

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-15-102621

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	8-10-15	OK	FIELD MATRIX:	W	OK
TIME COLLECTED (HH:MM):	1102	↓	MEDIA:	UA	↓
PRS ID:	OK	↓	SAMPLE TECH CODE:	UA	RSP
LOCATION ID:	SCI-2	↓	FIELD PREP:	UF	OK
LOCATION TYPE:	OK	↓	FIELD QC TYPE:	FD	↓
TOP DEPTH:	↓	↓	SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:	YES / NO / <u>NA</u>	

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:

LOCATION COMMENTS:

FIELD PARAMETERS:

8-10-15

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

COLLECTED BY (PRINT): A. Tash

RELINQUISHED BY (Printed Name) <u>Turner Bonham</u> (Signature)	Date/Time 8-10-15 1225	RECEIVED BY (Printed Name) <u>M. Mark</u> (Signature)	Date/Time 8/10/15 1225
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

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-15-102622

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	8-10-15	OK	FIELD MATRIX:	W	OK
TIME COLLECTED (HH:MM):	1102	↓	MEDIA:	UA	↓
PRS ID:	OK	↓	SAMPLE TECH CODE:	UA	RSP
LOCATION ID:	SCI-2	↓	FIELD PREP:	F	OK
LOCATION TYPE:	OK	↓	FIELD QC TYPE:	FD	↓
TOP DEPTH:	↓	↓	SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:	YES / NO / <u>(NA)</u>	

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Dissolved Oxygen _____ mg/L 8-10-15 Flow (in gpm) _____ GPM _____ Oxidation-Reduction Potential _____ mV
 pH _____ SU Specific Conductance _____ uS/cm _____ Temperature _____ deg C
 Turbidity _____ NTU

COLLECTED BY (PRINT): A. TOSH

RELINQUISHED BY (Printed Name) (Signature) <u>Tanner Bonham</u>	Date/Time 8-10-15 1225	RECEIVED BY (Printed Name) (Signature) <u>[Signature]</u>	Date/Time 8/10/15 1225
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

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-15-102643

WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	8-10-15	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1102		MEDIA:	UA	↓
PRS ID:	OK		SAMPLE TECH CODE:	UA	RSP
LOCATION ID:	SCI-2		FIELD PREP:	UF	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	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: NA

FIELD PARAMETERS:

Dissolved Oxygen	8.21	mg/L	Flow (in gpm)	0.71	GPM	Oxidation-Reduction Potential	142.5	mV
pH	7.25	SU	Specific Conductance	615	uS/cm	Temperature	14.32	deg C
Turbidity	1.93	NTU						

COLLECTED BY (PRINT): A. Tosh

RELINQUISHED BY (Printed Name) <i>Tomer Borshom</i> (Signature) <i>[Signature]</i>	Date/Time 8-10-15 1225	RECEIVED BY (Printed Name) <i>M. Montoya</i> (Signature) <i>[Signature]</i>	Date/Time 8/10/15 1225
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

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-15-102657

WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	8-10-15	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1102	↓	MEDIA:	UA	↓
PRS ID:	OK	↓	SAMPLE TECH CODE:	UA	ASP
LOCATION ID:	SCI-2	↓	FIELD PREP:	F	OK
LOCATION TYPE:	MON	↓	FIELD QC TYPE:	REG	↓
TOP DEPTH:	OK	↓	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:	YES / NO / <u>NA</u>	

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

8-10-15 JS

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

COLLECTED BY (PRINT): A. Tosa

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 8-10-15 1225	RECEIVED BY (Printed Name) (Signature)	Date/Time 8/10/15 1225
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

DATA VALIDATION REPORT

Chain Of Custody No. 2015-2126

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
379146	EPA:120.1	1	1			
379146	EPA:150.1	1	1			
379146	EPA:160.1	1	1			
379146	EPA:245.2	2	2			
379146	EPA:300.0	1	1			
379146	EPA:310.1	1	1			
379146	EPA:335.4	1	1			
379146	EPA:350.1	1	1			
379146	EPA:351.2	1	1			
379146	EPA:353.2	1	1			
379146	EPA:365.4	1	1			
379146	SM:A2340B	1	1			
379146	SW-846:6010C	1	1			
379146	SW-846:6020	1	1			
379146	SW-846:6850	1	1			
379146	SW-846:9060	1	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
379146	EPA:120.1	1501375	1501375		1	1								1				2			
379146	EPA:150.1	1501372	1501372		1	1								1				2			
379146	EPA:160.1	1499948	1499948		1	1			1					1				1			
379146	EPA:245.2	1503572	1503571		2	2			1	2				1				2			
379146	EPA:300.0	1500059	1500059		1	1			1					1				1			
379146	EPA:310.1	1500640	1500640		1	1			1	1				1				1			
379146	EPA:335.4	1500086	1500085		1	1			1	1				1				1			
379146	EPA:350.1	1500088	1500087		1	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
379146	EPA:351.2	1499653	1499651	1	1				1	1				1			1				
379146	EPA:353.2	1500089	1500089	1	1				1					1			1				
379146	EPA:365.4	1500565	1500564	1	1				1	1				1			1				
379146	SM:A2340B	1503257	1503257	1	1																
379146	SW-846:6010C	1499875	1499874	1	1				1	1				1			1				
379146	SW-846:6020	1499903	1499902	1	1				1	1				1			1				
379146	SW-846:6850	1500488	1500487	1	1				1	1	1			1							
379146	SW-846:9060	1500166	1500166	1	1				1					1			1				

2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-15-102607	1203376811	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-15-102622	379146004	FD	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-15-102657	1203376810	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-15-102657	379146002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203376809	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-15-102607	1203376805	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102622	379146004	FD	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102657	1203376806	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102657	379146002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203376804	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CASA-15-102622	379146004	FD	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-15-102657	1203372990	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-15-102657	379146002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203372989	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203372988	MB	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102621	379146003	FD	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102622	379146004	FD	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102643	1203382650	DUP	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102643	1203382652	MS	0	0	1	0
EPA:245.2	INORGANIC	CASA-15-102643	379146001	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102657	379146002	REG	1	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:245.2	INORGANIC	LCS	1203382648	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203382647	MB	1	0	0	0
EPA:245.2	INORGANIC	WTESR-15-97804	1203382649	DUP	1	0	0	0
EPA:245.2	INORGANIC	WTESR-15-97804	1203382651	MS	0	0	1	0
EPA:300.0	GENERAL CHEMISTRY	CASA-15-102622	379146004	FD	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-15-102647	1203373270	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-15-102657	379146002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203373269	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203373268	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102622	379146004	FD	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102657	1203374904	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102657	1203374907	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102657	379146002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203374902	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1203374900	MB	2	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102621	379146003	FD	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102643	1203373393	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102643	1203373395	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102643	379146001	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203373392	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203373391	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102622	379146004	FD	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102657	1203373401	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102657	1203373403	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102657	379146002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203373400	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203373399	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-15-102621	379146003	FD	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-15-102633	1203372231	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-15-102633	1203372232	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CASA-15-102643	379146001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203372230	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203372229	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102622	379146004	FD	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102657	1203373407	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102657	379146002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203373406	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203373405	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102622	379146004	FD	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102657	1203374698	DUP	1	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:365.4	GENERAL CHEMISTRY	CASA-15-102657	1203374700	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102657	379146002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203374696	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203374695	MB	1	0	0	0
SM:A2340B	INORGANIC	CASA-15-102622	379146004	FD	1	0	0	0
SM:A2340B	INORGANIC	CASA-15-102657	379146002	REG	1	0	0	0
SW-846:6010C	INORGANIC	CASA-15-102622	379146004	FD	17	0	0	0
SW-846:6010C	INORGANIC	CASA-15-102657	1203372793	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CASA-15-102657	1203372794	MS	0	0	17	0
SW-846:6010C	INORGANIC	CASA-15-102657	379146002	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203372792	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203372791	MB	17	0	0	0
SW-846:6020	INORGANIC	CASA-15-102622	379146004	FD	11	0	0	0
SW-846:6020	INORGANIC	CASA-15-102657	1203372870	DUP	11	0	0	0
SW-846:6020	INORGANIC	CASA-15-102657	1203372871	MS	0	0	11	0
SW-846:6020	INORGANIC	CASA-15-102657	379146002	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203372869	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203372868	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-15-102559	1203374487	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-15-102559	1203374488	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-15-102622	379146004	FD	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-15-102657	379146002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203374486	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203374485	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-15-102621	379146003	FD	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-15-102643	379146001	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.

DATA VALIDATION REPORT

5. Any contaminants in blanks?

No.

6. Any surrogate recoveries outside the control limits?

No.

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-15-102643	1203373395		EPA:335.4	Cyanide (Total)	1500085	08-20-2015	W	111		110	90	10		
CASA-15-102643	1203373395		EPA:335.4	Cyanide (Total)	1500085	08-20-2015	W	111		110	90	10		
CASA-15-102633	1203372232		EPA:351.2	Total Kjeldahl Nitrogen	1499651	08-13-2015	W	61		110	90	10		
CASA-15-102657	1203372871		SW-846:6020	Chromium	1499902	09-03-2015	W	132		125	75	10		
CASA-15-102657	1203372871		SW-846:6020	Chromium	1499902	09-03-2015	W	132		125	75	10		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CASA-15-102622	SCI-2	FD	EPA:350.1	0	1
CASA-15-102622	SCI-2	FD	EPA:353.2	0	1
CASA-15-102622	SCI-2	FD	EPA:365.4	0	1
CASA-15-102622	SCI-2	FD	SM:A2340B	0	1
CASA-15-102622	SCI-2	FD	SW-846:6010C	0	17
CASA-15-102622	SCI-2	FD	SW-846:6020	0	11
CASA-15-102622	SCI-2	FD	SW-846:6850	0	1
CASA-15-102643	SCI-2	REG	EPA:245.2	0	1
CASA-15-102643	SCI-2	REG	EPA:335.4	0	1
CASA-15-102643	SCI-2	REG	EPA:351.2	0	1
CASA-15-102643	SCI-2	REG	SW-846:9060	0	1
CASA-15-102657	SCI-2	REG	EPA:120.1	0	1
CASA-15-102657	SCI-2	REG	EPA:150.1	0	1
CASA-15-102657	SCI-2	REG	EPA:160.1	0	1
CASA-15-102657	SCI-2	REG	EPA:245.2	0	1
CASA-15-102657	SCI-2	REG	EPA:300.0	0	4
CASA-15-102657	SCI-2	REG	EPA:310.1	0	2
CASA-15-102657	SCI-2	REG	EPA:350.1	0	1
CASA-15-102657	SCI-2	REG	EPA:353.2	0	1
CASA-15-102657	SCI-2	REG	EPA:365.4	0	1
CASA-15-102657	SCI-2	REG	SM:A2340B	0	1
CASA-15-102657	SCI-2	REG	SW-846:6010C	0	17
CASA-15-102657	SCI-2	REG	SW-846:6020	0	11
CASA-15-102657	SCI-2	REG	SW-846:6850	0	1



September 04, 2015

gel.com

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

Re: LANL- WQH Water Samples
Work Order: 379146
SDG: 2015-2126

Dear Mr. Greene:

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

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

Sincerely,

Hope Taylor for
Valerie Davis
Project Manager

Chain of Custody: 2015-2126
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 379146
SDG: 2015-2126

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 379146
SDG # : 2015-2126**

September 04, 2015

Laboratory Identification:

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

Summary

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

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
379146001	CASA-15-102643
379146002	CASA-15-102657
379146003	CASA-15-102621
379146004	CASA-15-102622

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 04 September 2015

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

Chain of Custody and Supporting Documentation



SAMPLE RECEIPT & REVIEW FORM

Client: LANL		SDG/AR/COC/Work Order: 2015-2126	
Received By: Brielle Luthman		Date Received: 8/12/15 0855	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags <u>Blue ice</u> Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): E5032015835
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples (EPA 6850) have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials free of headspace (defined as < 6mm bubble)?			<input checked="" type="checkbox"/>	Sample ID's and containers affected:
8 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
9 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
10 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
11 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
14 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
15 Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 5908 1779 3153-4° 5908 1779 3131-2° 5908 1779 3120-2°

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
BILL SENDER

SHIP DATE: 11AUG15
ACTWGT: 40.0 LB MAN
CAD: 0014176/CAFE2807

BILL SENDER

10 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

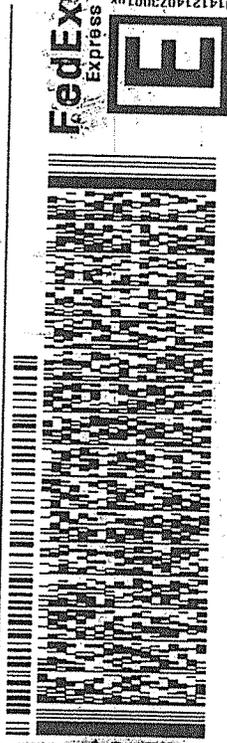
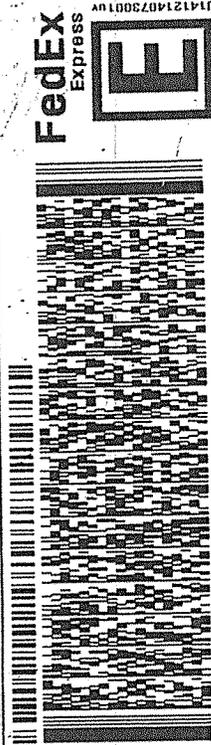
10 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171
REF: MRCH088FYMCO

CHARLESTON SC 29407

(843) 566-8171
REF: MRSW12CHWCEO



WED - 12 AUG 10:30A
PRIORITY OVERNIGHT

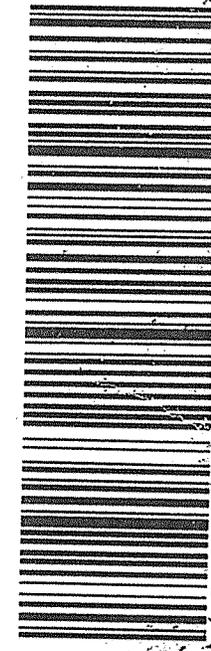
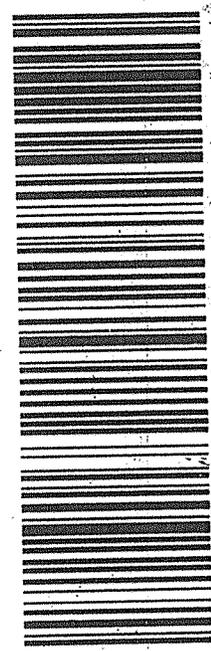
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SC-US CHS

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0201

X7 CHSA 2^o 29407
SC-US CHS



Part # 156148-434 RIT2 10/11

Part # 156148-434 RIT2 10/11

521C1/FECA/6F03

521C1/FECA/6F03

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

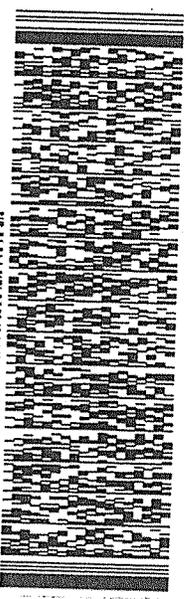
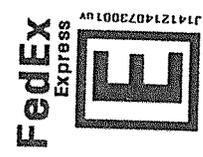
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ACTWGT: 32.0 LB MAN
CAD: 0014176/CAFE2807

BILL SENDER

10 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(649) 566-8171
REF: MRSW12CHWCE0

521C1/FECA/6F03

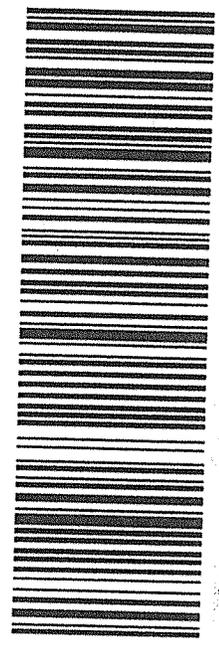


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PRIORITY OVERNIGHT

TRK# 5908 1779 3120
[0201]

X7 CHSA

29407
SC-US CHS



Part # 156148-434 R1T2 10/11 88

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

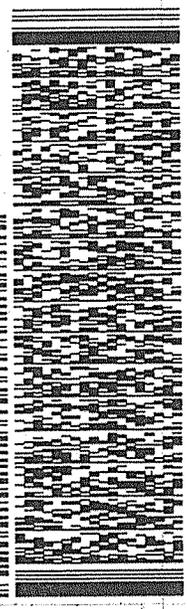
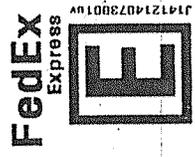
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ACTWGT: 32.0 LB MAN
CAD: 0014176/CAFE2807

BILL SENDER

10 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(649) 566-8171
REF: MRGW04BAGWEO

521C1/FECA/6F03

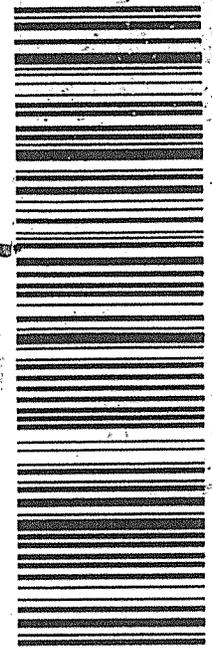


WED - 12 AUG 10:30A
PRIORITY OVERNIGHT

TRK# 5908 1779 3110
[0201]

X7 CHSA

29407
SC-US CHS



Part # 156148-434 R1T2 10/11 88

Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

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

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

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

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2015-2126
Work Order #: 379146**

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: 1500488

Prep Batch Number: 1500487

Sample Analysis

Sample ID	Client ID
379146002	CASA-15-102657
379146004	CASA-15-102622
1203374489	Interference Check Sample (ICS)
1203374485	Method Blank (MB)
1203374486	Laboratory Control Sample (LCS)
1203374487	379019004(CAMO-15-102559) Matrix Spike (MS)
1203374488	379019004(CAMO-15-102559) 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 379019004 (CAMO-15-102559) 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

The 1203374486 (LCS) was re-analyzed due to non-conforming spike recoveries in the initial analysis. The re-analysis met acceptance criteria, and the data 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.

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: 2015-2126 GEL Work Order: 379146

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 LLC

Client Sample No.

CASA-15-102657Lab Code: GELDate Received: 12-AUG-15Instrument: LCMSMSGEL Job No (SDG): 2015-2126Method: SW846 6850 ModifiedGEL Sample ID: 379146002Matrix: WATERDate Filtered: 14-AUG-15Extraction Batch ID: 1500487Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids: .

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.899	ug/L		1	15-AUG-15 00:48	per0814027a
	Perchlorate Isotope Ratio			3.1			1	15-AUG-15 00:48	per0814027a
14797-73-0	Perchlorate-101	.05	.2	0.896	ug/L		1	15-AUG-15 00:48	per0814027a
	Perchlorate-O(18)			0.500	ug/L		1	15-AUG-15 00:48	per0814027a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

CASA-15-102622Lab Code: GELDate Received: 12-AUG-15Instrument: LCMSMSGEL Job No (SDG): 2015-2126Method: SW846 6850 ModifiedGEL Sample ID: 379146004Matrix: WATERDate Filtered: 14-AUG-15Extraction Batch ID: 1500487Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids: .

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.938	ug/L		1	15-AUG-15 01:01	per0814028a
	Perchlorate Isotope Ratio			3.03			1	15-AUG-15 01:01	per0814028a
14797-73-0	Perchlorate-101	.05	.2	0.955	ug/L		1	15-AUG-15 01:01	per0814028a
	Perchlorate-O(18)			0.501	ug/L		1	15-AUG-15 01:01	per0814028a

^ 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): 2015-2126

Extract Batch Code: 1500487

Date Filtered: 14-AUG-15

Matrix: WATER

Sample ID: 1203374486

Analyte [^]	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.195	ug/L	97.5		85 - 115
Perchlorate Isotope Ratio		3.04				-
Perchlorate-101	0.200	.203	ug/L	102		85 - 115
Perchlorate-O(18)		.463	ug/L			-

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

Perchlorate Spike/Spike Duplicate Summary

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No (SDG): 2015-2126

Extract Batch Code: 1500487

Date Extracted: 14-AUG-15

GEL MS/PS ID: 1203374487

Client ID: CAMO-15-102559

GEL MSD/PSD ID: 1203374488

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	0.404	ug/L	0.591	93.5	.566	81.2	4.27	30	75 - 125
Perchlorate Isotope Ratio	0	3.18		3.14		3		4.64		-
Perchlorate-101	0.200	0.393	ug/L	0.581	94.3	.584	95.4	.362	30	75 - 125
Perchlorate-O(18)	0	0.479	ug/L	0.480		.49		2.11		-

^ 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 LLC

Client Sample No.

MBLab Code: GELDate Received: 14-AUG-15Instrument: LCMSMSGEL Job No (SDG): 2015-2126Method: EPA 6850 ModifiedGEL Sample ID: 1203374485Matrix: WATERDate Filtered: 14-AUG-15Extraction Batch ID: 1500487Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids: .

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.200	ug/L	U	1	14-AUG-15 21:34	per0814012a
	Perchlorate Isotope Ratio						1	14-AUG-15 21:34	per0814012a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	14-AUG-15 21:34	per0814012a
	Perchlorate-O(18)			0.486	ug/L		1	14-AUG-15 21:34	per0814012a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

LCSLab Code: GELDate Received: 14-AUG-15Instrument: LCMSMSGEL Job No (SDG): 2015-2126Method: EPA 6850 ModifiedGEL Sample ID: 1203374486Matrix: WATERDate Filtered: 14-AUG-15Extraction Batch ID: 1500487Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids: .

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.195	ug/L	J	1	15-AUG-15 13:21	per0815012a
	Perchlorate Isotope Ratio			3.04			1	15-AUG-15 13:21	per0815012a
14797-73-0	Perchlorate-101	.05	.2	0.203	ug/L		1	15-AUG-15 13:21	per0815012a
	Perchlorate-O(18)			0.463	ug/L		1	15-AUG-15 13:21	per0815012a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

ICSLab Code: GEL

Date Received:

Instrument: LCMSMSGEL Job No (SDG): 2015-2126Method: SW846 6850 ModifiedGEL Sample ID: 1203374489Matrix: WATERDate Filtered: 14-AUG-15Extraction Batch ID: 1500487Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids:

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.241	ug/L		1	14-AUG-15 22:00	per0814014a
	Perchlorate Isotope Ratio			3.09			1	14-AUG-15 22:00	per0814014a
14797-73-0	Perchlorate-101	.05	.2	0.241	ug/L		1	14-AUG-15 22:00	per0814014a
	Perchlorate-O(18)			0.514	ug/L		1	14-AUG-15 22:00	per0814014a

^ 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: 1500487Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-15-102559MSDate Received: 11-AUG-15GEL Job No (SDG): 2015-2126GEL Sample ID: 1203374487Date Filtered: 14-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	0.591	ug/L		1	14-AUG-15 23:04	per0814019a
	Perchlorate Isotope Ratio			3.14			1	14-AUG-15 23:04	per0814019a
14797-73-0	Perchlorate-101	.05	.2	0.581	ug/L		1	14-AUG-15 23:04	per0814019a
	Perchlorate-O(18)			0.480	ug/L		1	14-AUG-15 23:04	per0814019a

^ 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: 1500487Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-15-102559MSDDate Received: 11-AUG-15GEL Job No (SDG): 2015-2126GEL Sample ID: 1203374488Date Filtered: 14-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	0.566	ug/L		1	14-AUG-15 23:17	per0814020a
	Perchlorate Isotope Ratio			3			1	14-AUG-15 23:17	per0814020a
14797-73-0	Perchlorate-101	.05	.2	0.584	ug/L		1	14-AUG-15 23:17	per0814020a
	Perchlorate-O(18)			0.490	ug/L		1	14-AUG-15 23:17	per0814020a

^ 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 #: 2015-2126
Work Order #: 379146

Sample ID	Client ID
379146001	CASA-15-102643
379146002	CASA-15-102657
379146003	CASA-15-102621
379146004	CASA-15-102622
1203372791	Method Blank (MB)ICP
1203372792	Laboratory Control Sample (LCS)
1203372795	379146002(CASA-15-102657L) Serial Dilution (SD)
1203372793	379146002(CASA-15-102657D) Sample Duplicate (DUP)
1203372794	379146002(CASA-15-102657S) Matrix Spike (MS)
1203372868	Method Blank (MB)ICP-MS
1203372869	Laboratory Control Sample (LCS)
1203372872	379146002(CASA-15-102657L) Serial Dilution (SD)
1203372870	379146002(CASA-15-102657D) Sample Duplicate (DUP)
1203372871	379146002(CASA-15-102657S) Matrix Spike (MS)
1203382647	Method Blank (MB)CVAA
1203382648	Laboratory Control Sample (LCS)
1203382654	379146001(CASA-15-102643L) Serial Dilution (SD)
1203382650	379146001(CASA-15-102643D) Sample Duplicate (DUP)
1203382652	379146001(CASA-15-102643S) Matrix Spike (MS)

Sample Analysis

Method/Analysis Information

Analytical Batch:	1499875, 1499903, 1503572 and 1503257
Prep Batch :	1499874, 1499902 and 1503571
Standard Operating Procedures:	GL-MA-E-013 REV# 24, GL-MA-E-006 REV# 12, GL-MA-E-014 REV# 26, GL-MA-E-010 REV# 30 and GL-GC-E-107 REV# 9
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.1/245.2 and SM 2340 B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

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

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

The Metals analysis - 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 PQL standard recoveries for SW846 6010C met the control limits with the exception of silica. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 379146002 (CASA-15-102657) and 379146004 (CASA-15-102622)-ICP.

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: 379146002 (CASA-15-102657)-ICP and ICP-MS and 379146001 (CASA-15-102643)-CVAA.

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20%

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

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples 379146002 (CASA-15-102657) and 379146004 (CASA-15-102622)-ICP-MS were diluted to ensure that the analyte concentrations were within the linear calibration range of the instrument.

Analyte	379146	
	002	004
Chromium	5X	5X

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

A data exception report was not required for this SDG.

Additional Comments

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

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2015-2126 GEL Work Order: 379146

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:



Name: **Nik-Cole Elmore**

Date: **08 SEP 2015**

Title: **Data Validator**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2126

CONTRACT: ESHL00114

METHOD TYPE: EPA

SAMPLE ID:379146001

BASIS: As Received

DATE COLLECTED 10-AUG-15

CLIENT ID: CASA-15-102643

LEVEL: Low

DATE RECEIVED 12-AUG-15

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	08/27/15 15:49	082715W1-10	1503572

Prep Information:

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

AV EPA 245.1/245.2

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2126

CONTRACT: ESHL00114

METHOD TYPE: EPA

SAMPLE ID:379146002

BASIS: As Received

DATE COLLECTED 10-AUG-15

CLIENT ID: CASA-15-102657

LEVEL: Low

DATE RECEIVED 12-AUG-15

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTMI	08/27/15 16:01	082715W1-10	1503572

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2126

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 379146002

BASIS: As Received

DATE COLLECTED 10-AUG-15

CLIENT ID: CASA-15-102657

LEVEL: Low

DATE RECEIVED 12-AUG-15

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	SKJ	09/03/15 09:38	150902-6	1499903
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	SKJ	09/03/15 09:38	150902-6	1499903
7440-39-3	Barium	69.4	ug/L		1	5	5	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-42-8	Boron	20.7	ug/L	J	15	50	50	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	SKJ	09/02/15 17:59	150902-2	1499903
7440-70-2	Calcium	65500	ug/L		50	200	200	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-47-3	Chromium	432	ug/L		10	50	50	5	MS	SKJ	09/03/15 13:05	150903-7	1499903
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	08/18/15 21:35	081815-1	1499875
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	08/18/15 21:35	081815-1	1499875
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	SKJ	09/02/15 17:59	150902-2	1499903
7439-95-4	Magnesium	15600	ug/L		110	300	300	1	P	HSC	08/18/15 21:35	081815-1	1499875
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	08/18/15 21:35	081815-1	1499875
7439-98-7	Molybdenum	0.555	ug/L		0.165	0.5	0.5	1	MS	SKJ	09/03/15 15:08	150903-9	1499903
7440-02-0	Nickel	17.2	ug/L		0.5	2	2	1	MS	SKJ	09/02/15 17:59	150902-2	1499903
7440-09-7	Potassium	3670	ug/L		50	150	150	1	P	HSC	08/18/15 21:35	081815-1	1499875
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	SKJ	09/02/15 17:59	150902-2	1499903
7631-86-9	Silica	62100	ug/L		53	213	213	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	SKJ	09/02/15 17:59	150902-2	1499903
7440-23-5	Sodium	25600	ug/L		100	300	300	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-24-6	Strontium	343	ug/L		1	5	5	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	SKJ	09/02/15 17:59	150902-2	1499903
7440-31-5	Tin	5.11	ug/L	J	2.5	10	10	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-61-1	Uranium	1.84	ug/L		0.067	0.2	0.2	1	MS	SKJ	09/02/15 17:59	150902-2	1499903
7440-62-2	Vanadium	1.65	ug/L	J	1	5	5	1	P	HSC	08/18/15 21:35	081815-1	1499875
7440-66-6	Zinc	4.28	ug/L	J	3.3	10	10	1	P	HSC	08/18/15 21:35	081815-1	1499875

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2126

CONTRACT: ESHL00114

METHOD TYPE:

SAMPLE ID:379146002

BASIS: As Received

DATE COLLECTED 10-AUG-15

CLIENT ID: CASA-15-102657

LEVEL: Low

DATE RECEIVED 12-AUG-15

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	228	mg/L		0.453	1.24	1.24	1		JJ2	08/26/15 12:52		1503257

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1499875	1499874	SW846 3005A	50	mL	50	mL	08/12/15	JP1
1499903	1499902	SW846 3005A	50	mL	50	mL	08/12/15	JP1
1503572	1503571	EPA 245.1/245.2 Prep	20	mL	20	mL	08/27/15	MTM1

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2126

CONTRACT: ESHL00114

METHOD TYPE: EPA

SAMPLE ID:379146003

BASIS: As Received

DATE COLLECTED 10-AUG-15

CLIENT ID: CASA-15-102621

LEVEL: Low

DATE RECEIVED 12-AUG-15

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	08/27/15 16:03	082715W1-10	1503572

Prep Information:

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

AV EPA 245.1/245.2

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2126

CONTRACT: ESHL00114

METHOD TYPE: EPA

SAMPLE ID:379146004

BASIS: As Received

DATE COLLECTED 10-AUG-15

CLIENT ID: CASA-15-102622

LEVEL: Low

DATE RECEIVED 12-AUG-15

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	08/27/15 16:05	082715W1-10	1503572

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2126

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 379146004

BASIS: As Received

DATE COLLECTED 10-AUG-15

CLIENT ID: CASA-15-102622

LEVEL: Low

DATE RECEIVED 12-AUG-15

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	SKJ	09/03/15 09:46	150902-6	1499903
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	SKJ	09/03/15 09:46	150902-6	1499903
7440-39-3	Barium	69.2	ug/L		1	5	5	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-42-8	Boron	20.4	ug/L	J	15	50	50	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	SKJ	09/02/15 18:18	150902-2	1499903
7440-70-2	Calcium	65200	ug/L		50	200	200	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-47-3	Chromium	449	ug/L		10	50	50	5	MS	SKJ	09/03/15 13:11	150903-7	1499903
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	08/18/15 21:32	081815-1	1499875
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	08/18/15 21:32	081815-1	1499875
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	SKJ	09/02/15 18:18	150902-2	1499903
7439-95-4	Magnesium	15500	ug/L		110	300	300	1	P	HSC	08/18/15 21:32	081815-1	1499875
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	08/18/15 21:32	081815-1	1499875
7439-98-7	Molybdenum	0.384	ug/L	J	0.165	0.5	0.5	1	MS	SKJ	09/03/15 15:13	150903-9	1499903
7440-02-0	Nickel	18.3	ug/L		0.5	2	2	1	MS	SKJ	09/02/15 18:18	150902-2	1499903
7440-09-7	Potassium	3680	ug/L		50	150	150	1	P	HSC	08/18/15 21:32	081815-1	1499875
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	SKJ	09/02/15 18:18	150902-2	1499903
7631-86-9	Silica	61800	ug/L		53	213	213	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	SKJ	09/02/15 18:18	150902-2	1499903
7440-23-5	Sodium	25000	ug/L		100	300	300	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-24-6	Strontium	338	ug/L		1	5	5	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	SKJ	09/02/15 18:18	150902-2	1499903
7440-31-5	Tin	6.14	ug/L	J	2.5	10	10	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-61-1	Uranium	1.87	ug/L		0.067	0.2	0.2	1	MS	SKJ	09/02/15 18:18	150902-2	1499903
7440-62-2	Vanadium	1.5	ug/L	J	1	5	5	1	P	HSC	08/18/15 21:32	081815-1	1499875
7440-66-6	Zinc	3.96	ug/L	J	3.3	10	10	1	P	HSC	08/18/15 21:32	081815-1	1499875

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2126

CONTRACT: ESHL00114

METHOD TYPE:

SAMPLE ID:379146004

BASIS: As Received

DATE COLLECTED 10-AUG-15

CLIENT ID: CASA-15-102622

LEVEL: Low

DATE RECEIVED 12-AUG-15

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	226	mg/L		0.453	1.24	1.24	1		JJ2	08/26/15 12:52		1503257

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1499875	1499874	SW846 3005A	50	mL	50	mL	08/12/15	JP1
1499903	1499902	SW846 3005A	50	mL	50	mL	08/12/15	JP1
1503572	1503571	EPA 245.1/245.2 Prep	20	mL	20	mL	08/27/15	MTM1

***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. 2015-2126
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>
1203372791								
	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	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203372868								
	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	1.7	ug/L	+/-5	U	MS	1.7	5
	Cadmium	0.11	ug/L	+/-1	U	MS	0.11	1
	Chromium	2	ug/L	+/-10	U	MS	2	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.165	ug/L	+/-0.5	U	MS	0.165	0.5
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Selenium	1.5	ug/L	+/-5	U	MS	1.5	5
	Silver	0.2	ug/L	+/-1	U	MS	0.2	1
	Thallium	0.45	ug/L	+/-2	U	MS	0.45	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203382647								
	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

*Analytical Methods:

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

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2126 Client ID: CASA-15-102657S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 379146002 Spike ID: 1203372794

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Sodium	ug/L		30800		25600		5000	104	N/A	P
Strontium	ug/L	75-125	862		343		500	104		P
Tin	ug/L	75-125	506		5.11	J	500	100		P
Vanadium	ug/L	75-125	510		1.65	J	500	102		P
Zinc	ug/L	75-125	482		4.28	J	500	95.5		P
Aluminum	ug/L	75-125	4900		68	U	5000	97.5		P
Barium	ug/L	75-125	558		69.4		500	97.8		P
Beryllium	ug/L	75-125	479		1	U	500	95.7		P
Boron	ug/L	75-125	543		20.7	J	500	104		P
Calcium	ug/L		70200		65500		5000	93.9	N/A	P
Cobalt	ug/L	75-125	463		1	U	500	92.7		P
Copper	ug/L	75-125	516		3	U	500	103		P
Iron	ug/L	75-125	5160		30	U	5000	103		P
Magnesium	ug/L	75-125	20900		15600		5000	105		P
Manganese	ug/L	75-125	485		2	U	500	96.9		P
Potassium	ug/L	75-125	8800		3670		5000	103		P
Silica	ug/L		72200		62100		10700	94.8	N/A	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2126 Client ID: CASA-15-102657S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 379146002 Spike ID: 1203372871

<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	51.3		1	U	50	102		MS
Arsenic	ug/L	75-125	50		1.7	U	50	100		MS
Cadmium	ug/L	75-125	51.4		0.11	U	50	103		MS
Chromium	ug/L		499		432		50	132	N/A	MS
Lead	ug/L	75-125	48.4		0.5	U	50	96.8		MS
Molybdenum	ug/L	75-125	52.8		0.555		50	104		MS
Nickel	ug/L	75-125	66.1		17.2		50	97.9		MS
Selenium	ug/L	75-125	52.1		1.5	U	50	102		MS
Silver	ug/L	75-125	50.4		0.2	U	50	101		MS
Thallium	ug/L	75-125	46.9		0.45	U	50	93.5		MS
Uranium	ug/L	75-125	52.9		1.84		50	102		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2126 Client ID: CASA-15-102643S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 379146001 Spike ID: 1203382652

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	2.11		0.067	U	2	104		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2015-2126

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-15-102657D

Matrix: WATER

Level: Low

Sample ID: 379146002

Duplicate ID: 1203372793

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%	69.4		70.6		1.63		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	20.7 J		20.8 J		.541		P
Calcium	ug/L	+/-20%	65500		66600		1.71		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%	15600		16000		2.24		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	3670		3740		1.77		P
Silica	ug/L	+/-20%	62100		63300		1.97		P
Sodium	ug/L	+/-20%	25600		25900		1.2		P
Strontium	ug/L	+/-20%	343		348		1.48		P
Tin	ug/L	+/-10	5.11 J		4.96 J		3.12		P
Vanadium	ug/L	+/-5	1.65 J		1.7 J		2.87		P
Zinc	ug/L	+/-10	4.28 J		3.92 J		8.84		P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2015-2126

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-15-102657D

Matrix: WATER

Level: Low

Sample ID: 379146002

Duplicate ID: 1203372870

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		1.7 U		1.7 U				MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L	+/-20%	432		453		4.58		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.555		0.47 J		16.6		MS
Nickel	ug/L	+/-20%	17.2		17.2		.0756		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	+/-20%	1.84		1.88		2.37		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
-6-
Duplicate Sample Summary

SDG No.: 2015-2126

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-15-102643D

Matrix: WATER

Level: Low

Sample ID: 379146001

Duplicate ID: 1203382650

Percent Solids for Dup: N/A

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

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2015-2126

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>
1203372792								
	Aluminum	ug/L	5000	4860		97.1	80-120	P
	Barium	ug/L	500	481		96.3	80-120	P
	Beryllium	ug/L	500	468		93.5	80-120	P
	Boron	ug/L	500	496		99.3	80-120	P
	Calcium	ug/L	5000	4780		95.5	80-120	P
	Cobalt	ug/L	500	473		94.6	80-120	P
	Copper	ug/L	500	511		102	80-120	P
	Iron	ug/L	5000	5070		101	80-120	P
	Magnesium	ug/L	5000	4890		97.8	80-120	P
	Manganese	ug/L	500	488		97.6	80-120	P
	Potassium	ug/L	5000	4950		98.9	80-120	P
	Silica	ug/L	10700	10100		94.6	80-120	P
	Sodium	ug/L	5000	5530		111	80-120	P
	Tin	ug/L	500	482		96.5	80-120	P
	Vanadium	ug/L	500	498		99.5	80-120	P
	Zinc	ug/L	500	480		95.9	80-120	P
	Strontium	ug/L	500	528		106	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2015-2126

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>
1203372869								
	Antimony	ug/L	50	51.3		103	80-120	MS
	Arsenic	ug/L	50	53		106	80-120	MS
	Cadmium	ug/L	50	52.7		105	80-120	MS
	Chromium	ug/L	50	52.8		106	80-120	MS
	Lead	ug/L	50	49.5		99.1	80-120	MS
	Molybdenum	ug/L	50	50.6		101	80-120	MS
	Nickel	ug/L	50	50.8		102	80-120	MS
	Selenium	ug/L	50	53.3		107	80-120	MS
	Silver	ug/L	50	50.9		102	80-120	MS
	Thallium	ug/L	50	47		94	80-120	MS
	Uranium	ug/L	50	51.2		102	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2015-2126

Contract: ESHL00114

Aqueous LCS Source:GEL

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203382648	Mercury	ug/L	2	1.97		98.7	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2015-2126 Client ID: CASA-15-102657L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 379146002 Serial Dilution ID: 1203372795

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	69.4		66		4.89		10	P
Beryllium	1	U	5	U				P
Boron	20.7	J	75	U	100			P
Calcium	65500		64200		2.09		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	15600		15400		1.46		10	P
Manganese	2	U	10	U				P
Potassium	3670		3470		5.51		10	P
Silica	62100		58900		5.16		10	P
Sodium	25600		23700		7.26		10	P
Strontium	343		327		4.61		10	P
Tin	5.11	J	22.1	J	331			P
Vanadium	1.65	J	5	U	100			P
Zinc	4.28	J	16.5	U	100			P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2015-2126 Client ID: CASA-15-102657L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 379146002 Serial Dilution ID: 1203372872

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	1.7	U	8.5	U				MS
Cadmium	.11	U	.55	U				MS
Chromium	86.5		90.9		5.14			MS
Lead	.5	U	2.5	U				MS
Molybdenum	.555		.825	U	100			MS
Nickel	17.2		18		4.77			MS
Selenium	1.5	U	7.5	U				MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.25	U				MS
Uranium	1.84		1.84		0			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2015-2126 Client ID: CASA-15-102643L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 379146001 Serial Dilution ID: 1203382654

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

*Analytical Methods:

AV EPA 245.1/245.2

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2015-2126
Work Order #: 379146**

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:

Sample ID	Client ID
379146001	CASA-15-102643
379146003	CASA-15-102621
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

Product: Cyanide and Total
Analytical Batch: 1500086 **Method:** WSP-CN(T)
Prep Batch : 1500085 **Method:** EPA 335.4

Sample Analysis

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

Sample ID	Client ID
379146001	CASA-15-102643
379146003	CASA-15-102621
1203373391	Method Blank (MB)
1203373392	Laboratory Control Sample (LCS)
1203373393	379146001(CASA-15-102643) Sample Duplicate (DUP)
1203373395	379146001(CASA-15-102643) 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.

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 379146001 (CASA-15-102643) 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
Cyanide, Total	1203373395 (CASA-15-102643MS)	111* (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) 1440765 was generated for sample 1203373395 (CASA-15-102643MS) 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: 1500059 **Method:** EPA 300.0 Anions Liquid 28 day

Sample Analysis

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

Sample ID	Client ID
379146002	CASA-15-102657
379146004	CASA-15-102622
1203373268	Method Blank (MB)
1203373269	Laboratory Control Sample (LCS)
1203373270	379011002(CASA-15-102647) Sample Duplicate (DUP)
1203373271	379011002(CASA-15-102647) 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 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 following samples were diluted because target analyte concentrations exceeded the calibration range. 379146002 (CASA-15-102657) and 379146004 (CASA-15-102622).

Analyte	379146	
	002	004
Chloride	10X	10X
Sulfate	10X	10X

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 1203373270 (CASA-15-102647DUP), 1203373271 (CASA-15-102647PS), 379146002 (CASA-15-102657) and 379146004 (CASA-15-102622) 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

Product: Ammonia Nitrogen
Analytical Batch: 1500088 **Method:** NH3
Prep Batch : 1500087 **Method:** EPA 350.1 Prep

Sample Analysis

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

Sample ID	Client ID
379146002	CASA-15-102657
379146004	CASA-15-102622
1203373399	Method Blank (MB)
1203373400	Laboratory Control Sample (LCS)
1203373401	379146002(CASA-15-102657) Sample Duplicate (DUP)
1203373403	379146002(CASA-15-102657) 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 379146002 (CASA-15-102657) 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

Sample1203373400 (LCS) 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

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1499653	Method:	TKN
Prep Batch :	1499651	Method:	EPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
379146001	CASA-15-102643
379146003	CASA-15-102621
1203372229	Method Blank (MB)
1203372230	Laboratory Control Sample (LCS)
1203372231	379011001(CASA-15-102633) Sample Duplicate (DUP)
1203372232	379011001(CASA-15-102633) 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 379011001 (CASA-15-102633) 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	1203372232 (CASA-15-102633MS)	61* (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 following samples in this sample group were diluted due to matrix interference. 1203372231 (CASA-15-102633DUP) and 1203372232 (CASA-15-102633MS).

Sample Re-analysis

Samples 1203372231 (CASA-15-102633DUP) and 1203372232 (CASA-15-102633MS) were re-analyzed to verify the results.

Miscellaneous Information

Data Exception (DER) Documentation

A data exception report (DER) 1438618 was generated for sample 1203372232 (CASA-15-102633MS) 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: 1500089 **Method:** NO3NO2

Sample Analysis

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

Sample ID	Client ID
379146002	CASA-15-102657
379146004	CASA-15-102622
1203373405	Method Blank (MB)
1203373406	Laboratory Control Sample (LCS)
1203373407	379146002(CASA-15-102657) Sample Duplicate (DUP)
1203373409	379146002(CASA-15-102657) 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 379146002 (CASA-15-102657) 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 following samples were diluted because target analyte concentrations exceeded the calibration range. 1203373407 (CASA-15-102657DUP), 1203373409 (CASA-15-102657PS), 379146002 (CASA-15-102657) and 379146004 (CASA-15-102622).

Analyte	379146	
	002	004
Nitrogen, Nitrate/Nitrite	10X	10X

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1500565	Method:	EPA 365.4 Phosphorus, Total in
Prep Batch :	1500564	Method:	EPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
379146002	CASA-15-102657
379146004	CASA-15-102622
1203374695	Method Blank (MB)
1203374696	Laboratory Control Sample (LCS)
1203374698	379146002(CASA-15-102657) Sample Duplicate (DUP)
1203374700	379146002(CASA-15-102657) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 379146002 (CASA-15-102657) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

scanned and inserted into the electronic package.

Method/Analysis Information

Product: Solids and Total Dissolved
Analytical Batch: 1499948 **Method:** TDS

Sample Analysis

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

Sample ID	Client ID
379146002	CASA-15-102657
379146004	CASA-15-102622
1203372988	Method Blank (MB)
1203372989	Laboratory Control Sample (LCS)
1203372990	379146002(CASA-15-102657) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-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 379146002 (CASA-15-102657) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Sample Aliquot

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity
Analytical Batch: 1501375 **Method:** EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
379146002	CASA-15-102657
379146004	CASA-15-102622
1203376809	Laboratory Control Sample (LCS)
1203376810	379146002(CASA-15-102657) Sample Duplicate (DUP)
1203376811	379323004(CAMO-15-102607) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH
Analytical Batch: 1501372 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
379146002	CASA-15-102657
379146004	CASA-15-102622
1203376804	Laboratory Control Sample (LCS)
1203376805	379323004(CAMO-15-102607) Sample Duplicate (DUP)
1203376806	379146002(CASA-15-102657) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

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

Sample	Analyte	Value
379146002 (CASA-15-102657)		Received 12-AUG-15, out of holding 10-AUG-15
379146004 (CASA-15-102622)		Received 12-AUG-15, out of holding 10-AUG-15

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

A data exception report (DER) 1440141 was generated for samples 379146002 (CASA-15-102657) and 379146004 (CASA-15-102622) 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: 1500640 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
379146002	CASA-15-102657
379146004	CASA-15-102622
1203374900	Method Blank (MB)
1203374902	Laboratory Control Sample (LCS)
1203374904	379146002(CASA-15-102657) Sample Duplicate (DUP)
1203374907	379146002(CASA-15-102657) 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 379146002 (CASA-15-102657) 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.

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Qualifier Definition Report for

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

Client SDG: 2015-2126 GEL Work Order: 379146

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:



Name: Thomas Lewis

Date: 08 SEP 2015

Title: Data Validator

Sample Data Summary

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Certificate of Analysis

Report Date: September 8, 2015

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

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

Client SDG: 2015-2126

Client Sample ID: CASA-15-102643
Sample ID: 379146001
Matrix: W
Collect Date: 10-AUG-15 11:02
Receive Date: 12-AUG-15
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average	J	0.822	0.330	1.00	mg/L	1	TSM	08/15/15	0910	1500166	1
Flow Injection Analysis											
WSP-CN(T) "As Received"											
Cyanide, Total		8.05	1.67	5.00	ug/L	1	AXH3	08/20/15	1201	1500086	2
Nutrient Analysis											
TKN "As Received"											
Nitrogen, Total Kjeldahl		0.107	0.033	0.100	mg/L	1	KLP1	08/13/15	1255	1499653	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	08/20/15	1047	1500085
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	08/13/15	1230	1499651

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: September 8, 2015

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

Los Alamos, New Mexico 87545

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

Client SDG: 2015-2126

Client Sample ID: CASA-15-102657
 Sample ID: 379146002
 Matrix: W
 Collect Date: 10-AUG-15 11:02
 Receive Date: 12-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		0.667	0.067	0.200	mg/L	1	MXL2	08/13/15	0640	1500059	1
Fluoride		0.190	0.033	0.100	mg/L	1					
Chloride		69.9	0.670	2.00	mg/L	10	MXL2	08/13/15	2140	1500059	2
Sulfate		94.4	1.33	4.00	mg/L	10					
Nutrient Analysis											
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P	U	ND	0.017	0.050	mg/L	1	KLP1	08/18/15	1425	1500565	3
NH3 "As Received"											
Nitrogen, Ammonia	J	0.0407	0.017	0.050	mg/L	1	KLP1	08/13/15	1511	1500088	4
NO3NO2 "As Received"											
Nitrogen, Nitrate/Nitrite		4.11	0.170	0.500	mg/L	10	AXH3	08/19/15	1029	1500089	5
Solids Analysis											
TDS "As Received"											
Total Dissolved Solids		443	3.40	14.3	mg/L		MXB3	08/13/15	0855	1499948	6
Titration and Ion Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		83.6	0.725	1.00	mg/L		PXO1	08/18/15	1510	1500640	7
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						
EPA120.1 Specific Conductivity "As Received"											
Conductivity		565	3.63	14.5	umhos/cm	1	PXO1	08/18/15	1328	1501375	8
PH "As Received"											
pH at Temp 21.5C	H	7.88	0.010	0.100	SU	1	PXO1	08/18/15	1405	1501372	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	08/13/15	1059	1500087
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	08/17/15	1700	1500564

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Certificate of Analysis

Report Date: September 8, 2015

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

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

Client SDG: 2015-2126

Client Sample ID: CASA-15-102657
Sample ID: 379146002

Project: ESHL00114
Client ID: ARSL004

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: September 8, 2015

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

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

Client SDG: 2015-2126

Client Sample ID: CASA-15-102621
 Sample ID: 379146003
 Matrix: W
 Collect Date: 10-AUG-15 11:02
 Receive Date: 12-AUG-15
 Collector: Client

Project: ESHL00114
 Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average	J	0.832	0.330	1.00	mg/L	1	TSM	08/15/15	0952	1500166	1
Flow Injection Analysis											
WSP-CN(T) "As Received"											
Cyanide, Total		8.44	1.67	5.00	ug/L	1	AXH3	08/20/15	1204	1500086	2
Nutrient Analysis											
TKN "As Received"											
Nitrogen, Total Kjeldahl		0.109	0.033	0.100	mg/L	1	KLP1	08/13/15	1256	1499653	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	08/20/15	1047	1500085
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	08/13/15	1230	1499651

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: September 8, 2015

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

Los Alamos, New Mexico 87545

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

Client SDG: 2015-2126

Client Sample ID: CASA-15-102622
Sample ID: 379146004
Matrix: W
Collect Date: 10-AUG-15 11:02
Receive Date: 12-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		0.661	0.067	0.200	mg/L	1	MXL2	08/13/15	0712	1500059	1
Fluoride		0.186	0.033	0.100	mg/L	1					
Chloride		69.9	0.670	2.00	mg/L	10	MXL2	08/13/15	2212	1500059	2
Sulfate		94.1	1.33	4.00	mg/L	10					
Nutrient Analysis											
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P	U	ND	0.017	0.050	mg/L	1	KLP1	08/18/15	1428	1500565	3
NH3 "As Received"											
Nitrogen, Ammonia		0.0531	0.017	0.050	mg/L	1	KLP1	08/13/15	1514	1500088	4
NO3NO2 "As Received"											
Nitrogen, Nitrate/Nitrite		4.19	0.170	0.500	mg/L	10	AXH3	08/19/15	1037	1500089	5
Solids Analysis											
TDS "As Received"											
Total Dissolved Solids		450	3.40	14.3	mg/L		MXB3	08/13/15	0855	1499948	6
Titration and Ion Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		82.6	0.725	1.00	mg/L		PXO1	08/18/15	1519	1500640	7
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						
EPA120.1 Specific Conductivity "As Received"											
Conductivity		575	3.63	14.5	umhos/cm	1	PXO1	08/18/15	1330	1501375	8
PH "As Received"											
pH at Temp 21.5C	H	7.86	0.010	0.100	SU	1	PXO1	08/18/15	1416	1501372	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	08/13/15	1059	1500087
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	08/17/15	1700	1500564

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Certificate of Analysis

Report Date: September 8, 2015

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

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

Client SDG: 2015-2126

Client Sample ID: CASA-15-102622
Sample ID: 379146004

Project: ESHL00114
Client ID: ARSL004

The following Analytical Methods were performed:

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

Notes:

Quality Control Summary

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QC Summary

Report Date: September 8, 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: 379146

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
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		99.6	(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		106	(65%-120%)		08/15/15	00:28
Flow Injection Analysis											
Batch	1500086										
QC1203373393	379146001	DUP									
Cyanide, Total		8.05		7.66	ug/L	4.96 ^		(+/-5.00)	AXH3	08/20/15	12:02
QC1203373392	LCS										
Cyanide, Total	50.0			53.8	ug/L		108	(90%-110%)		08/20/15	12:00
QC1203373391	MB										
Cyanide, Total			U	ND	ug/L					08/20/15	11:59
QC1203373395	379146001	MS									
Cyanide, Total	100	8.05		119	ug/L		111 *	(90%-110%)		08/20/15	12:03
Ion Chromatography											
Batch	1500059										
QC1203373270	379011002	DUP									
Bromide		J	0.086	J	0.091	mg/L	5.65 ^	(+/-0.200)	MXL2	08/13/15	01:21
Chloride			5.15		5.13	mg/L	0.389	(0%-20%)			
Fluoride			0.387		0.389	mg/L	0.593 ^	(+/-0.100)			
Sulfate			13.1		13.1	mg/L	0.451	(0%-20%)			
QC1203373269	LCS										
Bromide	1.25			1.26	mg/L		100	(90%-110%)		08/13/15	00:17
Chloride	5.00			4.90	mg/L		98	(90%-110%)			

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QC Summary

Workorder: 379146

Page 2 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1500059										
Fluoride	2.50			2.57	mg/L		103	(90%-110%)			
Sulfate	10.0			10.3	mg/L		103	(90%-110%)	MXL2	08/13/15	00:17
QC1203373268	MB										
Bromide			U	ND	mg/L					08/12/15	23:45
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203373271	379011002 PS										
Bromide	1.25	J	0.086	1.37	mg/L		103	(90%-110%)		08/13/15	01:53
Chloride	5.00		5.15	10.6	mg/L		108	(90%-110%)			
Fluoride	2.50		0.387	2.93	mg/L		102	(90%-110%)			
Sulfate	10.0		13.1	24.1	mg/L		110	(90%-110%)			
Nutrient Analysis											
Batch	1499653										
QC1203372231	379011001 DUP										
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	08/13/15	13:25
QC1203372230	LCS										
Nitrogen, Total Kjeldahl	1.00			0.921	mg/L		92.1	(90%-110%)		08/13/15	12:40
QC1203372229	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					08/13/15	12:39
QC1203372232	379011001 MS										
Nitrogen, Total Kjeldahl	1.00	U	ND	0.610	mg/L		61 *	(90%-110%)		08/13/15	13:22
Batch	1500088										
QC1203373401	379146002 DUP										
Nitrogen, Ammonia		J	0.0407	J	0.0424	mg/L	4.09 ^	(+/-0.050)	KLP1	08/13/15	15:12
QC1203373400	LCS										
Nitrogen, Ammonia	1.00			1.04	mg/L		104	(90%-110%)		08/13/15	15:21
QC1203373399	MB										
Nitrogen, Ammonia			U	ND	mg/L					08/13/15	15:10

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QC Summary

Workorder: 379146

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1500088										
QC1203373403	379146002	MS									
Nitrogen, Ammonia	1.00	J	0.0407	1.05	mg/L		101	(90%-110%)	KLP1	08/13/15	15:13
Batch	1500089										
QC1203373407	379146002	DUP									
Nitrogen, Nitrate/Nitrite			4.11	4.07	mg/L	0.978		(0%-20%)	AXH3	08/19/15	10:30
QC1203373406	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.04	mg/L		104	(90%-110%)		08/19/15	10:27
QC1203373405	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					08/19/15	10:26
QC1203373409	379146002	PS									
Nitrogen, Nitrate/Nitrite	1.00		0.411	1.46	mg/L		105	(90%-110%)		08/19/15	10:36
Batch	1500565										
QC1203374698	379146002	DUP									
Phosphorus, Total as P		U	ND	U	ND	mg/L	N/A		KLP1	08/18/15	14:26
QC1203374696	LCS										
Phosphorus, Total as P	1.00			1.09	mg/L		109	(83%-123%)		08/18/15	14:23
QC1203374695	MB										
Phosphorus, Total as P			U	ND	mg/L					08/18/15	14:22
QC1203374700	379146002	MS									
Phosphorus, Total as P	1.00	U	ND	1.11	mg/L		110	(59%-141%)		08/18/15	14:27
Solids Analysis											
Batch	1499948										
QC1203372990	379146002	DUP									
Total Dissolved Solids			443	441	mg/L	0.323		(0%-5%)	MXB3	08/13/15	08:55
QC1203372989	LCS										
Total Dissolved Solids	300			300	mg/L		100	(95%-105%)		08/13/15	08:55
QC1203372988	MB										
Total Dissolved Solids			U	ND	mg/L					08/13/15	08:55
Titration and Ion Analysis											
Batch	1500640										
QC1203374904	379146002	DUP									
Alkalinity, Total as CaCO3			83.6	82.6	mg/L	1.2		(0%-20%)	PXO1	08/18/15	15:15
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				

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QC Summary

Workorder: 379146

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1500640										
QC1203374902		LCS									
Alkalinity, Total as CaCO3	50.0			50.8	mg/L		102	(90%-110%)	PXO1	08/18/15	14:51
QC1203374900		MB									
Alkalinity, Total as CaCO3			U	ND	mg/L					08/18/15	14:51
Carbonate alkalinity (CaCO3)			U	ND	mg/L						
QC1203374907		379146002	MS								
Alkalinity, Total as CaCO3	50.0		83.6	133	mg/L		98.6	(80%-120%)		08/18/15	15:17
Batch	1501372										
QC1203376805		379323004	DUP								
pH		H	7.83	H	7.87	SU	0.481	(0%-5%)	PXO1	08/18/15	15:24
QC1203376806		379146002	DUP								
pH		H	7.88	H	7.88	SU	0.0795	(0%-5%)		08/18/15	14:11
QC1203376804		LCS									
pH	7.00			7.02	SU		100	(99%-101%)		08/18/15	13:56
Batch	1501375										
QC1203376810		379146002	DUP								
Conductivity			565		568	umhos/cm	0.526	(0%-10%)	PXO1	08/18/15	13:29
QC1203376811		379323004	DUP								
Conductivity			486		488	umhos/cm	0.409	(0%-10%)		08/18/15	13:45
QC1203376809		LCS									
Conductivity	1410			1390	umhos/cm		98.3	(95%-105%)		08/18/15	13:27

- 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.
 - NI 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

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Q											
Q											
R											
R											
U											
X											
Z											
^											
d											
e											
h											

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

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

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

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

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

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 13-AUG-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 351.2, EPA 351.2 SC	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1499653	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 379011(2015-2090),379019(2015-2084),379146(2015-2126)			
Application Issues: Failed Recovery for MS/MSD, or PS/PSD			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/MSD, or PS/PSD:</p> <p>QC 1203372232MS</p>		<p>1. The matrix spike recovered outside of the established acceptance limits due to matrix interference. Nitrogen, Total Kjeldahl 1203372232 (CASA-15-102633MS) [61* (90%-110%)].</p>	

Originator's Name:

Kristen Mizzell 13-AUG-15

Data Validator/Group Leader:

Aubrey Kingsbury 13-AUG-15

DATA EXCEPTION REPORT

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

Originator's Name:

Patrick Orgel 19-AUG-15

Data Validator/Group Leader:

Thomas Lewis 21-AUG-15

DATA EXCEPTION REPORT

Mo.Day Yr. 20-AUG-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 335.4, SW846 9012B	Matrix Type: Liquid	Client Code: ESHL, WSRB
Batch ID: 1500086	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 379146(2015-2126)			
Application Issues: Failed Recovery for MS/MSD, or PS/PSD			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203373395MS,1203373396MS</p>		<p>1. The matrix spike recovered outside of the established acceptance limits due to matrix interference. Cyanide, Total 1203373395 (CASA-15-102643MS) [111* (90%-110%)] and 1203373396 (FHRCRA0001668MS) [113* (90%-110%)].</p>	

Originator's Name:

Aubrey Kingsbury 20-AUG-15

Data Validator/Group Leader:

Kristen Mizzell 20-AUG-15