	MTM1
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***Analytical Methods:**

AV EPA 245.1/245.2

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2125**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 379148002**BASIS:** As Received**DATE COLLECTED** 10-AUG-15**CLIENT ID:** CASA-15-102650**LEVEL:** Low**DATE RECEIVED** 12-AUG-15**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	08/27/15 16:08	082715W1-7	1503572

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2125

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 379148002

BASIS: As Received

DATE COLLECTED 10-AUG-15

CLIENT ID: CASA-15-102650

LEVEL: Low

DATE RECEIVED 12-AUG-15

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	09/02/15 02:06	150901-6	1500862
7440-38-2	Arsenic	2.92	ug/L	J	1.7	5	5	1	MS	PRB	09/01/15 18:43	150901-2	1500862
7440-39-3	Barium	361	ug/L		1	5	5	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-42-8	Boron	44	ug/L	J	15	50	50	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	PRB	09/01/15 18:43	150901-2	1500862
7440-70-2	Calcium	22500	ug/L		50	200	200	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-47-3	Chromium	4.3	ug/L	J	2	10	10	1	MS	PRB	09/01/15 18:43	150901-2	1500862
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	08/18/15 07:48	081815-1	1500739
7439-89-6	Iron	35.8	ug/L	J	30	100	100	1	P	HSC	08/18/15 07:48	081815-1	1500739
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	09/01/15 18:43	150901-2	1500862
7439-95-4	Magnesium	6170	ug/L		110	300	300	1	P	HSC	08/18/15 07:48	081815-1	1500739
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	08/18/15 07:48	081815-1	1500739
7439-98-7	Molybdenum	1.13	ug/L		0.165	0.5	0.5	1	MS	PRB	09/02/15 02:06	150901-6	1500862
7440-02-0	Nickel	5.85	ug/L		0.5	2	2	1	MS	PRB	09/01/15 18:43	150901-2	1500862
7440-09-7	Potassium	4080	ug/L		50	150	150	1	P	HSC	08/18/15 07:48	081815-1	1500739
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	PRB	09/01/15 18:43	150901-2	1500862
7631-86-9	Silica	80100	ug/L		53	213	213	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	PRB	09/01/15 18:43	150901-2	1500862
7440-23-5	Sodium	17900	ug/L		100	300	300	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-24-6	Strontium	174	ug/L		1	5	5	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	PRB	09/01/15 18:43	150901-2	1500862
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-61-1	Uranium	0.571	ug/L		0.067	0.2	0.2	1	MS	PRB	09/02/15 02:06	150901-6	1500862
7440-62-2	Vanadium	16.6	ug/L		1	5	5	1	P	HSC	08/18/15 07:48	081815-1	1500739
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	08/18/15 07:48	081815-1	1500739

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2125**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 379148002**BASIS:** As Received**DATE COLLECTED** 10-AUG-15**CLIENT ID:** CASA-15-102650**LEVEL:** Low**DATE RECEIVED** 12-AUG-15**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	81.5	mg/L		0.453	1.24	1.24	1		JJ2	08/20/15 10:45		1501953

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1500739	1500737	SW846 3005A	50	mL	50	mL	08/17/15	JXM5
1500862	1500861	SW846 3005A	50	mL	50	mL	08/17/15	JXM5

1503572	1503571	EPA 245.1/245.2 Prep	20	mL	20	mL	08/27/15	MTM1
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***Analytical Methods:**

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

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2015-2125
Contract: ESHL00114
Matrix: W

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Acceptance Window</u>	<u>Conc Qual</u>	<u>M*</u>	<u>MDL</u>	<u>RDL</u>
1203375421	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Calcium	50	ug/L	+/-200	U	P	50	200
	Boron	15	ug/L	+/-50	U	P	15	50
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Barium	1	ug/L	+/-5	U	P	1	5
	Aluminum	68	ug/L	+/-200	U	P	68	200
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203375446	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	1.7	ug/L	+/-5	U	MS	1.7	5
	Cadmium	0.11	ug/L	+/-1	U	MS	0.11	1
	Chromium	2	ug/L	+/-10	U	MS	2	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.165	ug/L	+/-0.5	U	MS	0.165	0.5
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Selenium	1.5	ug/L	+/-5	U	MS	1.5	5
	Silver	0.2	ug/L	+/-1	U	MS	0.2	1
	Thallium	0.45	ug/L	+/-2	U	MS	0.45	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203382647	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

***Analytical Methods:**

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

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2125 Client ID: CASA-15-102650S

Contract: ESHL00114 Level: Low

Matrix: STORM WATER % Solids:

Sample ID: 379148002 Spike ID: 1203375424

<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	5070		68	U	5000	101		P
Barium	ug/L	75-125	869		361		500	102		P
Beryllium	ug/L	75-125	518		1	U	500	104		P
Boron	ug/L	75-125	578		44	J	500	107		P
Calcium	ug/L		27500		22500		5000	100	N/A	P
Cobalt	ug/L	75-125	502		1	U	500	100		P
Copper	ug/L	75-125	532		3	U	500	106		P
Iron	ug/L	75-125	5450		35.8	J	5000	108		P
Magnesium	ug/L	75-125	11500		6170		5000	106		P
Manganese	ug/L	75-125	502		2	U	500	100		P
Potassium	ug/L	75-125	9210		4080		5000	103		P
Silica	ug/L		90000		80100		10700	92.7	N/A	P
Sodium	ug/L	75-125	23000		17900		5000	101		P
Strontium	ug/L	75-125	678		174		500	101		P
Tin	ug/L	75-125	528		2.5	U	500	105		P
Vanadium	ug/L	75-125	535		16.6		500	104		P
Zinc	ug/L	75-125	498		3.3	U	500	99.6		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2125 **Client ID:** CASA-15-102650S

Contract: ESHL00114 **Level:** Low

Matrix: STORM WATER **% Solids:**

Sample ID: 379148002 **Spike ID:** 1203375449

<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>
Cadmium	ug/L	75-125	50.5		0.11	U	50	101		MS
Chromium	ug/L	75-125	54.5		4.3	J	50	100		MS
Lead	ug/L	75-125	44.2		0.5	U	50	88.4		MS
Molybdenum	ug/L	75-125	53.1		1.13		50	104		MS
Nickel	ug/L	75-125	55.2		5.85		50	98.7		MS
Selenium	ug/L	75-125	52.4		1.5	U	50	103		MS
Silver	ug/L	75-125	51.2		0.2	U	50	102		MS
Thallium	ug/L	75-125	42.5		0.45	U	50	84.8		MS
Uranium	ug/L	75-125	52.6		0.571		50	104		MS
Antimony	ug/L	75-125	48.7		1	U	50	97.1		MS
Arsenic	ug/L	75-125	53.5		2.92	J	50	101		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2125 Client ID: WTESR-15-97804S

Contract: ESHL00114 Level: Low

Matrix: STORM WATER % Solids:

Sample ID: 379110004 Spike ID: 1203382651

<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	2.22		0.067	U	2	109		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
–6–
Duplicate Sample Summary

SDG No.: 2015–2125

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA–15–102650D

Matrix: STORM WATER

Level: Low

Sample ID: 379148002

Duplicate ID: 1203375423

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-20%	361		361		.00277		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	44 J		43.7 J		.7		P
Calcium	ug/L	+/-20%	22500		22300		.679		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L	+/-100	35.8 J		30.3 J		16.7		P
Magnesium	ug/L	+/-20%	6170		6120		.862		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	4080		4060		.551		P
Silica	ug/L	+/-20%	80100		80100		.0736		P
Sodium	ug/L	+/-20%	17900		17500		2.14		P
Strontium	ug/L	+/-20%	174		173		.576		P
Tin	ug/L		2.5 U		2.53 J		200		P
Vanadium	ug/L	+/-5	16.6		16.6		.175		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2015-2125

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-15-102650D

Matrix: STORM WATER

Level: Low

Sample ID: 379148002

Duplicate ID: 1203375448

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	2.92 J		2.9 J		.928		MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L	+/-10	4.3 J		4.3 J		0		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.13		1.08		5.07		MS
Nickel	ug/L	+/-2	5.85		6.07		3.84		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	0.571		0.563		1.41		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
–6–
Duplicate Sample Summary

SDG No.: 2015–2125**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** WTESR–15–97804D**Matrix:** STORM WATER**Level:** Low**Sample ID:** 379110004**Duplicate ID:** 1203382649**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

-7-

Laboratory Control Sample Summary

SDG NO. 2015-2125

Contract: ESHL00114

Aqueous LCS Source:OS2I

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203375422								
	Aluminum	ug/L	5000	5030		101	80-120	P
	Barium	ug/L	500	519		104	80-120	P
	Beryllium	ug/L	500	516		103	80-120	P
	Boron	ug/L	500	531		106	80-120	P
	Calcium	ug/L	5000	5210		104	80-120	P
	Cobalt	ug/L	500	514		103	80-120	P
	Iron	ug/L	5000	5460		109	80-120	P
	Magnesium	ug/L	5000	5410		108	80-120	P
	Manganese	ug/L	500	508		102	80-120	P
	Potassium	ug/L	5000	5060		101	80-120	P
	Silica	ug/L	10700	10500		98.4	80-120	P
	Sodium	ug/L	5000	5340		107	80-120	P
	Strontium	ug/L	500	517		103	80-120	P
	Tin	ug/L	500	529		106	80-120	P
	Vanadium	ug/L	500	521		104	80-120	P
	Zinc	ug/L	500	501		100	80-120	P
	Copper	ug/L	500	518		104	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2015-2125

Contract: ESHL00114

Aqueous LCS Source: O2Si

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203375447								
	Antimony	ug/L	50	48.2		96.5	80-120	MS
	Arsenic	ug/L	50	54.2		108	80-120	MS
	Cadmium	ug/L	50	51.1		102	80-120	MS
	Chromium	ug/L	50	51.4		103	80-120	MS
	Lead	ug/L	50	47.5		95	80-120	MS
	Molybdenum	ug/L	50	52.2		104	80-120	MS
	Nickel	ug/L	50	51.8		104	80-120	MS
	Selenium	ug/L	50	54.9		110	80-120	MS
	Silver	ug/L	50	52.9		106	80-120	MS
	Thallium	ug/L	50	46		92.1	80-120	MS
	Uranium	ug/L	50	51.9		104	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2015-2125

Contract: ESHL00114

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>
1203382648	Mercury	ug/L	2	1.97		98.7	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2015-2125

Client ID: CASA-15-102650L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 379148002

Serial Dilution ID: 1203375425

<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	361		364		.69		10	P
Beryllium	1	U	5	U				P
Boron	44	J	75	U	100			P
Calcium	22500		22300		.762		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	35.8	J	150	U	100			P
Magnesium	6170		6140		.499		10	P
Manganese	2	U	10	U				P
Potassium	4080		4190		2.82		10	P
Silica	80100		79900		.212		10	P
Sodium	17900		17200		4.03		10	P
Strontium	174		173		.715		10	P
Tin	2.5	U	12.5	U				P
Vanadium	16.6		17	J	2.46			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2015-2125

Client ID: CASA-15-102650L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 379148002

Serial Dilution ID: 1203375450

<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	2.92	J	8.5	U	100			MS
Cadmium	.11	U	.55	U				MS
Chromium	4.3	J	10	U	100			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.13		1.28	J	13			MS
Nickel	5.85		6.25	J	6.84			MS
Selenium	1.5	U	7.5	U				MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.25	U				MS
Uranium	.571		.41	J	28.2			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2015-2125 **Client ID:** WTESR-15-97804L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 379110004 **Serial Dilution ID:** 1203382653

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

*Analytical Methods:

AV EPA 245.1/245.2

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2015-2125
Work Order #: 379148**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1500883

Method: SW 9060 Total Organic Carbon

Sample Analysis

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

Sample ID	Client ID
379148001	CASA-15-102636
1203375541	Method Blank (MB)
1203375542	Laboratory Control Sample (LCS)
1203375544	379323003(CAMO-15-102583) Sample Duplicate (DUP)
1203375546	379323003(CAMO-15-102583) Post Spike (PS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-093 REV# 13.

Preparation/Analytical Method Verification

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

Calibration Information

The Carbon analysis was performed on a O-I Analytical 1030W Carbon Analyzer.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

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

Sample Analysis

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

Sample ID	Client ID
379148001	CASA-15-102636
1203374457	Method Blank (MB)
1203374458	Laboratory Control Sample (LCS)
1203375613	379148001(CASA-15-102636) Sample Duplicate (DUP)
1203375615	379148001(CASA-15-102636) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 379148001 (CASA-15-102636) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

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

Sample Analysis

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

Sample ID	Client ID
379148002	CASA-15-102650
1203374761	Method Blank (MB)
1203374762	Laboratory Control Sample (LCS)
1203374763	379148002(CASA-15-102650) Sample Duplicate (DUP)
1203374764	379268002(CAMO-15-102598) Sample Duplicate (DUP)
1203374765	379148002(CASA-15-102650) Matrix Spike (MS)
1203374766	379268002(CAMO-15-102598) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

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

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1500575	Method:	TKN
Prep Batch :	1500574	Method:	EPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
379148001	CASA-15-102636
1203374724	Method Blank (MB)
1203374725	Laboratory Control Sample (LCS)
1203374726	379324001(CAMO-15-102738) Sample Duplicate (DUP)
1203374727	379324001(CAMO-15-102738) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1501200

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
379148002	CASA-15-102650
1203376383	Method Blank (MB)
1203376384	Laboratory Control Sample (LCS)
1203376385	379148002(CASA-15-102650) Sample Duplicate (DUP)
1203376432	379148002(CASA-15-102650) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 379148002 (CASA-15-102650) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

scanned and inserted into the electronic package.

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1499655	Method:	EPA 365.4 Phosphorus, Total in
Prep Batch :	1499654	Method:	EPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
379148002	CASA-15-102650
1203372233	Method Blank (MB)
1203372234	Laboratory Control Sample (LCS)
1203372235	379011002(CASA-15-102647) Sample Duplicate (DUP)
1203375689	379148002(CASA-15-102650) Sample Duplicate (DUP)
1203372236	379011002(CASA-15-102647) Matrix Spike (MS)
1203375690	379148002(CASA-15-102650) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-103 REV# 10.

Preparation/Analytical Method Verification

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

Calibration Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 379011002 (CASA-15-102647) and 379148002 (CASA-15-102650) were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1500913

Method: TDS

Sample Analysis

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

Sample ID	Client ID
379148002	CASA-15-102650
1203375598	Method Blank (MB)
1203375599	Laboratory Control Sample (LCS)
1203375600	379148002(CASA-15-102650) 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-001 REV# 15.

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

Sample 379148002 (CASA-15-102650) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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: Specific Conductivity

Analytical Batch: 1501375

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
379148002	CASA-15-102650
1203376809	Laboratory Control Sample (LCS)
1203376810	379146002(CASA-15-102657) Sample Duplicate (DUP)
1203376811	379323004(CAMO-15-102607) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

The Titration and Ion analysis was performed on a ManSci PC-Titrate TitraSip System.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH

Analytical Batch: 1501372 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
379148002	CASA-15-102650
1203376804	Laboratory Control Sample (LCS)
1203376805	379323004(CAMO-15-102607) Sample Duplicate (DUP)
1203376806	379146002(CASA-15-102657) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

The Titration and Ion analysis was performed on a ManSci PC-Titrate TitraSip System.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

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

Sample	Analyte	Value
379148002 (CASA-15-102650)		Received 12-AUG-15, out of holding 10-AUG-15

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

A data exception report (DER) 1440141 was generated for sample 379148002 (CASA-15-102650) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1502700 **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
379148002	CASA-15-102650
1203380450	Method Blank (MB)
1203380451	Laboratory Control Sample (LCS)
1203380452	379148002(CASA-15-102650) Sample Duplicate (DUP)
1203380453	379148002(CASA-15-102650) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 11.

Preparation/Analytical Method Verification

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

Calibration Information

The Titration and Ion analysis was performed on a manually operated buret.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 379148002 (CASA-15-102650) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

GEL LABORATORIES LLC

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Qualifier Definition Report for

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

Client SDG: 2015-2125 GEL Work Order: 379148

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Thomas Lewis

Date: 08 SEP 2015

Title: Data Validator

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 8, 2015

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

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

Client SDG: 2015-2125

Client Sample ID: CASA-15-102636
Sample ID: 379148001
Matrix: W
Collect Date: 10-AUG-15 12:50
Receive Date: 12-AUG-15
Collector: Client

Project: ESHL00114
Client ID: ARSL004

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	0.359	0.330	1.00	mg/L	1	TSM	08/17/15	2154	1500883	1
Flow Injection Analysis											
WSP-CN(T) "As Received"											
Cyanide, Total	U	ND	1.67	5.00	ug/L	1	AXH3	08/17/15	1324	1500478	2
Nutrient Analysis											
TKN "As Received"											
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1	KLP1	08/25/15	1228	1500575	3

The following Prep Methods were performed:

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

The following Analytical Methods were performed:

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

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 8, 2015

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

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

Client SDG: 2015-2125

Client Sample ID: CASA-15-102650
Sample ID: 379148002
Matrix: W
Collect Date: 10-AUG-15 12:50
Receive Date: 12-AUG-15
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Nutrient Analysis											
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P	U	ND	0.017	0.050	mg/L	1	KLP1	08/18/15	1400	1499655	1
NH3 "As Received"											
Nitrogen, Ammonia		0.083	0.017	0.050	mg/L	1	KLP1	08/20/15	1218	1500587	2
NO3NO2 "As Received"											
Nitrogen, Nitrate/Nitrite		0.448	0.017	0.050	mg/L	1	AXH3	08/18/15	1000	1501200	3
Solids Analysis											
TDS "As Received"											
Total Dissolved Solids		203	3.40	14.3	mg/L		MXB3	08/17/15	1447	1500913	4
Titration and Ion Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		92.1	0.725	1.00	mg/L		SXC5	08/24/15	1602	1502700	5
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						
EPA120.1 Specific Conductivity "As Received"											
Conductivity		223	3.63	14.5	umhos/cm	1	PXO1	08/18/15	1332	1501375	6
PH "As Received"											
pH at Temp 21.8C	H	8.10	0.010	0.100	SU	1	PXO1	08/18/15	1424	1501372	7

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	08/19/15	1307	1500585
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	08/17/15	1700	1499654

The following Analytical Methods were performed:

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

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: September 8, 2015

Page 1 of 4

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

Contact: Mr. Keith Greene

Workorder: 379148

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1500883										
QC1203375544	379323003	DUP									
Total Organic Carbon Average		J	0.864	J	0.869	mg/L	0.577 ^	(+/-1.00)	TSM	08/18/15	05:39
QC1203375542	LCS										
Total Organic Carbon Average	10.0				9.92	mg/L		99.2	(85%-115%)		08/17/15 21:40
QC1203375541	MB										
Total Organic Carbon Average			U	ND	mg/L						08/17/15 21:26
QC1203375546	379323003	PS									
Total Organic Carbon Average	10.0	J	0.864		10.5	mg/L		96.2	(65%-120%)		08/18/15 06:21
Flow Injection Analysis											
Batch	1500478										
QC1203375613	379148001	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	08/17/15	13:25
QC1203374458	LCS										
Cyanide, Total	50.0				53.0	ug/L		106	(90%-110%)		08/17/15 13:23
QC1203374457	MB										
Cyanide, Total			U	ND	ug/L						08/17/15 13:22
QC1203375615	379148001	MS									
Cyanide, Total	100	U	ND		109	ug/L		109	(90%-110%)		08/17/15 13:26
Nutrient Analysis											
Batch	1499655										
QC1203372235	379011002	DUP									
Phosphorus, Total as P			0.0553	U	ND	mg/L	146 ^	(+/-0.050)	KLP1	08/18/15	13:36
QC1203375689	379148002	DUP									
Phosphorus, Total as P		U	ND	U	ND	mg/L	N/A				08/18/15 14:01
QC1203372234	LCS										
Phosphorus, Total as P	1.00				1.09	mg/L		109	(83%-123%)		08/18/15 13:34
QC1203372233	MB										
Phosphorus, Total as P			U	ND	mg/L						08/18/15 13:33
QC1203372236	379011002	MS									
Phosphorus, Total as P	1.00		0.0553		1.27	mg/L		121	(59%-141%)		08/18/15 13:36
QC1203375690	379148002	MS									

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QC Summary

Workorder: 379148

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1499655										
Phosphorus, Total as P	1.00	U	ND	1.09	mg/L		109	(59%-141%)		08/18/15	14:02
Batch	1500575										
QC1203374726	379324001	DUP									
Nitrogen, Total Kjeldahl			0.179	0.177	mg/L	1.12	^	(+/-0.100)	KLP1	08/25/15	12:46
QC1203374725	LCS										
Nitrogen, Total Kjeldahl	1.00			1.04	mg/L		104	(90%-110%)		08/25/15	12:27
QC1203374724	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					08/25/15	12:26
QC1203374727	379324001	MS									
Nitrogen, Total Kjeldahl	1.00		0.179	1.13	mg/L		95.1	(90%-110%)		08/25/15	12:47
Batch	1500587										
QC1203374763	379148002	DUP									
Nitrogen, Ammonia			0.083	0.075	mg/L	10.1	^	(+/-0.050)	KLP1	08/20/15	12:19
QC1203374764	379268002	DUP									
Nitrogen, Ammonia			0.157	0.129	mg/L	19.6	^	(+/-0.050)		08/20/15	12:24
QC1203374762	LCS										
Nitrogen, Ammonia	1.00			0.971	mg/L		97.1	(90%-110%)		08/20/15	12:14
QC1203374761	MB										
Nitrogen, Ammonia			U	ND	mg/L					08/20/15	12:13
QC1203374765	379148002	MS									
Nitrogen, Ammonia	1.00		0.083	1.26	mg/L		118*	(90%-110%)		08/20/15	12:20
QC1203374766	379268002	MS									
Nitrogen, Ammonia	1.00		0.157	1.24	mg/L		108	(90%-110%)		08/20/15	12:25
Batch	1501200										
QC1203376385	379148002	DUP									
Nitrogen, Nitrate/Nitrite			0.448	0.453	mg/L	1.11		(0%-20%)	AXH3	08/18/15	10:02
QC1203376384	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.932	mg/L		93.2	(90%-110%)		08/18/15	08:38
QC1203376383	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					08/18/15	08:37
QC1203376432	379148002	PS									
Nitrogen, Nitrate/Nitrite	1.00		0.448	1.45	mg/L		100	(90%-110%)		08/18/15	10:03

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QC Summary

Workorder: 379148

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1500913										
QC1203375600	379148002	DUP									
Total Dissolved Solids		203		206	mg/L	1.4		(0%-5%)	MXB3	08/17/15	14:47
QC1203375599	LCS										
Total Dissolved Solids	300			301	mg/L		100	(95%-105%)		08/17/15	14:47
QC1203375598	MB										
Total Dissolved Solids			U	ND	mg/L					08/17/15	14:47
Titration and Ion Analysis											
Batch	1501372										
QC1203376805	379323004	DUP									
pH		H	7.83	H	7.87	SU	0.481	(0%-5%)	PXO1	08/18/15	15:24
QC1203376806	379146002	DUP									
pH		H	7.88	H	7.88	SU	0.0795	(0%-5%)		08/18/15	14:11
QC1203376804	LCS										
pH	7.00			7.02	SU		100	(99%-101%)		08/18/15	13:56
Batch	1501375										
QC1203376810	379146002	DUP									
Conductivity			565		568	umhos/cm	0.526	(0%-10%)	PXO1	08/18/15	13:29
QC1203376811	379323004	DUP									
Conductivity			486		488	umhos/cm	0.409	(0%-10%)		08/18/15	13:45
QC1203376809	LCS										
Conductivity	1410			1390	umhos/cm		98.3	(95%-105%)		08/18/15	13:27
Batch	1502700										
QC1203380452	379148002	DUP									
Alkalinity, Total as CaCO3			92.1		90.6	mg/L	1.63	(0%-20%)	SXC5	08/24/15	16:09
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1203380451	LCS										
Alkalinity, Total as CaCO3	50.0				45.8	mg/L	91.6	(90%-110%)		08/24/15	15:55
QC1203380450	MB										
Alkalinity, Total as CaCO3			U		ND	mg/L				08/24/15	15:43
Carbonate alkalinity (CaCO3)			U		ND	mg/L					
QC1203380453	379148002	MS									
Alkalinity, Total as CaCO3	50.0		92.1		150	mg/L	115	(80%-120%)		08/24/15	16:12

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QC Summary

Workorder: 379148

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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Notes:

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

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

Originator's Name:

Patrick Orgel 19-AUG-15

Data Validator/Group Leader:

Thomas Lewis 21-AUG-15

DATA EXCEPTION REPORT			
Mo.Day Yr. 20-AUG-15	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: ESHL
Batch ID: 1500587	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 379148(2015-2125),379197,379248,379268(2015-2137),379323(2015-2151),379324(2015-2153),379325(2015-2156),379326(2015-2157),379330(2015-2152),379340,379350 Application Issues: Failed Recovery for MS/MSD, or PS/PSD			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203374765MS		1. The matrix spike recovered outside of the established acceptance limits due to matrix interference. Nitrogen, Ammonia 1203374765 (CASA-15-102650MS) [118* (90%-110%)].	

Originator's Name:
Kristen Mizzell 20-AUG-15

Data Validator/Group Leader:
Aubrey Kingsbury 20-AUG-15