

[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-15-102637

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	8-4-15	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1428		MEDIA:	UA	↓
PRS ID:	OK		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-35b		FIELD PREP:	UF	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	OK		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	OK	↓	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 soft from Diesel generator

## FIELD PARAMETERS:

Dissolved Oxygen	6.11	mg/L	Flow (in gpm)	2.88	GPM	Oxidation-Reduction Potential	136.2	mV
pH	7.62	SU	Specific Conductance	173	uS/cm	Temperature	22.59	deg C
Turbidity	0.5	NTU						

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) (Signature)	Tanner Bonham <i>[Signature]</i>	Date/Time 8-4-15 15:00	RECEIVED BY (Printed Name) (Signature)	J. Sherwood <i>[Signature]</i>	Date/Time 8/4/15 15:20
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: Morlandad/Sandia (Chromium and General Surveillance)  
MY2015 Q4 Watershed Sampling\_Sandia

SAMPLE ID: CASA-15-102651

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	8-4-15	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1428		MEDIA:	UA	↓
PRS ID:	OK		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-35b		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	OK		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	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+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: NA

LOCATION COMMENTS: Sampled Soil from Diesel generator

## FIELD PARAMETERS:

Dissolved Oxygen	6.11	mg/L	Flow (in gpm)	2.88	GPM	Oxidation-Reduction Potential	136.2	mV
pH	7.62	SU	Specific Conductance	173	uS/cm	Temperature	22.59	deg C
Turbidity	0.5	NTU						

## COLLECTED BY (PRINT):

RELINQUISHED BY (Printed Name) (Signature)	Tanner Bonham <i>[Signature]</i>	Date/Time 8-4-15 1520	RECEIVED BY (Printed Name) (Signature)	Shawwood <i>[Signature]</i>	Date/Time 8/4/15 1520
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. 2015-2021

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
378714	EPA:120.1	1				
378714	EPA:150.1	1				
378714	EPA:160.1	1				
378714	EPA:245.2	2				
378714	EPA:300.0	1				
378714	EPA:310.1	1				
378714	EPA:335.4	1				
378714	EPA:350.1	1				
378714	EPA:351.2	1				
378714	EPA:353.2	1				
378714	EPA:365.4	1				
378714	SM:A2340B	1				
378714	SW-846:6010C	1				
378714	SW-846:6020	1				
378714	SW-846:6850	1				
378714	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
378714	EPA:120.1	1499473	1499473	1										1			1				
378714	EPA:150.1	1499464	1499464	1										1			2				
378714	EPA:160.1	1498593	1498593	1					1					1			1				
378714	EPA:245.2	1502170	1502169	2					1	1				1			1				
378714	EPA:300.0	1498367	1498367	1					1					1			1				
378714	EPA:310.1	1499840	1499840	1					1	1				1			1				
378714	EPA:335.4	1498448	1498447	1					1	1				1			1				
378714	EPA:350.1	1498650	1498649	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
378714	EPA:351.2	1497307	1497306	1					1	1				1				1			
378714	EPA:353.2	1497883	1497883	1					1					1				1			
378714	EPA:365.4	1498655	1498654	1					1	1				1				1			
378714	SM:A2340B	1503017	1503017	1																	
378714	SW-846:6010C	1498415	1498414	1					1	1				1				1			
378714	SW-846:6020	1498395	1498394	1					1	1				1				1			
378714	SW-846:6850	1497475	1497474	1					1	1	1			1							
378714	SW-846:9060	1500166	1500166	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	CASA-15-102651	1203371783	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-15-102651	378714002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203371781	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-15-102597	1203371765	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102651	1203371764	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102651	378714002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203371763	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-15-102597	1203369496	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-15-102651	378714002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203369495	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203369494	MB	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102637	378714001	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102651	378714002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203378860	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203378859	MB	1	0	0	0
EPA:245.2	INORGANIC	WSTSIP-15-103065	1203378861	DUP	1	0	0	0
EPA:245.2	INORGANIC	WSTSIP-15-103065	1203378863	MS	0	0	1	0
EPA:300.0	GENERAL CHEMISTRY	CASA-15-102651	1203368957	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-15-102651	378714002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203368956	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203368955	MB	4	0	0	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102647	1203372714	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102647	1203372716	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102651	378714002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203372712	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1203372710	MB	2	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102637	1203369151	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102637	1203369154	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102637	378714001	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203369150	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203369149	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-15-102612	1203369691	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-15-102612	1203369692	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102651	378714002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203369688	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203369687	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-15-102637	378714001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-15-102532	1203366271	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-15-102532	1203366272	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203366270	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203366269	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102651	1203368535	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102651	378714002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203367700	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203367699	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-15-102612	1203369699	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-15-102612	1203369700	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102651	378714002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203369698	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203369697	MB	1	0	0	0
SM:A2340B	INORGANIC	CASA-15-102651	378714002	REG	1	0	0	0
SW-846:6010C	INORGANIC	CASA-15-102651	1203369070	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CASA-15-102651	1203369071	MS	0	0	17	0
SW-846:6010C	INORGANIC	CASA-15-102651	378714002	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203369069	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203369068	MB	17	0	0	0
SW-846:6020	INORGANIC	CASA-15-102651	1203369015	DUP	11	0	0	0
SW-846:6020	INORGANIC	CASA-15-102651	1203369016	MS	0	0	11	0
SW-846:6020	INORGANIC	CASA-15-102651	378714002	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203369014	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203369013	MB	11	0	0	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-15-100894	1203366644	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-15-100894	1203366645	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-15-102651	378714002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203366643	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203366642	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-15-102573	1203373636	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-15-102637	378714001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203373634	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203373633	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203369068	METHOD BLANK	SW-846:6010C	W	Sodium	183	J	ug/L	300

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-15-102637	1203369154		EPA:335.4	Cyanide (Total)	1498447	08-10-2015	W	78.9		110	90	10		
CASA-15-102637	1203369154		EPA:335.4	Cyanide (Total)	1498447	08-10-2015	W	78.9		110	90	10		
CAWA-15-102532	1203366272		EPA:351.2	Total Kjeldahl Nitrogen	1497306	08-07-2015	W	115		110	90	10		
CASA-15-102651	1203369071		SW-846:6010C	Silicon Dioxide	1498414	08-07-2015	W	67.7		125	75			
CASA-15-102651	1203369071		SW-846:6010C	Silicon Dioxide	1498414	08-07-2015	W	67.7		125	75			

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.



## 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-35b	2015-2021	CASA-15-102637	REG	INIT	GENERAL CHEMISTRY	EPA:335.4	Cyanide (Total)	J	UJ	I6a	N	5.00	ug/L	0.005	mg/L			W	08/04/2015		1498448	VAL	Y
R-35b	2015-2021	CASA-15-102651	REG	INIT	INORGANIC	SW-846:6010C	Silicon Dioxide	J	J	I6a	Y	75800	ug/L	75.8	mg/L			W	08/04/2015		1498415	VAL	Y

### Reason Code

### Description

I6a

The associated matrix spike recovery was below the lower acceptance limit (LAL) but >10%. Follow the external laboratory limits located within the associated data package.

J\_LAB

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

NQ

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

U\_LAB

The analytical laboratory qualified the analyte as not detected.

### 14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CASA-15-102637	R-35b	REG	EPA:245.2	0	1
CASA-15-102637	R-35b	REG	EPA:335.4	0	1
CASA-15-102637	R-35b	REG	EPA:351.2	0	1
CASA-15-102637	R-35b	REG	SW-846:9060	0	1
CASA-15-102651	R-35b	REG	EPA:120.1	0	1
CASA-15-102651	R-35b	REG	EPA:150.1	0	1
CASA-15-102651	R-35b	REG	EPA:160.1	0	1
CASA-15-102651	R-35b	REG	EPA:245.2	0	1
CASA-15-102651	R-35b	REG	EPA:300.0	0	4
CASA-15-102651	R-35b	REG	EPA:310.1	0	2
CASA-15-102651	R-35b	REG	EPA:350.1	0	1
CASA-15-102651	R-35b	REG	EPA:353.2	0	1
CASA-15-102651	R-35b	REG	EPA:365.4	0	1
CASA-15-102651	R-35b	REG	SM:A2340B	0	1
CASA-15-102651	R-35b	REG	SW-846:6010C	0	17
CASA-15-102651	R-35b	REG	SW-846:6020	0	11
CASA-15-102651	R-35b	REG	SW-846:6850	0	1

September 01, 2015

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

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

Re: LANL- WQH Water Samples  
Work Order: 378714  
SDG: 2015-2021

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on August 06, 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: 2015-2021  
Enclosures



**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 378714**  
**SDG: 2015-2021**

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# Case Narrative

**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 378714  
SDG # : 2015-2021**

**September 01, 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 06, 2015 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
378714001	CASA-15-102637
378714002	CASA-15-102651

**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 01 September 2015**

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



# **Chain of Custody and Supporting Documentation**

878714

[illegible]



## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <u>LANL</u>		SDG/AR/COC/Work Order: <u>2015-2021</u>	
Received By: <u>Brielle Luthman</u>		Date Received: <u>8/6/15</u> <u>1020</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
COC/Samples marked as radioactive?	<input type="checkbox"/> <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u>	
Classified Radioactive II or III by RSO?	<input type="checkbox"/> <input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?	
COC/Samples marked containing PCBs?	<input type="checkbox"/> <input checked="" type="checkbox"/>		
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input type="checkbox"/> <input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.	
Shipped as a DOT Hazardous?	<input type="checkbox"/> <input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:	
Samples identified as Foreign Soil?	<input type="checkbox"/> <input checked="" type="checkbox"/>		

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
8 Are Encore containers present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
9 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
10 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
11 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
14 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 Carrier and tracking number.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other  5908 1779 2650-2° 5908 1779 2672-2°

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: 05AUG15  
ACTWGT: 51.0 LB MAN  
CAD: 0014176/CAFE2807

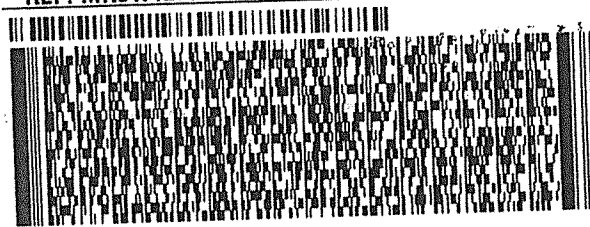
BILL SENDER

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

**CHARLESTON SC 29407**

(843) 666-8171

REF: MRSW12CHWCA0



521C1/FECA/5F03

10:30  
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Express



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2 of 3

MPs# 5908 1779 2650

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Mstr# 5908 1779 2640

0201

**X7 CHSA**

2<sup>0</sup>

**THU - 06 AUG 10:30A**  
**PRIORITY OVERNIGHT**

29407  
SC-US CHS

Part # 155148-434 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: 05AUG15  
ACTWGT: 47.0 LB MAN  
CAD: 0014176/CAFE2807

BILL SENDER

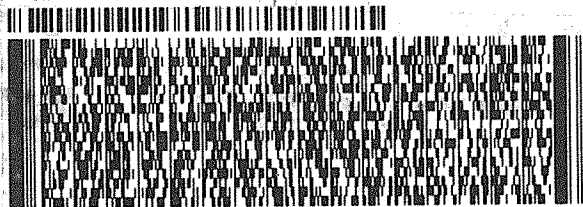
0 VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: MRSW12CHWCC0

521C1/FECA/6F03



FedEx  
Express



J141214073001W

1 of 2

TRK# 5908 1779 2672  
0201

## MASTER ##

X7 CHSA

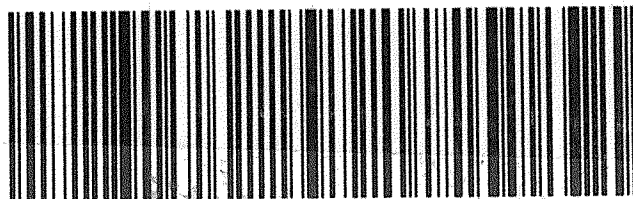
THU - 06 AUG 10:30A  
PRIORITY OVERNIGHT

2°

29407

SC-US CHS

Post # 153148-434 RIT2 10/1 3%



# **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 #: 2015-2021  
Work Order #: 378714**

**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: 1497475

Prep Batch Number: 1497474

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
378714002	CASA-15-102651
1203366646	Interference Check Sample (ICS)
1203366642	Method Blank (MB)
1203366643	Laboratory Control Sample (LCS)
1203366644	378336005(CAPA-15-100894) Matrix Spike (MS)
1203366645	378336005(CAPA-15-100894) 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**

All associated initial calibration verification standard(s) (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 378336005 (CAPA-15-100894) was chosen for matrix spike and matrix spike duplicate analysis.

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

The MS 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**

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

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

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

**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: 2015-2021 GEL Work Order: 378714

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

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

#### Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 19 AUG 2015

Title: Group Leader

# **Sample Data Summary**



## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1497474Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-15-102651Date Received: 06-AUG-15GEL Job No (SDG): 2015-2021GEL Sample ID: 378714002Date Filtered: 08-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	0.579	ug/L		1	11-AUG-15 17:43	per0811025a
	Perchlorate Isotope Ratio			2.99			1	11-AUG-15 17:43	per0811025a
14797-73-0	Perchlorate-101	.05	.2	0.587	ug/L		1	11-AUG-15 17:43	per0811025a
	Perchlorate-O(18)			0.498	ug/L		1	11-AUG-15 17:43	per0811025a

^ 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):** 2015-2021

**Extract Batch Code:** 1497474

**Date Filtered:** 08-AUG-15

**Matrix:** WATER

**Sample ID:** 1203366643

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.194	ug/L	96.9		85 - 115
Perchlorate Isotope Ratio		3.17				-
Perchlorate-101	0.200	.186	ug/L	92.8		85 - 115
Perchlorate-O(18)		.493	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

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**Lab Name:** General Engineering Laboratories

**Lab Code:** GEL

**GEL Job No (SDG):** 2015-2021

**Extract Batch Code:** 1497474

**Date Extracted:** 08-AUG-15

**GEL MS/PS ID:** 1203366644

**Client ID:** CAPA-15-100894

**GEL MSD/PSD ID:** 1203366645

**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	0.251	ug/L	0.419	84	.425	87.1	1.46	30	75 - 125
Perchlorate Isotope Ratio	0	3.01		3.06		3.05		.333		-
Perchlorate-101	0.200	0.253	ug/L	0.415	80.7	.422	84.5	1.8	30	75 - 125
Perchlorate-O(18)	0	0.495	ug/L	0.483		.468		3.09		-

^ 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: 1497474Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 08-AUG-15GEL Job No (SDG): 2015-2021GEL Sample ID: 1203366642Date Filtered: 08-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	11-AUG-15 15:53	per0811012a
	Perchlorate Isotope Ratio						1	11-AUG-15 15:53	per0811012a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	11-AUG-15 15:53	per0811012a
	Perchlorate-O(18)			0.492	ug/L		1	11-AUG-15 15:53	per0811012a

^ 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: 1497474Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 08-AUG-15GEL Job No (SDG): 2015-2021GEL Sample ID: 1203366643Date Filtered: 08-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	0.194	ug/L	J	1	11-AUG-15 16:01	per0811013a
	Perchlorate Isotope Ratio			3.17			1	11-AUG-15 16:01	per0811013a
14797-73-0	Perchlorate-101	.05	.2	0.186	ug/L	J	1	11-AUG-15 16:01	per0811013a
	Perchlorate-O(18)			0.493	ug/L		1	11-AUG-15 16:01	per0811013a

^ 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: 1497474Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2015-2021GEL Sample ID: 1203366646Date Filtered: 08-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	0.218	ug/L		1	11-AUG-15 16:10	per0811014a
	Perchlorate Isotope Ratio			3.17			1	11-AUG-15 16:10	per0811014a
14797-73-0	Perchlorate-101	.05	.2	0.208	ug/L		1	11-AUG-15 16:10	per0811014a
	Perchlorate-O(18)			0.486	ug/L		1	11-AUG-15 16:10	per0811014a

^ 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: 1497474Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-15-100894MSDate Received: 31-JUL-15GEL Job No (SDG): 2015-2021GEL Sample ID: 1203366644Date Filtered: 08-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	0.419	ug/L		1	11-AUG-15 16:52	per0811019a
	Perchlorate Isotope Ratio			3.06			1	11-AUG-15 16:52	per0811019a
14797-73-0	Perchlorate-101	.05	.2	0.415	ug/L		1	11-AUG-15 16:52	per0811019a
	Perchlorate-O(18)			0.483	ug/L		1	11-AUG-15 16:52	per0811019a

^ 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: 1497474Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-15-100894MSDDate Received: 31-JUL-15GEL Job No (SDG): 2015-2021GEL Sample ID: 1203366645Date Filtered: 08-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	0.425	ug/L		1	11-AUG-15 17:01	per0811020a
	Perchlorate Isotope Ratio			3.05			1	11-AUG-15 17:01	per0811020a
14797-73-0	Perchlorate-101	.05	.2	0.422	ug/L		1	11-AUG-15 17:01	per0811020a
	Perchlorate-O(18)			0.468	ug/L		1	11-AUG-15 17:01	per0811020a

^ 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 #: 2015-2021**  
**Work Order #: 378714**

<b>Sample ID</b>	<b>Client ID</b>
378714001	CASA-15-102637
378714002	CASA-15-102651
1203369068	Method Blank (MB) <b>ICP</b>
1203369069	Laboratory Control Sample (LCS)
1203369072	378714002(CASA-15-102651L) Serial Dilution (SD)
1203369070	378714002(CASA-15-102651D) Sample Duplicate (DUP)
1203369071	378714002(CASA-15-102651S) Matrix Spike (MS)
1203369013	Method Blank (MB) <b>ICP-MS</b>
1203369014	Laboratory Control Sample (LCS)
1203369017	378714002(CASA-15-102651L) Serial Dilution (SD)
1203369015	378714002(CASA-15-102651D) Sample Duplicate (DUP)
1203369016	378714002(CASA-15-102651S) Matrix Spike (MS)
1203378859	Method Blank (MB) <b>CVAA</b>
1203378860	Laboratory Control Sample (LCS)
1203378865	379215001(WSTSIP-15-103065L) Serial Dilution (SD)
1203378861	379215001(WSTSIP-15-103065D) Sample Duplicate (DUP)
1203378863	379215001(WSTSIP-15-103065S) Matrix Spike (MS)

**Sample Analysis**

**Method/Analysis Information**

<b>Analytical Batch:</b>	1498415, 1498395, 1502170 and 1503017
<b>Prep Batch :</b>	1498414, 1498394 and 1502169
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 24, GL-MA-E-006 REV# 12, GL-MA-E-014 REV# 26, GL-MA-E-010 REV# 30 and GL-GC-E-107 REV# 9
<b>Analytical Method:</b>	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.1/245.2 and SM 2340 B
<b>Prep Method :</b>	SW846 3005A and EPA 245.1/245.2 Prep

**Preparation/Analytical Method Verification**

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

**System Configuration**

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

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

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

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.

#### **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: 378714002 (CASA-15-102651)-ICP and ICP-MS and 379215001 (WSTSIP-15-103065)-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**

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL/MDL for CVAA, 50X the IDL/MDL for ICP and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

Sample	Analyte	Value
1203369072 (CASA-15-102651SDILT)	Strontium	10.6 *(0%-10%)

**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 (DER) was generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) 1441580 was generated for sample 1203369072 (CASA-15-102651SDILT) in this SDG/batch.

**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.

Hardness = 2.497 (Ca) + 4.118 (Mg)

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

**Certification Statement**

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



## 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: 2015-2021 GEL Work Order: 378714

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

- \* A quality control analyte recovery is outside of specified acceptance criteria
- E %difference of sample and SD is >10%. Sample concentration must meet flagging 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: Jamie Johnson

Date: 02 SEP 2015

Title: Group Leader

# **Sample Data Summary**

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

**SDG No:** 2015-2021**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 378714001**BASIS:** As Received**DATE COLLECTED** 04-AUG-15**CLIENT ID:** CASA-15-102637**LEVEL:** Low**DATE RECEIVED** 06-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	08/24/15 11:38	082415W1-4	1502170

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1502170	1502169	EPA 245.1/245.2 Prep	20	mL	20	mL	08/21/15	AXS5

**\*Analytical Methods:**

AV EPA 245.1/245.2

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

**SDG No:** 2015–2021**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 378714002**BASIS:** As Received**DATE COLLECTED** 04–AUG–15**CLIENT ID:** CASA–15–102651**LEVEL:** Low**DATE RECEIVED** 06–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	08/24/15 11:39	082415W1–4	1502170

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

SDG No: 2015-2021

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 378714002

BASIS: As Received

DATE COLLECTED 04-AUG-15

CLIENT ID: CASA-15-102651

LEVEL: Low

DATE RECEIVED 06-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	08/07/15 15:20	080715-1	1498415
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BCD1	08/26/15 04:37	150825-2	1498395
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	BCD1	08/26/15 04:37	150825-2	1498395
7440-39-3	Barium	39.8	ug/L		1	5	5	1	P	HSC	08/07/15 15:20	080715-1	1498415
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/07/15 15:20	080715-1	1498415
7440-42-8	Boron	27.6	ug/L	J	15	50	50	1	P	HSC	08/07/15 15:20	080715-1	1498415
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	BCD1	08/26/15 04:37	150825-2	1498395
7440-70-2	Calcium	15500	ug/L		50	200	200	1	P	HSC	08/07/15 15:20	080715-1	1498415
7440-47-3	Chromium	6.98	ug/L	J	2	10	10	1	MS	BCD1	08/26/15 04:37	150825-2	1498395
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/07/15 15:20	080715-1	1498415
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	08/07/15 15:20	080715-1	1498415
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	08/07/15 15:20	080715-1	1498415
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BCD1	08/26/15 04:37	150825-2	1498395
7439-95-4	Magnesium	5030	ug/L		110	300	300	1	P	HSC	08/07/15 15:20	080715-1	1498415
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	08/07/15 15:20	080715-1	1498415
7439-98-7	Molybdenum	1.22	ug/L		0.165	0.5	0.5	1	MS	BCD1	08/26/15 04:37	150825-2	1498395
7440-02-0	Nickel	2.6	ug/L		0.5	2	2	1	MS	BCD1	08/26/15 04:37	150825-2	1498395
7440-09-7	Potassium	1970	ug/L		50	150	150	1	P	HSC	08/07/15 15:20	080715-1	1498415
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	BCD1	08/26/15 04:37	150825-2	1498395
7631-86-9	Silica	75800	ug/L		53	213	213	1	P	HSC	08/07/15 15:20	080715-1	1498415
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	BCD1	08/26/15 04:37	150825-2	1498395
7440-23-5	Sodium	11500	ug/L		100	300	300	1	P	HSC	08/07/15 15:20	080715-1	1498415
7440-24-6	Strontium	69.7	ug/L	E	1	5	5	1	P	HSC	08/07/15 15:20	080715-1	1498415
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	BCD1	08/26/15 04:37	150825-2	1498395
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	08/07/15 15:20	080715-1	1498415
7440-61-1	Uranium	0.312	ug/L		0.067	0.2	0.2	1	MS	BCD1	08/27/15 05:03	150826-3	1498395
7440-62-2	Vanadium	14.3	ug/L		1	5	5	1	P	HSC	08/07/15 15:20	080715-1	1498415
7440-66-6	Zinc	16.6	ug/L		3.3	10	10	1	P	HSC	08/07/15 15:20	080715-1	1498415

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

**SDG No:** 2015-2021**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 378714002**BASIS:** As Received**DATE COLLECTED** 04-AUG-15**CLIENT ID:** CASA-15-102651**LEVEL:** Low**DATE RECEIVED** 06-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	59.5	mg/L		0.453	1.24	1.24	1		JJ2	08/25/15 15:26		1503017

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1498395	1498394	SW846 3005A	50	mL	50	mL	08/06/15	JP1
1498415	1498414	SW846 3005A	50	mL	50	mL	08/06/15	JP1
1502170	1502169	EPA 245.1/245.2 Prep	20	mL	20	mL	08/21/15	AXS5

**\*Analytical Methods:**

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

# **Quality Control Summary**

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

**SDG NO.** 2015-2021  
**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>
1203369013	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
1203369068	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	183	ug/L	+/-300	J	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203378859	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. 2015-2021 Client ID: CASA-15-102651S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 378714002 Spike ID: 1203369016

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	50.8		1	U	50	101		MS
Arsenic	ug/L	75-125	49		1.7	U	50	95.1		MS
Cadmium	ug/L	75-125	50		0.11	U	50	100		MS
Chromium	ug/L	75-125	56.4		6.98	J	50	98.8		MS
Lead	ug/L	75-125	50.3		0.5	U	50	100		MS
Molybdenum	ug/L	75-125	51.6		1.22		50	101		MS
Nickel	ug/L	75-125	53.1		2.6		50	101		MS
Selenium	ug/L	75-125	47.1		1.5	U	50	92.9		MS
Silver	ug/L	75-125	49.9		0.2	U	50	99.7		MS
Thallium	ug/L	75-125	48.9		0.45	U	50	97.3		MS
Uranium	ug/L	75-125	53		0.312		50	105		MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2015-2021

Client ID: CASA-15-102651S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 378714002

Spike ID: 1203369071

<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>
Iron	ug/L	75-125	4930		30	U	5000	98.5		P
Magnesium	ug/L	75-125	9680		5030		5000	92.9		P
Manganese	ug/L	75-125	478		2	U	500	95.5		P
Potassium	ug/L	75-125	6890		1970		5000	98.3		P
Silica	ug/L		83000		75800		10700	67.7	N/A	P
Sodium	ug/L	75-125	15900		11500		5000	87.1		P
Strontium	ug/L	75-125	581		69.7		500	102		P
Tin	ug/L	75-125	484		2.5	U	500	96.7		P
Vanadium	ug/L	75-125	509		14.3		500	98.9		P
Zinc	ug/L	75-125	485		16.6		500	93.6		P
Aluminum	ug/L	75-125	4890		68	U	5000	97.7		P
Barium	ug/L	75-125	524		39.8		500	96.8		P
Beryllium	ug/L	75-125	490		1	U	500	98		P
Boron	ug/L	75-125	533		27.6	J	500	101		P
Calcium	ug/L	75-125	19700		15500		5000	84		P
Cobalt	ug/L	75-125	477		1	U	500	95.5		P
Copper	ug/L	75-125	519		3	U	500	104		P

\*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2015-2021

Client ID: WSTSIP-15-103065S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 379215001

Spike ID: 1203378863

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	1.91		0.067	U	2	94.8		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

**Metals**  
**–6–**  
**Duplicate Sample Summary**

SDG No.: 2015–2021

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA–15–102651D

Matrix: WATER

Level: Low

Sample ID: 378714002

Duplicate ID: 1203369015

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		1.7 U		2.21 J		200		MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L	+/-10	6.98 J		5.96 J		15.7		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.22		1.23		1.06		MS
Nickel	ug/L	+/-2	2.6		2.68		2.84		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	0.312		0.295		5.6		MS

\*Analytical Methods:

MS SW846 3005A/6020A

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

SDG No.: 2015-2021

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-15-102651D

Matrix: WATER

Level: Low

Sample ID: 378714002

Duplicate ID: 1203369070

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%	39.8		39.4		1.05		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	27.6 J		26.6 J		3.49		P
Calcium	ug/L	+/-20%	15500		15500		.0967		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	5030		5000		.714		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1970		2030		2.69		P
Silica	ug/L	+/-20%	75800		76200		.609		P
Sodium	ug/L	+/-20%	11500		11300		2.36		P
Strontium	ug/L	+/-20%	69.7		68		2.58		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	14.3		14		1.83		P
Zinc	ug/L	+/-10	16.6		16.1		3.26		P

\*Analytical Methods:

P SW846 3005A/6010C

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

**SDG No.:** 2015–2021**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** WSTSIP–15–103065D**Matrix:** WATER**Level:** Low**Sample ID:** 379215001**Duplicate ID:** 1203378861**Percent Solids for Dup:** N/A

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

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**\*Analytical Methods:**

AV EPA 245.1/245.2

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2015-2021

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>
1203369014								
	Antimony	ug/L	50	51		102	80-120	MS
	Arsenic	ug/L	50	48.6		97.2	80-120	MS
	Cadmium	ug/L	50	50.3		101	80-120	MS
	Chromium	ug/L	50	50.6		101	80-120	MS
	Lead	ug/L	50	50.5		101	80-120	MS
	Molybdenum	ug/L	50	49.7		99.4	80-120	MS
	Nickel	ug/L	50	49.2		98.3	80-120	MS
	Selenium	ug/L	50	49.7		99.4	80-120	MS
	Silver	ug/L	50	51.5		103	80-120	MS
	Thallium	ug/L	50	49.2		98.4	80-120	MS
	Uranium	ug/L	50	51.1		102	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2015-2021

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>
1203369069								
	Aluminum	ug/L	5000	5100		102	80-120	P
	Barium	ug/L	500	512		102	80-120	P
	Beryllium	ug/L	500	507		101	80-120	P
	Boron	ug/L	500	521		104	80-120	P
	Calcium	ug/L	5000	5160		103	80-120	P
	Cobalt	ug/L	500	506		101	80-120	P
	Copper	ug/L	500	516		103	80-120	P
	Iron	ug/L	5000	5170		103	80-120	P
	Magnesium	ug/L	5000	5240		105	80-120	P
	Manganese	ug/L	500	498		99.7	80-120	P
	Potassium	ug/L	5000	5160		103	80-120	P
	Silica	ug/L	10700	10400		97.1	80-120	P
	Sodium	ug/L	5000	5240		105	80-120	P
	Strontium	ug/L	500	535		107	80-120	P
	Tin	ug/L	500	496		99.2	80-120	P
	Vanadium	ug/L	500	515		103	80-120	P
	Zinc	ug/L	500	490		98.1	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

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## Laboratory Control Sample Summary

SDG NO. 2015-2021

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>
1203378860	Mercury	ug/L	2	1.95		97.7	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Serial Dilution Sample Summary

SDG NO. 2015-2021

Client ID: CASA-15-102651L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 378714002

Serial Dilution ID: 1203369017

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	1.7	U	8.5	U				MS
Cadmium	.11	U	.55	U				MS
Chromium	6.98	J	10	U	100			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.22		1.23	J	.74			MS
Nickel	2.6		2.75	J	5.54			MS
Selenium	1.5	U	7.5	U				MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.25	U				MS
Uranium	.312		.335	U	100			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

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## Serial Dilution Sample Summary

SDG NO. 2015-2021

Client ID: CASA-15-102651L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 378714002

Serial Dilution ID: 1203369072

<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	39.8		37.3		6.16			P
Beryllium	1	U	5	U				P
Boron	27.6	J	75	U	100			P
Calcium	15500		15000		3.62		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	5030		4880		2.99			P
Manganese	2	U	10	U				P
Potassium	1970		1800		8.81			P
Silica	75800		72600		4.16		10	P
Sodium	11500		10500		9.01		10	P
Strontium	69.7		62.4		10.6	E	10	P
Tin	2.5	U	12.5	U				P
Vanadium	14.3		15.6	J	9.29			P
Zinc	16.6		25.1	J	51.1			P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2015-2021 **Client ID:** WSTSIP-15-103065L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 379215001 **Serial Dilution ID:** 1203378865

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

## \*Analytical Methods:

AV EPA 245.1/245.2

# Miscellaneous

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 24-AUG-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ICP	<b>Test / Method:</b> SW846 3005A/6010C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1498415	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 378714(2015-2021),378720(2015-2020)</b> <b>Application Issues:</b> Failed difference for SDILT			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Failed difference for SDILT:  QC 1203369072SDILT		1. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified. 1203369072 (CASA-15-102651SDILT) Strontium [10.6 *(0%-10%)].	

**Originator's Name:**  
Helen Camello 24-AUG-15

**Data Validator/Group Leader:**  
Jerry Wigfall 26-AUG-15

# **General Chem Analysis**

# Case Narrative



**General Chemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2015-2021  
Work Order #: 378714**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1500166

**Method:** SW 9060 Total Organic Carbon

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714001	CASA-15-102637
1203373633	Method Blank (MB)
1203373634	Laboratory Control Sample (LCS)
1203373636	378720001(CAMO-15-102573) Sample Duplicate (DUP)
1203373638	378720001(CAMO-15-102573) 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 378720001 (CAMO-15-102573) 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**

<b>Product:</b>	<b>Cyanide and Total</b>		
<b>Analytical Batch:</b>	1498448	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1498447	<b>Method:</b>	EPA 335.4

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714001	CASA-15-102637
1203369149	Method Blank (MB)
1203369150	Laboratory Control Sample (LCS)
1203369151	378714001(CASA-15-102637) Sample Duplicate (DUP)
1203369154	378714001(CASA-15-102637) 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 378714001 (CASA-15-102637) was 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. 1203369154 (CASA-15-102637MS).

##### **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**

Sample 1203369150 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

#### **Miscellaneous Information**

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

A data exception report (DER) 1437204 was generated for sample 1203369154 (CASA-15-102637MS) 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:** Ion Chromatography

**Analytical Batch:** 1498367

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

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714002	CASA-15-102651
1203368955	Method Blank (MB)
1203368956	Laboratory Control Sample (LCS)
1203368957	378714002(CASA-15-102651) Sample Duplicate (DUP)
1203368958	378714002(CASA-15-102651) Post Spike (PS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

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

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

### **Y Intercept Rule**

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

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

The LCS spike recovery met the acceptance limits.

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

Sample 378714002 (CASA-15-102651) 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.

#### **Manual Integrations**

Samples 1203368957 (CASA-15-102651DUP), 1203368958 (CASA-15-102651PS) and 378714002 (CASA-15-102651) were manually integrated to correctly position the baseline as set in the calibration standards.

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

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

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



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

### **Method/Analysis Information**

<b>Product:</b>	<b>Ammonia Nitrogen</b>		
<b>Analytical Batch:</b>	1498650	<b>Method:</b>	NH3
<b>Prep Batch :</b>	1498649	<b>Method:</b>	EPA 350.1 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714002	CASA-15-102651
1203369687	Method Blank (MB)
1203369688	Laboratory Control Sample (LCS)
1203369691	378836002(CAMO-15-102612) Sample Duplicate (DUP)
1203369692	378836002(CAMO-15-102612) Matrix Spike (MS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**

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

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

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

acceptance limits.

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 378836002 (CAMO-15-102612) 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**

Sample1203369687 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an

effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1497307	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1497306	<b>Method:</b>	EPA 351.2 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714001	CASA-15-102637
1203366269	Method Blank (MB)
1203366270	Laboratory Control Sample (LCS)
1203366271	378424001(CAWA-15-102532) Sample Duplicate (DUP)
1203366272	378424001(CAWA-15-102532) 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+ 8000 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 378424001 (CAWA-15-102532) was 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, Total Kjeldahl	1203366272 (CAWA-15-102532MS)	115* (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) 1436702 was generated for sample 1203366272 (CAWA-15-102532MS) 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:** Nitrate Nitrite by Cadmium Reduction

**Analytical Batch:** 1497883

**Method:** NO3NO2

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714002	CASA-15-102651
1203367699	Method Blank (MB)
1203367700	Laboratory Control Sample (LCS)
1203368535	378714002(CASA-15-102651) Sample Duplicate (DUP)
1203368536	378714002(CASA-15-102651) 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 378714002 (CASA-15-102651) 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**

Samples 1203368535 (CASA-15-102651DUP) and 378714002 (CASA-15-102651) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

### **Miscellaneous Information**

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

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

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

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

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1498655	<b>Method:</b>	EPA 365.4 Phosphorus, Total in
<b>Prep Batch :</b>	1498654	<b>Method:</b>	EPA 365.4 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714002	CASA-15-102651
1203369697	Method Blank (MB)
1203369698	Laboratory Control Sample (LCS)
1203369699	378836002(CAMO-15-102612) Sample Duplicate (DUP)
1203369700	378836002(CAMO-15-102612) 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+ 8000 Series.

### **Continuing Calibration Blanks**

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

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

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

### **Y Intercept Rule**

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

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

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 378836002 (CAMO-15-102612) 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**

Samples 1203369697 (MB), 1203369698 (LCS) and 378714002 (CASA-15-102651) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported. Samples 1203369699 (CAMO-15-102612DUP) and 1203369700 (CAMO-15-102612MS) were re-analyzed due to CCB failure. The reanalysis data with passing instrument QC was reported.

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

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

### **Method/Analysis Information**

**Product:** Solids and Total Dissolved

**Analytical Batch:** 1498593

**Method:** TDS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714002	CASA-15-102651
1203369494	Method Blank (MB)
1203369495	Laboratory Control Sample (LCS)
1203369496	378720002(CAMO-15-102597) 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 378720002 (CAMO-15-102597) 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:** 1499473

**Method:** EPA120.1 Specific Conductivity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714002	CASA-15-102651
1203371781	Laboratory Control Sample (LCS)
1203371783	378714002(CASA-15-102651) 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

### **Calibration Verification Information**

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

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

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

The LCS spike recovery met the acceptance limits.

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

Sample 378714002 (CASA-15-102651) 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.

### **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:** 1499464 **Method:** PH

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714002	CASA-15-102651
1203371763	Laboratory Control Sample (LCS)
1203371764	378714002(CASA-15-102651) Sample Duplicate (DUP)
1203371765	378720002(CAMO-15-102597) 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 378714002 (CASA-15-102651) and 378720002 (CAMO-15-102597) 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
378714002 (CASA-15-102651)		Received 06-AUG-15, out of holding 04-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) 1438017 was generated for sample 378714002 (CASA-15-102651) 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:** 1499840      **Method:** EPA 310.1 Total Alkalinity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
378714002	CASA-15-102651
1203372710	Method Blank (MB)
1203372712	Laboratory Control Sample (LCS)
1203372714	379011002(CASA-15-102647) Sample Duplicate (DUP)
1203372716	379011002(CASA-15-102647) 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 379011002 (CASA-15-102647) was selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2015-2021 GEL Work Order: 378714

#### 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: 01 SEP 2015

Title: Data Validator

# **Sample Data Summary**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: September 2, 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: 2015-2021

Client Sample ID: CASA-15-102637  
Sample ID: 378714001  
Matrix: W  
Collect Date: 04-AUG-15 14:28  
Receive Date: 06-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	U	ND	0.330	1.00	mg/L	1	TSM	08/14/15	2224	1500166	1
Flow Injection Analysis											
WSP-CN(T) "As Received"											
Cyanide, Total	U	ND	1.67	5.00	ug/L	1	AXH3	08/10/15	1236	1498448	2
Nutrient Analysis											
TKN "As Received"											
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1	KLP1	08/07/15	1047	1497307	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	08/10/15	1132	1498447
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	08/06/15	2200	1497306

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 2, 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: 2015-2021

Client Sample ID: CASA-15-102651  
Sample ID: 378714002  
Matrix: W  
Collect Date: 04-AUG-15 14:28  
Receive Date: 06-AUG-15  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	U	ND	0.067	0.200	mg/L	1	RXB5	08/06/15	1536	1498367	1
Chloride		2.82	0.067	0.200	mg/L	1					
Fluoride		0.450	0.033	0.100	mg/L	1					
Sulfate		3.48	0.133	0.400	mg/L	1					
Nutrient Analysis											
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P	U	ND	0.017	0.050	mg/L	1	KLP1	08/12/15	1048	1498655	2
NH3 "As Received"											
Nitrogen, Ammonia		0.0563	0.017	0.050	mg/L	1	KLP1	08/10/15	1448	1498650	3
NO3NO2 "As Received"											
Nitrogen, Nitrate/Nitrite		1.16	0.017	0.050	mg/L	1	AXH3	08/10/15	1158	1497883	4
Solids Analysis											
TDS "As Received"											
Total Dissolved Solids		144	3.40	14.3	mg/L		MXB3	08/07/15	0935	1498593	5
Titration and Ion Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		71.7	0.725	1.00	mg/L		PXO1	08/13/15	1408	1499840	6
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						
EPA120.1 Specific Conductivity "As Received"											
Conductivity		156	3.63	14.5	umhos/cm	1	PXO1	08/11/15	1409	1499473	7
PH "As Received"											
pH at Temp 23.2C	H	7.89	0.010	0.100	SU	1	PXO1	08/11/15	1531	1499464	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	08/10/15	1043	1498649
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	08/11/15	1600	1498654

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: September 2, 2015

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

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

Client SDG: 2015-2021

Client Sample ID: CASA-15-102651  
Sample ID: 378714002

Project: ESHL00114  
Client ID: ARSL004

The following Analytical Methods were performed:

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

**Notes:**

# **Quality Control Summary**

# GEL LABORATORIES LLC

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## QC Summary

Report Date: September 2, 2015

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

Contact: Mr. Keith Greene

Workorder: 378714

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1500166										
QC1203373636	378720001	DUP									
Total Organic Carbon Average		1.01		1.00	mg/L	0.597	^	(+/-1.00)	TSM	08/14/15	23:46
QC1203373634	LCS										
Total Organic Carbon Average	10.0			9.96	mg/L			(85%-115%)		08/14/15	22:10
QC1203373633	MB										
Total Organic Carbon Average			U	ND	mg/L					08/14/15	21:57
QC1203373638	378720001	PS									
Total Organic Carbon Average	10.0	1.01		11.6	mg/L			(65%-120%)		08/15/15	00:28
<b>Flow Injection Analysis</b>											
Batch	1498448										
QC1203369151	378714001	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	08/10/15	12:37
QC1203369150	LCS										
Cyanide, Total	50.0			50.3	ug/L			(90%-110%)		08/10/15	12:47
QC1203369149	MB										
Cyanide, Total			U	ND	ug/L					08/10/15	12:34
QC1203369154	378714001	MS									
Cyanide, Total	100	U	ND	78.9	ug/L			(90%-110%)		08/10/15	12:38
<b>Ion Chromatography</b>											
Batch	1498367										
QC1203368957	378714002	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		RXB5	08/06/15	16:06
Chloride			2.82		2.82	mg/L	0.039	(0%-20%)			
Fluoride			0.450		0.437	mg/L	2.82	^	(+/-0.100)		
Sulfate			3.48		3.47	mg/L	0.311	(0%-20%)			
QC1203368956	LCS										
Bromide	1.25			1.28	mg/L			(90%-110%)		08/06/15	14:17
Chloride	5.00			5.00	mg/L			(90%-110%)			

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## QC Summary

Workorder: 378714

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1498367										
Fluoride	2.50			2.56	mg/L		102	(90%-110%)			
Sulfate	10.0			10.3	mg/L		103	(90%-110%)	RXB5	08/06/15	14:17
QC1203368955 MB											
Bromide			U	ND	mg/L					08/06/15	13:12
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203368958 378714002 PS											
Bromide	1.25	U	ND	1.32	mg/L		102	(90%-110%)		08/06/15	16:36
Chloride	5.00		2.82	8.09	mg/L		105	(90%-110%)			
Fluoride	2.50		0.450	2.98	mg/L		101	(90%-110%)			
Sulfate	10.0		3.48	13.8	mg/L		103	(90%-110%)			
<b>Nutrient Analysis</b>											
Batch	1497307										
QC1203366271 378424001 DUP											
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	08/07/15	10:37
QC1203366270 LCS											
Nitrogen, Total Kjeldahl	1.00			1.03	mg/L		103	(90%-110%)		08/07/15	10:31
QC1203366269 MB											
Nitrogen, Total Kjeldahl			U	ND	mg/L					08/07/15	10:30
QC1203366272 378424001 MS											
Nitrogen, Total Kjeldahl	1.00	U	ND	1.16	mg/L		115 *	(90%-110%)		08/07/15	10:38
Batch	1497883										
QC1203368535 378714002 DUP											
Nitrogen, Nitrate/Nitrite			1.16	1.15	mg/L	0.866		(0%-20%)	AXH3	08/10/15	11:59
QC1203367700 LCS											
Nitrogen, Nitrate/Nitrite	1.00			0.963	mg/L		96.3	(90%-110%)		08/10/15	09:12
QC1203367699 MB											
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					08/10/15	09:10

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## QC Summary

Workorder: 378714

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1497883										
QC1203368536	378714002	PS									
Nitrogen, Nitrate/Nitrite	1.00	1.16		2.12	mg/L		96	(90%-110%)	AXH3	08/10/15	12:01
Batch	1498650										
QC1203369691	378836002	DUP									
Nitrogen, Ammonia		0.0718	J	0.0449	mg/L	46.1	^	(+/-0.050)	KLP1	08/10/15	14:59
QC1203369688	LCS										
Nitrogen, Ammonia	1.00			1.04	mg/L		104	(90%-110%)		08/10/15	14:33
QC1203369687	MB										
Nitrogen, Ammonia			U	ND	mg/L					08/10/15	14:44
QC1203369692	378836002	MS									
Nitrogen, Ammonia	1.00	0.0718		1.08	mg/L		101	(90%-110%)		08/10/15	15:00
Batch	1498655										
QC1203369699	378836002	DUP									
Phosphorus, Total as P		J	0.0332	J	0.0255	mg/L	26.2	^	(+/-0.050)	KLP1	08/12/15 14:49
QC1203369698	LCS										
Phosphorus, Total as P	1.00			0.977	mg/L		97.7	(83%-123%)		08/12/15	10:47
QC1203369697	MB										
Phosphorus, Total as P			U	ND	mg/L					08/12/15	10:46
QC1203369700	378836002	MS									
Phosphorus, Total as P	1.00	J	0.0332	1.11	mg/L		108	(59%-141%)		08/12/15	14:49
<b>Solids Analysis</b>											
Batch	1498593										
QC1203369496	378720002	DUP									
Total Dissolved Solids			396	393	mg/L	0.725		(0%-5%)	MXB3	08/07/15	09:35
QC1203369495	LCS										
Total Dissolved Solids	300			301	mg/L		100	(95%-105%)		08/07/15	09:35
QC1203369494	MB										
Total Dissolved Solids			U	ND	mg/L					08/07/15	09:35
<b>Titration and Ion Analysis</b>											
Batch	1499464										
QC1203371764	378714002	DUP									
pH		H	7.89	H	7.90	SU	0.152	(0%-5%)	PXO1	08/11/15	15:36
QC1203371765	378720002	DUP									
pH		H	7.80	H	7.82	SU	0.289	(0%-5%)		08/11/15	16:01

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## QC Summary

Workorder: 378714

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1499464										
QC1203371763	LCS										
pH	7.00			7.02	SU		100	(99%-101%)	PXO1	08/11/15	14:25
Batch	1499473										
QC1203371783	378714002	DUP									
Conductivity		156		158	umhos/cm	0.926		(0%-10%)	PXO1	08/11/15	14:10
QC1203371781	LCS										
Conductivity	1410			1400	umhos/cm		98.9	(95%-105%)		08/11/15	14:00
Batch	1499840										
QC1203372714	379011002	DUP									
Alkalinity, Total as CaCO3		70.7		70.7	mg/L	0		(0%-20%)	PXO1	08/13/15	14:31
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203372712	LCS										
Alkalinity, Total as CaCO3	50.0			51.3	mg/L		103	(90%-110%)		08/13/15	13:40
QC1203372710	MB										
Alkalinity, Total as CaCO3			U	ND	mg/L					08/13/15	13:40
Carbonate alkalinity (CaCO3)			U	ND	mg/L						
QC1203372716	379011002	MS									
Alkalinity, Total as CaCO3	50.0	70.7		121	mg/L		101	(80%-120%)		08/13/15	14:33

### 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.

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## QC Summary

Workorder: 378714

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

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

<b>Mo.Day Yr.</b> 07-AUG-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LACHAT Flow Injection Analyzer	<b>Test / Method:</b> EPA 351.2, EPA 351.2 SC	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> CPWC, ESHL, MIAN, PNTX,
<b>Batch ID:</b> 1497307	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 378329(2015-1922),378333(2015-1917),378336(2015-1916),378389,378424(2015-1943),378497,378508,378592(15077251),378674,378714(2015-2021),378720(2015-2020),378737 <b>Application Issues:</b> Failed Recovery for MS/MSD, or PS/PSD			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203366272MS,1203367909MS, 1203369386MS		1. The matrix spike recovered outside of the established acceptance limits due to matrix interference. Nitrogen, Total Kjeldahl 1203366272 (CAWA-15-102532MS) [115* (90%-110%)], 1203367909 (NIZ 755/WWTS-EFFMS) [89* (90%-110%)] and 1203369386 (20150804TLW027MS) [131* (90%-110%)].	

**Originator's Name:**

Kristen Mizzell 07-AUG-15

**Data Validator/Group Leader:**

Aubrey Kingsbury 07-AUG-15

### DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 10-AUG-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LACHAT Flow Injection Analyzer	<b>Test / Method:</b> EPA 335.4, EPA 335.4 SC, SW846 9012B	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> CBMW, ESHL, FONZ
<b>Batch ID:</b> 1498448	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 378714(2015-2021),378720(2015-2020),378958</b> <b>Application Issues:</b> Failed Recovery for MS/MSD, or PS/PSD Sample Logged out of Holding			
<b>Specification and Requirements</b> <b>Exception Description:</b>		<b>DER Disposition:</b>	
1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203369154MS,1203369155MS  2. Sample Logged out of Holding:  378958 001		1. The matrix spike recovered outside of the established acceptance limits due to matrix interference. 1203369154 (CASA-15-102637MS). The spike recovery falls outside of the GEL acceptance limits but within the client specified limits. 1203369155 (RG8MS).  2. Sample (See Below) was logged in for this analysis outside of the method specified holding time. The data is qualified. 378958001 (Effluent Flume (Grab)) [Logged 07-AUG-15, out of holding 29-JUL-15].	

**Originator's Name:**

Aubrey Kingsbury 10-AUG-15

**Data Validator/Group Leader:**

Kristen Mizzell 11-AUG-15

### DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 12-AUG-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> PC-Titrate TitraSip System	<b>Test / Method:</b> EPA 150.1, SM 4500-H B, SW846 9040C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> CBMW, DMAX, ESHL,
<b>Batch ID:</b> 1499464	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 378568,378590(2015-1988),378595(2015-1987),378598(2015-1986),378600,378714(2015-2021),378715(2015-2018),378716(2015-2017),378720(2015-2020),378781,378851,378910 <b>Application Issues:</b> Sample received out of holding			
<b>Specification and Requirements</b> <b>Exception Description:</b>		<b>DER Disposition:</b>	
1. Sample received out of holding:  378568 001  378590 001,015,023  378595 007  378598 001,003,005,007,009  378600 003  378714 002  378715 005  378716 001  378720 002  378781 004,014  378851 004,014  378910 001		1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified. 378568001 (LVL Level 8) [See applicable report]. 378590001 (WTLAP-15-103340) [See applicable report]. 378590015 (WTLAP-15-97616) [See applicable report]. 378590023 (WTLAP-15-103311) [See applicable report]. 378595007 (WTESR-15-98346) [See applicable report]. 378598001 (Urban-15-102310) [See applicable report]. 378598003 (Urban-15-102313) [See applicable report]. 378598005 (Urban-15-102314) [See applicable report]. 378598007 (Urban-15-102305) [See applicable report]. 378598009 (Urban-15-102306) [See applicable report]. 378600003 (15-08-04-1) [See applicable report]. 378714002 (CASA-15-102651) [See applicable report]. 378715005 (WTESR-15-99190) [See applicable report]. 378716001 (WT_IPC-15-101991) [See applicable report]. 378720002 (CAMO-15-102597) [See applicable report]. 378781004 (PSS Stage 1.4) [See applicable report]. 378781014 (PSS Stage 4.4) [See applicable report]. 378851004 (PSS Stage 8.4) [See applicable report]. 378851014 (PSS Stage 11.4) [See applicable report]. 378910001 (TSFRAC-03) [See applicable report].	

**Originator's Name:**  
Patrick Orgel 12-AUG-15

**Data Validator/Group Leader:**  
Elzbieta Szulc 12-AUG-15