

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-15-102633

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	08/07/2015	Y	FIELD MATRIX:	WG	Y
TIME COLLECTED (HH:MM):	11:02	Y	MEDIA:	UA	Y
PRS ID:	NA	↓	SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-11	↓	FIELD PREP:	UF	Y
LOCATION TYPE:	MON	↓	FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA	↓	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	NL	↓	EXCAVATED:		YES / NO / NA

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

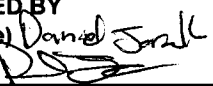
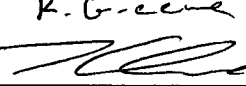
SAMPLE COMMENTS: None

LOCATION COMMENTS: Sampled 50 ft from running discharger

FIELD PARAMETERS:

Dissolved Oxygen	6.86	mg/L	Flow (in gpm)	3.0	GPM	Oxidation-Reduction Potential	69.7	mV
pH	7.90	SU	Specific Conductance	244	uS/cm	Temperature	21.68	deg C
Turbidity	0.9	NTU						

COLLECTED BY (PRINT): A. Ugal

RELINQUISHED BY (Printed Name) Daniel Smith (Signature) 	Date/Time 8/7/15 11:47	RECEIVED BY (Printed Name) K. Greene (Signature) 	Date/Time 8/7/15 11:47
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 07/31/2015

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 10309

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

SAMPLE ID: CASA-15-102638

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	08/07/2015	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1057		MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	GSD
LOCATION ID:	R-36		FIELD PREP:	UF	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
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: None

LOCATION COMMENTS: Sampled 40' From running diesel generator

FIELD PARAMETERS:

Dissolved Oxygen	5.74	mg/L	Flow (in gpm)	3.37	GPM	Oxidation-Reduction Potential	161.0	mV
pH	7.14	SU	Specific Conductance	196	uS/cm	Temperature	21.09	deg C
Turbidity	0.85	NTU						

COLLECTED BY (PRINT): J. Berryhill

RELINQUISHED BY (Printed Name) Austin Tosh (Signature) Austin Tosh	Date/Time 8/7/2015 1145	RECEIVED BY (Printed Name) K. Greene (Signature) K. Greene	Date/Time 8/7/15 1145
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 07/31/2015

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 10309

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

SAMPLE ID: CASA-15-102647

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	08/07/2015	Y	FIELD MATRIX:	WG	Y
TIME COLLECTED (HH:MM):	11:02	Y	MEDIA:	UA	↓
PRS ID:	NA	↓	SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-11	↓	FIELD PREP:	F	Y
LOCATION TYPE:	MON	↓	FIELD QC TYPE:	REG	↓
TOP DEPTH:	NA	↓	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP- GENINORG+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 *8.7-15* Flow (in gpm) _____ GPM Oxidation-Reduction Potential _____ mV
 pH _____ SU Specific Conductance _____ uS/cm Temperature _____ deg C
 Turbidity _____ NTU

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) <i>Daniel Searls</i> (Signature) <i>[Signature]</i>	Date/Time 8-7-15 1147	RECEIVED BY (Printed Name) <i>K. Green</i> (Signature) <i>[Signature]</i>	Date/Time 8/7/15 11:47
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 07/31/2015

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 10309

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

SAMPLE ID: CASA-15-102652

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	08/07/2015	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1657		MEDIA:	UA	↓
PRS ID:	NA		SAMPLE TECH CODE:	UA	GSP
LOCATION ID:	R-36		FIELD PREP:	F	OK
LOCATION TYPE:	MON		FIELD QC TYPE:	REG	
TOP DEPTH:	NA		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): J. Berryhill

RELINQUISHED BY (Printed Name) Austin Tosh (Signature) <i>Austin Tosh</i>	Date/Time 8-7-15 1145	RECEIVED BY (Printed Name) K. Greene (Signature) <i>K. Greene</i>	Date/Time 8/7/15 1145
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 07/31/2015

DATA VALIDATION REPORT

Chain Of Custody No. 2015-2090

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
379011	EPA:120.1	2				
379011	EPA:150.1	2				
379011	EPA:160.1	2				
379011	EPA:245.2	4				
379011	EPA:300.0	2				
379011	EPA:310.1	2				
379011	EPA:335.4	2				
379011	EPA:350.1	2				
379011	EPA:351.2	2				
379011	EPA:353.2	2				
379011	EPA:365.4	2				
379011	SM:A2340B	2				
379011	SW-846:6010C	2				
379011	SW-846:6020	2				
379011	SW-846:6850	2				
379011	SW-846:9060	2				

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
379011	EPA:120.1	1499837	1499837	2										1				1			
379011	EPA:150.1	1499835	1499835	2										1				2			
379011	EPA:160.1	1499735	1499735	2					1					1				1			
379011	EPA:245.2	1502174	1502173	4					1	2				1				2			
379011	EPA:300.0	1500059	1500059	2					1					1				1			
379011	EPA:310.1	1499840	1499840	2					1	1				1				1			
379011	EPA:335.4	1498741	1498740	2					1	1				1				1			
379011	EPA:350.1	1499451	1499449	2					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
379011	EPA:351.2	1499653	1499651	2					1	1				1				1			
379011	EPA:353.2	1499212	1499212	1					1					1				1			
379011	EPA:353.2	1499852	1499852	1					1					1				1			
379011	EPA:365.4	1499655	1499654	2					1	2				1				2			
379011	SM:A2340B	1501953	1501953	2																	
379011	SW-846:6010C	1499471	1499470	2					1	1				1				1			
379011	SW-846:6020	1499480	1499479	2					1	1				1				1			
379011	SW-846:6850	1500488	1500487	2					1	1	1			1							
379011	SW-846:9060	1500166	1500166	2					1					1				1			

2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CASA-15-102647	1203372696	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-15-102647	379011002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-15-102652	379011004	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203372695	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-15-102604	1203372688	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102647	1203372687	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102647	379011002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-15-102652	379011004	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203372686	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-15-102604	1203372379	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-15-102647	379011002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-15-102652	379011004	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203372378	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203372377	MB	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102633	1203378894	DUP	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102633	1203378896	MS	0	0	1	0
EPA:245.2	INORGANIC	CASA-15-102633	379011001	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102638	379011003	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102647	379011002	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-15-102652	379011004	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	1203378892	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203378891	MB	1	0	0	0
EPA:245.2	INORGANIC	WT_IPC-15-101991	1203378893	DUP	1	0	0	0
EPA:245.2	INORGANIC	WT_IPC-15-101991	1203378895	MS	0	0	1	0
EPA:300.0	GENERAL CHEMISTRY	CASA-15-102647	1203373270	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-15-102647	379011002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-15-102652	379011004	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-15-102647	1203372714	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102647	1203372716	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102647	379011002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-15-102652	379011004	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203372712	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1203372710	MB	2	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-15-102580	1203371911	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-15-102580	1203371912	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102633	379011001	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-15-102638	379011003	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203369924	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203369923	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102647	1203371696	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102647	1203371697	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102647	379011002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-15-102652	379011004	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203371693	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203371692	MB	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-15-102633	379011001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-15-102638	379011003	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-15-102647	1203372742	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102647	379011002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102652	1203372752	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-15-102652	379011004	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203371096	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203372751	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203371095	MB	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:353.2	GENERAL CHEMISTRY	MB	1203372750	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102647	1203372235	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102647	1203372236	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102647	379011002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102650	1203375689	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102650	1203375690	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-15-102652	379011004	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203372234	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203372233	MB	1	0	0	0
SM:A2340B	INORGANIC	CASA-15-102647	379011002	REG	1	0	0	0
SM:A2340B	INORGANIC	CASA-15-102652	379011004	REG	1	0	0	0
SW-846:6010C	INORGANIC	CASA-15-102647	1203371768	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CASA-15-102647	1203371769	MS	0	0	17	0
SW-846:6010C	INORGANIC	CASA-15-102647	379011002	REG	17	0	0	0
SW-846:6010C	INORGANIC	CASA-15-102652	379011004	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203371767	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203371766	MB	17	0	0	0
SW-846:6020	INORGANIC	CASA-15-102647	1203371802	DUP	11	0	0	0
SW-846:6020	INORGANIC	CASA-15-102647	1203371803	MS	0	0	11	0
SW-846:6020	INORGANIC	CASA-15-102647	379011002	REG	11	0	0	0
SW-846:6020	INORGANIC	CASA-15-102652	379011004	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203371801	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203371800	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-15-102647	379011002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-15-102652	379011004	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-15-102633	379011001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-15-102638	379011003	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.

DATA VALIDATION REPORT

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203371800	METHOD BLANK	SW-846:6020	W	Arsenic	3.12	J	ug/L	5.00
MB	1203371800	METHOD BLANK	SW-846:6020	W	Molybdenum	.227	J	ug/L	0.500
MB	1203378891	METHOD BLANK	EPA:245.2	W	Mercury	.083	J	ug/L	0.200

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CASA-15-102647	1203378891	METHOD BLANK	EPA:245.2	Mercury	.083	ug/L	.079	J	0.200	Y	5	100	Y
CASA-15-102638	1203378891	METHOD BLANK	EPA:245.2	Mercury	.083	ug/L	.092	J	0.200	Y	5	100	Y
CASA-15-102652	1203378891	METHOD BLANK	EPA:245.2	Mercury	.083	ug/L	.095	J	0.200	Y	5	100	Y
CASA-15-102647	1203371800	METHOD BLANK	SW-846:6020	Arsenic	3.12	ug/L	2.5	J	5.00	Y	5	100	Y
CASA-15-102652	1203371800	METHOD BLANK	SW-846:6020	Arsenic	3.12	ug/L	2.95	J	5.00	Y	5	100	Y
CASA-15-102647	1203371800	METHOD BLANK	SW-846:6020	Molybdenum	.227	ug/L	1.68		0.500	Y	5	100	Y
CASA-15-102652	1203371800	METHOD BLANK	SW-846:6020	Molybdenum	.227	ug/L	1.71		0.500	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

DATA VALIDATION REPORT

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CASA-15-102633	1203372232		EPA:351.2	Total Kjeldahl Nitrogen	1499651	08-13-2015	W	61		110	90	10		
CASA-15-102633	1203372232		EPA:351.2	Total Kjeldahl Nitrogen	1499651	08-13-2015	W	61		110	90	10		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

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

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-11	2015-2090	CASA-15-102633	REG	INIT	GENERAL CHEMISTRY	EPA:351.2	Total Kjeldahl Nitrogen	J	JJ	I6a	N	0.500	mg/L	0.500	mg/L			W	08/07/2015		1499653	VAL	Y
R-36	2015-2090	CASA-15-102638	REG	INIT	INORGANIC	EPA:245.2	Mercury	J	J	I4	N	.092	ug/L	.092	ug/L			W	08/07/2015		1502174	VAL	Y
R-11	2015-2090	CASA-15-102647	REG	INIT	INORGANIC	SW-846.6020	Arsenic	J	J	I4	N	2.5	ug/L	2.5	ug/L			W	08/07/2015		1499480	VAL	Y
R-11	2015-2090	CASA-15-102647	REG	INIT	INORGANIC	EPA:245.2	Mercury	J	J	I4	N	.079	ug/L	.079	ug/L			W	08/07/2015		1502174	VAL	Y
R-11	2015-2090	CASA-15-102647	REG	INIT	INORGANIC	SW-846.6020	Molybdenum	J	J	I4a	Y	1.68	ug/L	1.68	ug/L			W	08/07/2015		1499480	VAL	Y
R-36	2015-2090	CASA-15-102652	REG	INIT	INORGANIC	SW-846.6020	Arsenic	J	J	I4	N	2.95	ug/L	2.95	ug/L			W	08/07/2015		1499480	VAL	Y
R-36	2015-2090	CASA-15-102652	REG	INIT	INORGANIC	EPA:245.2	Mercury	J	J	I4	N	.095	ug/L	.095	ug/L			W	08/07/2015		1502174	VAL	Y
R-36	2015-2090	CASA-15-102652	REG	INIT	INORGANIC	SW-846.6020	Molybdenum	J	J	I4a	Y	1.71	ug/L	1.71	ug/L			W	08/07/2015		1499480	VAL	Y

Reason Code

Description

I4	the sample result is <=5x the concentration of related analyte in the method blank.
I4a	The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was >5x
I6a	The associated matrix spike recovery was below the lower acceptance limit (LAL) but >10%. Follow the external laboratory limits located within the associated data package.
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.
U_LAB	The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CASA-15-102633	R-11	REG	EPA:245.2	0	1
CASA-15-102633	R-11	REG	EPA:335.4	0	1
CASA-15-102633	R-11	REG	EPA:351.2	0	1
CASA-15-102633	R-11	REG	SW-846.9060	0	1
CASA-15-102638	R-36	REG	EPA:245.2	0	1
CASA-15-102638	R-36	REG	EPA:335.4	0	1
CASA-15-102638	R-36	REG	EPA:351.2	0	1
CASA-15-102638	R-36	REG	SW-846.9060	0	1
CASA-15-102647	R-11	REG	EPA:120.1	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CASA-15-102647	R-11	REG	EPA:150.1	0	1
CASA-15-102647	R-11	REG	EPA:160.1	0	1
CASA-15-102647	R-11	REG	EPA:245.2	0	1
CASA-15-102647	R-11	REG	EPA:300.0	0	4
CASA-15-102647	R-11	REG	EPA:310.1	0	2
CASA-15-102647	R-11	REG	EPA:350.1	0	1
CASA-15-102647	R-11	REG	EPA:353.2	0	1
CASA-15-102647	R-11	REG	EPA:365.4	0	1
CASA-15-102647	R-11	REG	SM:A2340B	0	1
CASA-15-102647	R-11	REG	SW-846:6010C	0	17
CASA-15-102647	R-11	REG	SW-846:6020	0	11
CASA-15-102647	R-11	REG	SW-846:6850	0	1
CASA-15-102652	R-36	REG	EPA:120.1	0	1
CASA-15-102652	R-36	REG	EPA:150.1	0	1
CASA-15-102652	R-36	REG	EPA:160.1	0	1
CASA-15-102652	R-36	REG	EPA:245.2	0	1
CASA-15-102652	R-36	REG	EPA:300.0	0	4
CASA-15-102652	R-36	REG	EPA:310.1	0	2
CASA-15-102652	R-36	REG	EPA:350.1	0	1
CASA-15-102652	R-36	REG	EPA:353.2	0	1
CASA-15-102652	R-36	REG	EPA:365.4	0	1
CASA-15-102652	R-36	REG	SM:A2340B	0	1
CASA-15-102652	R-36	REG	SW-846:6010C	0	17
CASA-15-102652	R-36	REG	SW-846:6020	0	11
CASA-15-102652	R-36	REG	SW-846:6850	0	1

September 03, 2015

gel.com

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

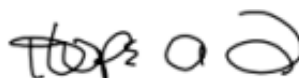
Re: LANL- WQH Water Samples
Work Order: 379011
SDG: 2015-2090

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on August 11, 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: 2015-2090
Enclosures

ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 379011
SDG: 2015-2090

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 379011
SDG # : 2015-2090**

September 03, 2015

Laboratory Identification:

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

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on August 11, 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>
379011001	CASA-15-102633
379011002	CASA-15-102647
379011003	CASA-15-102638
379011004	CASA-15-102652

Case Narrative

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

Data Package

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

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

top a d

Hope Taylor for
Valerie Davis
Project Manager

List of current GEL Certifications as of 03 September 2015

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

Chain of Custody and Supporting Documentation

COC/Lab Request #: 2015-2090
Page 1 of 1

Chain of Custody/Analysis Request

[illegible]

Special Instructions:

Relinquished by:	Print Name: <i>[Signature]</i>	Date/Time: 8/15/15	Received by: B. Luthman	Print Name: B. Luthman	Date/Time: 8/11/15
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:

SAMPLE RECEIPT & REVIEW FORM

Client: <u>LANL</u>			SDG/AR/COC/Work Order: <u>2015-2090</u>		
Received By: <u>Brielle Luthman</u>			Date Received: <u>8/11/15</u> <u>0845</u>		
Suspected Hazard Information		Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
COC/Samples marked as radioactive?				Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>φ</u>	
Classified Radioactive II or III by RSO?				If yes, Were swipes taken of sample containers < action levels?	
COC/Samples marked containing PCBs?					
Package, COC, and/or Samples marked as beryllium or asbestos containing?				If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.	
Shipped as a DOT Hazardous?				Hazard Class Shipped: UN#:	
Samples identified as Foreign Soil?					

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): <u>E5032015835</u>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples (EPA 6850) have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
8 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
9 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
10 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
11 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
14 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
15 Carrier and tracking number.				Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>5908 1779 3006-2°</u> <u>5908 1779 2981-1°</u>

Comments (Use Continuation Form if needed):

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 10AUG15
ACTWGT: 51.0 LB MAN
CAD: 0014176/CAFE2807

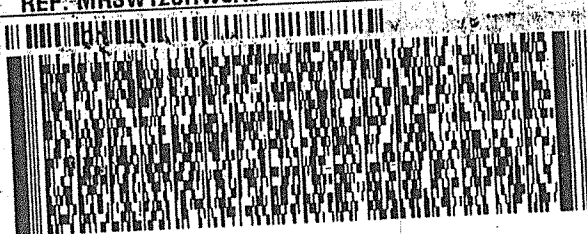
BILL SENDER

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

CHARLESTON SC 29407

(843) 666-8171

REF: MRSW12CHWCA0



FedEx
Express



521C1/FECA/6F03

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2 of 2

MPS# 5908 1779 3006

Mstr# 5908 1779 2992

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X7 CHSA

TUE - 11 AUG 10:30A
PRIORITY OVERNIGHT

2°

29407
SC-US CHS

Part #: 153148-434 RIT2 10/11



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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 10AUG15
ACTWGT: 56.0 LB MAN
CAD: 0014176/CAFE2807

BILL SENDER

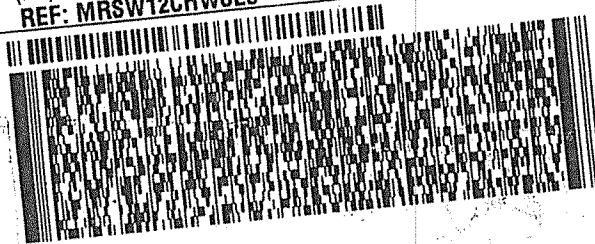
521C1/FECA/6F03

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

CHARLESTON SC 29407

(843) 668-8171

REF: MRSW12CHWCE0



FedEx
Express



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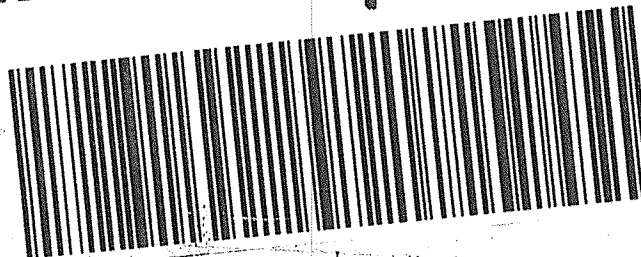
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0201

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PRIORITY OVERNIGHT

X7 CHSA

29407
SC-US CHS

Part # 155148-43A RIT2 10/11



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 #: 2015-2090
Work Order #: 379011**

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
379011002	CASA-15-102647
379011004	CASA-15-102652
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

Sample 379011004 (CASA-15-102652) was diluted to bring the over range concentration within the calibration range.

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: 2015-2090 GEL Work Order: 379011

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 19 AUG 2015

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1500487Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-15-102647Date Received: 11-AUG-15GEL Job No (SDG): 2015-2090GEL Sample ID: 379011002Date 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	0.830	ug/L		1	14-AUG-15 22:12	per0814015a
	Perchlorate Isotope Ratio			3.01			1	14-AUG-15 22:12	per0814015a
14797-73-0	Perchlorate-101	.05	.2	0.852	ug/L		1	14-AUG-15 22:12	per0814015a
	Perchlorate-O(18)			0.510	ug/L		1	14-AUG-15 22:12	per0814015a

^ 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.

CASA-15-102652Date Received: 11-AUG-15GEL Job No (SDG): 2015-2090GEL Sample ID: 379011004Date 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	.2	.8	1.55	ug/L		4	15-AUG-15 13:35	per0815013a
	Perchlorate Isotope Ratio			3.16			4	15-AUG-15 13:35	per0815013a
14797-73-0	Perchlorate-101	.2	.8	1.56	ug/L		4	15-AUG-15 13:35	per0815013a
	Perchlorate-O(18)			1.95	ug/L		4	15-AUG-15 13:35	per0815013a

^ 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): 2015-2090

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): 2015-2090

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 LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1500487Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 14-AUG-15GEL Job No (SDG): 2015-2090GEL Sample ID: 1203374485Date 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	0.200	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 LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1500487Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 14-AUG-15GEL Job No (SDG): 2015-2090GEL Sample ID: 1203374486Date 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	0.195	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 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.

ICS

Date Received:

GEL Job No (SDG): 2015-2090GEL Sample ID: 1203374489Date 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	0.241	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): 2015-2090GEL 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): 2015-2090GEL 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 #: 2015-2090
Work Order #: 379011

Sample ID	Client ID
379011001	CASA-15-102633
379011002	CASA-15-102647
379011003	CASA-15-102638
379011004	CASA-15-102652
1203371766	Method Blank (MB) ICP
1203371767	Laboratory Control Sample (LCS)
1203371770	379011002(CASA-15-102647L) Serial Dilution (SD)
1203371768	379011002(CASA-15-102647D) Sample Duplicate (DUP)
1203371769	379011002(CASA-15-102647S) Matrix Spike (MS)
1203371800	Method Blank (MB) ICP-MS
1203371801	Laboratory Control Sample (LCS)
1203371804	379011002(CASA-15-102647L) Serial Dilution (SD)
1203371802	379011002(CASA-15-102647D) Sample Duplicate (DUP)
1203371803	379011002(CASA-15-102647S) Matrix Spike (MS)
1203378891	Method Blank (MB) CVAA
1203378892	Laboratory Control Sample (LCS)
1203378898	379011001(CASA-15-102633L) Serial Dilution (SD)
1203378894	379011001(CASA-15-102633D) Sample Duplicate (DUP)
1203378896	379011001(CASA-15-102633S) Matrix Spike (MS)

Sample Analysis

Method/Analysis Information

Analytical Batch:	1499471, 1499480, 1502174 and 1501953
Prep Batch :	1499470, 1499479 and 1502173
Standard Operating Procedures:	GL-MA-E-013 REV# 24, GL-MA-E-006 REV# 12, GL-MA-E-014 REV# 26, GL-MA-E-010 REV# 30 and GL-GC-E-107 REV# 9
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.1/245.2 and SM 2340 B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

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

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

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

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 379011002 (CASA-15-102647) and 379011004 (CASA-15-102652)-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: 379011002 (CASA-15-102647)-ICP and ICP-MS and 379011001 (CASA-15-102633)-CVAA.

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

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

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

A data exception report was not required for this SDG.

Additional Comments

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

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2015-2090 GEL Work Order: 379011

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: 04 SEP 2015

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2090**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 379011001**BASIS:** As Received**DATE COLLECTED** 07-AUG-15**CLIENT ID:** CASA-15-102633**LEVEL:** Low**DATE RECEIVED** 11-AUG-15**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	08/24/15 13:38	082415W1-7	1502174

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1502174	1502173	EPA 245.1/245.2 Prep	20	mL	20	mL	08/21/15	AXS5

***Analytical Methods:**

AV EPA 245.1/245.2

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2090**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 379011002**BASIS:** As Received**DATE COLLECTED** 07-AUG-15**CLIENT ID:** CASA-15-102647**LEVEL:** Low**DATE RECEIVED** 11-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	0.079	ug/L	J	0.067	0.2	0.2	1	AV	MTM1	08/24/15 13:46	082415W1-7	1502174

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2090

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 379011002

BASIS: As Received

DATE COLLECTED 07-AUG-15

CLIENT ID: CASA-15-102647

LEVEL: Low

DATE RECEIVED 11-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	08/17/15 16:18	081715A-1	1499471
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	09/02/15 01:24	150901-6	1499480
7440-38-2	Arsenic	2.5	ug/L	J	1.7	5	5	1	MS	PRB	09/01/15 17:44	150901-2	1499480
7440-39-3	Barium	43.4	ug/L		1	5	5	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7440-42-8	Boron	32.1	ug/L	J	15	50	50	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	PRB	09/01/15 17:44	150901-2	1499480
7440-70-2	Calcium	24500	ug/L		50	200	200	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7440-47-3	Chromium	20.8	ug/L		2	10	10	1	MS	PRB	09/01/15 17:44	150901-2	1499480
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	09/01/15 17:44	150901-2	1499480
7439-95-4	Magnesium	6920	ug/L		110	300	300	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7439-98-7	Molybdenum	1.68	ug/L		0.165	0.5	0.5	1	MS	PRB	09/02/15 01:24	150901-6	1499480
7440-02-0	Nickel	2	ug/L	U	0.5	2	2	1	MS	PRB	09/01/15 17:44	150901-2	1499480
7440-09-7	Potassium	1550	ug/L		50	150	150	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7782-49-2	Selenium	2.27	ug/L	J	1.5	5	5	1	MS	PRB	09/01/15 17:44	150901-2	1499480
7631-86-9	Silica	75900	ug/L		53	213	213	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	PRB	09/01/15 17:44	150901-2	1499480
7440-23-5	Sodium	12300	ug/L		100	300	300	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7440-24-6	Strontium	89.7	ug/L		1	5	5	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	PRB	09/01/15 17:44	150901-2	1499480
7440-31-5	Tin	2.73	ug/L	J	2.5	10	10	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7440-61-1	Uranium	0.687	ug/L		0.067	0.2	0.2	1	MS	PRB	09/02/15 01:24	150901-6	1499480
7440-62-2	Vanadium	7.35	ug/L		1	5	5	1	P	HSC	08/17/15 16:18	081715A-1	1499471
7440-66-6	Zinc	7.9	ug/L	J	3.3	10	10	1	P	HSC	08/17/15 16:18	081715A-1	1499471

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2090**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 379011002**BASIS:** As Received**DATE COLLECTED** 07-AUG-15**CLIENT ID:** CASA-15-102647**LEVEL:** Low**DATE RECEIVED** 11-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	89.6	mg/L		0.453	1.24	1.24	1		JJ2	08/20/15 10:45		1501953

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1499471	1499470	SW846 3005A	50	mL	50	mL	08/11/15	JP1
1499480	1499479	SW846 3005A	50	mL	50	mL	08/11/15	JP1
1502174	1502173	EPA 245.1/245.2 Prep	20	mL	20	mL	08/21/15	AXS5

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2090**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 379011003**BASIS:** As Received**DATE COLLECTED** 07-AUG-15**CLIENT ID:** CASA-15-102638**LEVEL:** Low**DATE RECEIVED** 11-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	0.092	ug/L	J	0.067	0.2	0.2	1	AV	MTM1	08/24/15 13:48	082415W1-7	1502174

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1502174	1502173	EPA 245.1/245.2 Prep	20	mL	20	mL	08/21/15	AXS5

***Analytical Methods:**

AV EPA 245.1/245.2

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2090**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 379011004**BASIS:** As Received**DATE COLLECTED** 07-AUG-15**CLIENT ID:** CASA-15-102652**LEVEL:** Low**DATE RECEIVED** 11-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	0.095	ug/L	J	0.067	0.2	0.2	1	AV	MTM1	08/24/15 13:50	082415W1-7	1502174

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2090

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 379011004

BASIS: As Received

DATE COLLECTED 07-AUG-15

CLIENT ID: CASA-15-102652

LEVEL: Low

DATE RECEIVED 11-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	08/17/15 16:37	081715A-1	1499471
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	09/02/15 01:42	150901-6	1499480
7440-38-2	Arsenic	2.95	ug/L	J	1.7	5	5	1	MS	PRB	09/01/15 18:09	150901-2	1499480
7440-39-3	Barium	34.2	ug/L		1	5	5	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7440-42-8	Boron	27.2	ug/L	J	15	50	50	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	PRB	09/01/15 18:09	150901-2	1499480
7440-70-2	Calcium	17900	ug/L		50	200	200	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7440-47-3	Chromium	5.29	ug/L	J	2	10	10	1	MS	PRB	09/01/15 18:09	150901-2	1499480
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	09/01/15 18:09	150901-2	1499480
7439-95-4	Magnesium	4380	ug/L		110	300	300	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7439-96-5	Manganese	2.12	ug/L	J	2	10	10	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7439-98-7	Molybdenum	1.71	ug/L		0.165	0.5	0.5	1	MS	PRB	09/02/15 01:42	150901-6	1499480
7440-02-0	Nickel	0.923	ug/L	J	0.5	2	2	1	MS	PRB	09/01/15 18:09	150901-2	1499480
7440-09-7	Potassium	1940	ug/L		50	150	150	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	PRB	09/01/15 18:09	150901-2	1499480
7631-86-9	Silica	68900	ug/L		53	213	213	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	PRB	09/01/15 18:09	150901-2	1499480
7440-23-5	Sodium	13600	ug/L		100	300	300	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7440-24-6	Strontium	63.1	ug/L		1	5	5	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	PRB	09/01/15 18:09	150901-2	1499480
7440-31-5	Tin	2.54	ug/L	J	2.5	10	10	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7440-61-1	Uranium	0.230	ug/L		0.067	0.2	0.2	1	MS	PRB	09/02/15 01:42	150901-6	1499480
7440-62-2	Vanadium	14.9	ug/L		1	5	5	1	P	HSC	08/17/15 16:37	081715A-1	1499471
7440-66-6	Zinc	36.5	ug/L		3.3	10	10	1	P	HSC	08/17/15 16:37	081715A-1	1499471

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2015-2090**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 379011004**BASIS:** As Received**DATE COLLECTED** 07-AUG-15**CLIENT ID:** CASA-15-102652**LEVEL:** Low**DATE RECEIVED** 11-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	62.6	mg/L		0.453	1.24	1.24	1		JJ2	08/20/15 10:45		1501953

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1499471	1499470	SW846 3005A	50	mL	50	mL	08/11/15	JP1
1499480	1499479	SW846 3005A	50	mL	50	mL	08/11/15	JP1
1502174	1502173	EPA 245.1/245.2 Prep	20	mL	20	mL	08/21/15	AXS5

***Analytical Methods:**

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

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2015-2090

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>
1203371766								
	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
1203371800								
	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	3.12	ug/L	+/-5	J	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	0.227	ug/L	+/-0.5	J	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
1203378891								
	Mercury	0.083	ug/L	+/-0.2	J	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. 2015-2090 Client ID: CASA-15-102647S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 379011002 Spike ID: 1203371769

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	5100		68	U	5000	102		P
Barium	ug/L	75-125	571		43.4		500	105		P
Beryllium	ug/L	75-125	530		1	U	500	106		P
Boron	ug/L	75-125	575		32.1	J	500	109		P
Calcium	ug/L		29000		24500		5000	90.8	N/A	P
Cobalt	ug/L	75-125	515		1	U	500	103		P
Copper	ug/L	75-125	544		3	U	500	109		P
Iron	ug/L	75-125	5340		30	U	5000	107		P
Magnesium	ug/L	75-125	12200		6920		5000	106		P
Manganese	ug/L	75-125	525		2	U	500	105		P
Potassium	ug/L	75-125	6680		1550		5000	102		P
Silica	ug/L		84400		75900		10700	79.7	N/A	P
Sodium	ug/L	75-125	16800		12300		5000	89.6		P
Strontium	ug/L	75-125	577		89.7		500	97.4		P
Tin	ug/L	75-125	543		2.73	J	500	108		P
Vanadium	ug/L	75-125	538		7.35		500	106		P
Zinc	ug/L	75-125	518		7.9	J	500	102		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2090 Client ID: CASA-15-102647S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 379011002 Spike ID: 1203371803

<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	48.1		1	U	50	95.9		MS
Arsenic	ug/L	75-125	52.1		2.5	J	50	99.2		MS
Cadmium	ug/L	75-125	51		0.11	U	50	102		MS
Chromium	ug/L	75-125	71.5		20.8		50	101		MS
Lead	ug/L	75-125	45.4		0.5	U	50	90.6		MS
Molybdenum	ug/L	75-125	53.1		1.68		50	103		MS
Nickel	ug/L	75-125	50.1		0.5	U	50	99.5		MS
Selenium	ug/L	75-125	52.8		2.27	J	50	101		MS
Silver	ug/L	75-125	51.3		0.2	U	50	103		MS
Thallium	ug/L	75-125	43.9		0.45	U	50	87.7		MS
Uranium	ug/L	75-125	51.2		0.687		50	101		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2015-2090 **Client ID:** CASA-15-102633S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 379011001 **Spike ID:** 1203378896

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	1.97		0.067	U	2	95.4		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2015-2090

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-15-102647D

Matrix: WATER

Level: Low

Sample ID: 379011002

Duplicate ID: 1203371768

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68	U	145	J	200		P
Barium	ug/L	+/-20%	43.4		42.3		2.79		P
Beryllium	ug/L		1	U	1	U			P
Boron	ug/L	+/-50	32.1	J	30.8	J	4.09		P
Calcium	ug/L	+/-20%	24500		24100		1.44		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%	6920		6810		1.54		P
Manganese	ug/L		2	U	2	U			P
Potassium	ug/L	+/-20%	1550		1540		1.04		P
Silica	ug/L	+/-20%	75900		74400		2.06		P
Sodium	ug/L	+/-20%	12300		12000		2.42		P
Strontium	ug/L	+/-20%	89.7		88.8		.974		P
Tin	ug/L	+/-10	2.73	J	2.76	J	.972		P
Vanadium	ug/L	+/-5	7.35		7.12		3.16		P
Zinc	ug/L	+/-10	7.9	J	10.8		31		P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2015-2090

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-15-102647D

Matrix: WATER

Level: Low

Sample ID: 379011002

Duplicate ID: 1203371802

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	2.5 J		2.24 J		11.1		MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L	+/-10	20.8		20.1		3.21		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.68		1.5		11.2		MS
Nickel	ug/L		0.5 U		0.5 U				MS
Selenium	ug/L	+/-5	2.27 J		1.72 J		27.9		MS
Silver	ug/L		0.2 U		0.2 U				MS
Thallium	ug/L		0.45 U		0.45 U				MS
Uranium	ug/L	+/- .2	0.687		0.65		5.53		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
–6–
Duplicate Sample Summary

SDG No.: 2015–2090**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CASA–15–102633D**Matrix:** WATER**Level:** Low**Sample ID:** 379011001**Duplicate ID:** 1203378894**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	0.087	J	200		AV

***Analytical Methods:**

AV EPA 245.1/245.2

METALS

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Laboratory Control Sample Summary

SDG NO. 2015-2090

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>
1203371767								
	Aluminum	ug/L	5000	5070		101	80-120	P
	Barium	ug/L	500	525		105	80-120	P
	Beryllium	ug/L	500	521		104	80-120	P
	Boron	ug/L	500	530		106	80-120	P
	Calcium	ug/L	5000	5240		105	80-120	P
	Cobalt	ug/L	500	521		104	80-120	P
	Copper	ug/L	500	527		105	80-120	P
	Iron	ug/L	5000	5220		104	80-120	P
	Magnesium	ug/L	5000	5410		108	80-120	P
	Manganese	ug/L	500	526		105	80-120	P
	Potassium	ug/L	5000	5080		102	80-120	P
	Silica	ug/L	10700	10600		99.2	80-120	P
	Sodium	ug/L	5000	4900		98	80-120	P
	Strontium	ug/L	500	477		95.4	80-120	P
	Tin	ug/L	500	538		108	80-120	P
	Vanadium	ug/L	500	526		105	80-120	P
	Zinc	ug/L	500	508		102	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2015-2090

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>
1203371801								
	Antimony	ug/L	50	48.6		97.3	80-120	MS
	Arsenic	ug/L	50	53.2		106	80-120	MS
	Cadmium	ug/L	50	52		104	80-120	MS
	Chromium	ug/L	50	51.1		102	80-120	MS
	Lead	ug/L	50	48.2		96.4	80-120	MS
	Molybdenum	ug/L	50	51.2		102	80-120	MS
	Nickel	ug/L	50	51.6		103	80-120	MS
	Selenium	ug/L	50	54.7		109	80-120	MS
	Silver	ug/L	50	52.9		106	80-120	MS
	Thallium	ug/L	50	45.9		91.7	80-120	MS
	Uranium	ug/L	50	51.8		104	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2015-2090

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>
1203378892	Mercury	ug/L	2	2.03		102	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2015-2090

Client ID: CASA-15-102647L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 379011002

Serial Dilution ID: 1203371770

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	43.4		43		1.11			P
Beryllium	1	U	5	U				P
Boron	32.1	J	75	U	100			P
Calcium	24500		24200		1.37		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	6920		6720		2.93		10	P
Manganese	2	U	10	U				P
Potassium	1550		1420		8.37			P
Silica	75900		75100		1.05		10	P
Sodium	12300		12000		1.92		10	P
Strontium	89.7		89.4		.313		10	P
Tin	2.73	J	12.5	U	100			P
Vanadium	7.35		6.97	J	5.16			P
Zinc	7.9	J	16.5	U	100			P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2015-2090

Client ID: CASA-15-102647L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 379011002

Serial Dilution ID: 1203371804

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2.5	J	8.5	U	100			MS
Cadmium	.11	U	.55	U				MS
Chromium	20.8		20.6	J	.952			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.68		1.94	J	15.6			MS
Nickel	.5	U	2.5	U				MS
Selenium	2.27	J	7.5	U	100			MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.25	U				MS
Uranium	.687		.575	J	16.3			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2015-2090 **Client ID:** CASA-15-102633L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 379011001 **Serial Dilution ID:** 1203378898

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Mercury	.067	U	.415	J				AV

*Analytical Methods:

AV EPA 245.1/245.2

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2015-2090
Work Order #: 379011**

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
379011001	CASA-15-102633
379011003	CASA-15-102638
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:	1498741	Method:	WSP-CN(T)
Prep Batch :	1498740	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
379011001	CASA-15-102633
379011003	CASA-15-102638
1203369923	Method Blank (MB)
1203369924	Laboratory Control Sample (LCS)
1203371911	379019001(CAMO-15-102580) Sample Duplicate (DUP)
1203371912	379019001(CAMO-15-102580) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 379019001 (CAMO-15-102580) 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:

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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
379011002	CASA-15-102647
379011004	CASA-15-102652
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 samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Manual Integrations

Samples 1203373270 (CASA-15-102647DUP), 1203373271 (CASA-15-102647PS), 379011002 (CASA-15-102647) and 379011004 (CASA-15-102652) 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:	1499451	Method:	NH3
Prep Batch :	1499449	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
379011002	CASA-15-102647
379011004	CASA-15-102652
1203371692	Method Blank (MB)
1203371693	Laboratory Control Sample (LCS)
1203371696	379011002(CASA-15-102647) Sample Duplicate (DUP)
1203371697	379011002(CASA-15-102647) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-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 379011002 (CASA-15-102647) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

Sample1203371692 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported. Sample379011002 (CASA-15-102647) was re-analyzed due to (its) proximity to an overrange sample. 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
379011001	CASA-15-102633
379011003	CASA-15-102638
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), 1203372232 (CASA-15-102633MS) and 379011001 (CASA-15-102633).

Analyte	379011
	001
Nitrogen, Total Kjeldahl	5X

Sample Re-analysis

Samples 1203372231 (CASA-15-102633DUP), 1203372232 (CASA-15-102633MS) and 379011001 (CASA-15-102633) 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: 1499212 and 1499852

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
379011002	CASA-15-102647
379011004	CASA-15-102652
1203371095	Method Blank (MB)
1203372750	Method Blank (MB)
1203371096	Laboratory Control Sample (LCS)
1203372751	Laboratory Control Sample (LCS)
1203372742	379011002(CASA-15-102647) Sample Duplicate (DUP)
1203372752	379011004(CASA-15-102652) Sample Duplicate (DUP)
1203372743	379011002(CASA-15-102647) Post Spike (PS)
1203372754	379011004(CASA-15-102652) 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 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) Designation

Samples 379011002 (CASA-15-102647)- Batch 1499212 and 379011004 (CASA-15-102652)- Batch 1499852 were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The following samples were diluted because target analyte concentrations exceeded the calibration range. 1203372742 (CASA-15-102647DUP), 1203372743 (CASA-15-102647PS), 379011002 (CASA-15-102647)- Batch 1499212, 1203372752 (CASA-15-102652DUP), 1203372754 (CASA-15-102652PS) and 379011004 (CASA-15-102652)- Batch 1499852.

Analyte	379011	
	002	004
Nitrogen, Nitrate/Nitrite	5X	5X

Sample Re-analysis

Samples 1203371095 (MB) and 1203371096 (LCS)- Batch 1499212 were re-analyzed to verify the results.

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

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

Sample Analysis

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

Sample ID	Client ID
379011002	CASA-15-102647
379011004	CASA-15-102652
1203372233	Method Blank (MB)
1203372234	Laboratory Control Sample (LCS)
1203372235	379011002(CASA-15-102647) Sample Duplicate (DUP)
1203375689	379148002(CASA-15-102650) Sample Duplicate (DUP)
1203372236	379011002(CASA-15-102647) Matrix Spike (MS)
1203375690	379148002(CASA-15-102650) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1499735

Method: TDS

Sample Analysis

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

Sample ID	Client ID
379011002	CASA-15-102647
379011004	CASA-15-102652
1203372377	Method Blank (MB)
1203372378	Laboratory Control Sample (LCS)
1203372379	379019002(CAMO-15-102604) 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 379019002 (CAMO-15-102604) 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: 1499837 **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
379011002	CASA-15-102647
379011004	CASA-15-102652
1203372695	Laboratory Control Sample (LCS)
1203372696	379011002(CASA-15-102647) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 379011002 (CASA-15-102647) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH

Analytical Batch: 1499835 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
379011002	CASA-15-102647
379011004	CASA-15-102652
1203372686	Laboratory Control Sample (LCS)
1203372687	379011002(CASA-15-102647) Sample Duplicate (DUP)
1203372688	379019002(CAMO-15-102604) 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 379011002 (CASA-15-102647) and 379019002 (CAMO-15-102604) 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
379011002 (CASA-15-102647)		Received 11-AUG-15, out of holding 07-AUG-15
379011004 (CASA-15-102652)		Received 11-AUG-15, out of holding 07-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) 1440339 was generated for samples 379011002 (CASA-15-102647) and 379011004 (CASA-15-102652) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1499840 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
379011002	CASA-15-102647
379011004	CASA-15-102652
1203372710	Method Blank (MB)
1203372712	Laboratory Control Sample (LCS)
1203372714	379011002(CASA-15-102647) Sample Duplicate (DUP)
1203372716	379011002(CASA-15-102647) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 379011002 (CASA-15-102647) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

GEL LABORATORIES LLC

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Qualifier Definition Report for

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

Client SDG: 2015-2090 GEL Work Order: 379011

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: 03 SEP 2015

Title: Data Validator

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 3, 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: 2015-2090

Client Sample ID: CASA-15-102633
Sample ID: 379011001
Matrix: W
Collect Date: 07-AUG-15 11:02
Receive Date: 11-AUG-15
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L	1	TSM	08/15/15	0422	1500166	1
Flow Injection Analysis											
WSP-CN(T) "As Received"											
Cyanide, Total	U	ND	1.67	5.00	ug/L	1	AXH3	08/12/15	1026	1498741	2
Nutrient Analysis											
TKN "As Received"											
Nitrogen, Total Kjeldahl	U	ND	0.165	0.500	mg/L	5	KLP1	08/13/15	1321	1499653	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	08/12/15	0845	1498740
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:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 3, 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: 2015-2090

Client Sample ID: CASA-15-102647
Sample ID: 379011002
Matrix: W
Collect Date: 07-AUG-15 11:02
Receive Date: 11-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	J	0.086	0.067	0.200	mg/L	1	MXL2	08/13/15	0049	1500059	1
Chloride		5.15	0.067	0.200	mg/L	1					
Fluoride		0.387	0.033	0.100	mg/L	1					
Sulfate		13.1	0.133	0.400	mg/L	1					
Nutrient Analysis											
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P		0.0553	0.017	0.050	mg/L	1	KLP1	08/18/15	1335	1499655	2
NH3 "As Received"											
Nitrogen, Ammonia	U	ND	0.017	0.050	mg/L	1	KLP1	08/13/15	1509	1499451	3
NO3NO2 "As Received"											
Nitrogen, Nitrate/Nitrite		5.65	0.085	0.250	mg/L	5	AXH3	08/19/15	0901	1499212	4
Solids Analysis											
TDS "As Received"											
Total Dissolved Solids		206	3.40	14.3	mg/L		MXB3	08/12/15	0854	1499735	5
Titration and Ion Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		70.7	0.725	1.00	mg/L		PXO1	08/13/15	1429	1499840	6
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						
EPA120.1 Specific Conductivity "As Received"											
Conductivity		213	3.63	14.5	umhos/cm	1	PXO1	08/12/15	1307	1499837	7
PH "As Received"											
pH at Temp 23.1C	H	8.05	0.010	0.100	SU	1	PXO1	08/12/15	1342	1499835	8

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	1499449
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	08/17/15	1700	1499654

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 3, 2015

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

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

Client SDG: 2015-2090

Client Sample ID: CASA-15-102647

Sample ID: 379011002

Project: ESHL00114

Client ID: ARSL004

The following Analytical Methods were performed:

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

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 3, 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: 2015-2090

Client Sample ID: CASA-15-102638
Sample ID: 379011003
Matrix: W
Collect Date: 07-AUG-15 10:57
Receive Date: 11-AUG-15
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L	1	TSM	08/15/15	0503	1500166	1
Flow Injection Analysis											
WSP-CN(T) "As Received"											
Cyanide, Total	U	ND	1.67	5.00	ug/L	1	AXH3	08/12/15	1026	1498741	2
Nutrient Analysis											
TKN "As Received"											
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1	KLP1	08/13/15	1244	1499653	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	08/12/15	0845	1498740
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 3, 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: 2015-2090

Client Sample ID: CASA-15-102652
Sample ID: 379011004
Matrix: W
Collect Date: 07-AUG-15 10:57
Receive Date: 11-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	J	0.103	0.067	0.200	mg/L	1	MXL2	08/13/15	0225	1500059	1
Chloride		6.22	0.067	0.200	mg/L	1					
Fluoride		0.540	0.033	0.100	mg/L	1					
Sulfate		7.35	0.133	0.400	mg/L	1					
Nutrient Analysis											
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P	U	ND	0.017	0.050	mg/L	1	KLP1	08/18/15	1337	1499655	2
NH3 "As Received"											
Nitrogen, Ammonia		0.0525	0.017	0.050	mg/L	1	KLP1	08/13/15	1446	1499451	3
NO3NO2 "As Received"											
Nitrogen, Nitrate/Nitrite		2.45	0.085	0.250	mg/L	5	AXH3	08/19/15	1114	1499852	4
Solids Analysis											
TDS "As Received"											
Total Dissolved Solids		163	3.40	14.3	mg/L		MXB3	08/12/15	0854	1499735	5
Titration and Ion Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		73.2	0.725	1.00	mg/L		PXO1	08/13/15	1437	1499840	6
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						
EPA120.1 Specific Conductivity "As Received"											
Conductivity		180	3.63	14.5	umhos/cm	1	PXO1	08/12/15	1309	1499837	7
PH "As Received"											
pH at Temp 22.7C	H	7.77	0.010	0.100	SU	1	PXO1	08/12/15	1353	1499835	8

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	1499449
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	08/17/15	1700	1499654

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Certificate of Analysis

Report Date: September 3, 2015

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

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

Client SDG: 2015-2090

Client Sample ID: CASA-15-102652
Sample ID: 379011004

Project: ESHL00114
Client ID: ARSL004

The following Analytical Methods were performed:

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

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: September 3, 2015

Page 1 of 5

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

Contact: Mr. Keith Greene

Workorder: 379011

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			(85%-115%)		08/14/15	22:10
QC1203373633	MB										
Total Organic Carbon Average			U	ND	mg/L					08/14/15	21:57
QC1203373638	378720001	PS									
Total Organic Carbon Average	10.0	1.01		11.6	mg/L			(65%-120%)		08/15/15	00:28
Flow Injection Analysis											
Batch	1498741										
QC1203371911	379019001	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	08/12/15	10:28
QC1203369924	LCS										
Cyanide, Total	50.0			52.8	ug/L			(90%-110%)		08/12/15	10:00
QC1203369923	MB										
Cyanide, Total			U	ND	ug/L					08/12/15	09:56
QC1203371912	379019001	MS									
Cyanide, Total	100	U	ND	109	ug/L			(90%-110%)		08/12/15	10:29
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%)		

GEL LABORATORIES LLC

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QC Summary

Workorder: 379011

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	1499212										
QC1203372742	379011002	DUP									
Nitrogen, Nitrate/Nitrite			5.65	5.55	mg/L	1.79		(0%-20%)	AXH3	08/19/15	09:02
QC1203371096	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.05	mg/L		105	(90%-110%)		08/19/15	08:26
QC1203371095	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					08/19/15	08:25
QC1203372743	379011002	PS									
Nitrogen, Nitrate/Nitrite	1.00		1.13	2.13	mg/L		100	(90%-110%)		08/19/15	09:03
Batch	1499451										
QC1203371696	379011002	DUP									
Nitrogen, Ammonia		U	ND	J	0.0284	mg/L	200		KLP1	08/13/15	14:40
QC1203371693	LCS										
Nitrogen, Ammonia	1.00			1.10	mg/L		110	(90%-110%)		08/13/15	14:34
QC1203371692	MB										
Nitrogen, Ammonia			U	ND	mg/L					08/13/15	14:45

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1499451										
QC1203371697	379011002	MS									
Nitrogen, Ammonia	1.00	U	ND		1.10	mg/L	109	(90%-110%)	KLP1	08/13/15	14:41
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	1499655										
QC1203372235	379011002	DUP									
Phosphorus, Total as P			0.0553	U	ND	mg/L	146 ^	(+/-0.050)	KLP1	08/18/15	13:36
QC1203375689	379148002	DUP									
Phosphorus, Total as P		U	ND	U	ND	mg/L	N/A			08/18/15	14:01
QC1203372234	LCS										
Phosphorus, Total as P	1.00				1.09	mg/L	109	(83%-123%)		08/18/15	13:34
QC1203372233	MB										
Phosphorus, Total as P			U		ND	mg/L				08/18/15	13:33
QC1203372236	379011002	MS									
Phosphorus, Total as P	1.00		0.0553		1.27	mg/L	121	(59%-141%)		08/18/15	13:36
QC1203375690	379148002	MS									
Phosphorus, Total as P	1.00	U	ND		1.09	mg/L	109	(59%-141%)		08/18/15	14:02
Batch	1499852										
QC1203372752	379011004	DUP									
Nitrogen, Nitrate/Nitrite			2.45		2.40	mg/L	2.07	(0%-20%)	AXH3	08/19/15	11:15
QC1203372751	LCS										
Nitrogen, Nitrate/Nitrite	1.00				1.04	mg/L	104	(90%-110%)		08/19/15	11:12
QC1203372750	MB										
Nitrogen, Nitrate/Nitrite			U		ND	mg/L				08/19/15	11:11
QC1203372754	379011004	PS									
Nitrogen, Nitrate/Nitrite	1.00		0.489		1.52	mg/L	103	(90%-110%)		08/19/15	11:16

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1499852										
Solids Analysis											
Batch	1499735										
QC1203372379	379019002	DUP									
Total Dissolved Solids		151		149	mg/L	2.84		(0%-5%)	MXB3	08/12/15	08:54
QC1203372378	LCS										
Total Dissolved Solids	300			301	mg/L		100	(95%-105%)		08/12/15	08:54
QC1203372377	MB										
Total Dissolved Solids		U		ND	mg/L					08/12/15	08:54
Titration and Ion Analysis											
Batch	1499835										
QC1203372687	379011002	DUP									
pH		H	8.05	H	8.04	SU	0.0542		(0%-5%)	PXO1	08/12/15 13:49
QC1203372688	379019002	DUP									
pH		H	7.87	H	7.90	SU	0.364		(0%-5%)		08/12/15 14:37
QC1203372686	LCS										
pH	7.00			7.01	SU		100	(99%-101%)		08/12/15	13:23
Batch	1499837										
QC1203372696	379011002	DUP									
Conductivity		213		215	umhos/cm	0.913		(0%-10%)	PXO1	08/12/15	13:08
QC1203372695	LCS										
Conductivity	1410			1400	umhos/cm		99.3	(95%-105%)		08/12/15	13:05
Batch	1499840										
QC1203372714	379011002	DUP									
Alkalinity, Total as CaCO3		70.7		70.7	mg/L	0		(0%-20%)	PXO1	08/13/15	14:31
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1203372712	LCS										
Alkalinity, Total as CaCO3	50.0			51.3	mg/L		103	(90%-110%)		08/13/15	13:40
QC1203372710	MB										
Alkalinity, Total as CaCO3		U		ND	mg/L					08/13/15	13:40
Carbonate alkalinity (CaCO3)		U		ND	mg/L						
QC1203372716	379011002	MS									
				121				(80%-120%)			

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Paramname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1499840										
Alkalinity, Total as CaCO ₃	50.0	70.7			mg/L		101			08/13/15	14:33

Notes:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J Value is estimated
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- d 5-day BOD--The 2:1 depletion requirement was not met for this sample
- e 5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes
- h Preparation or preservation holding time was exceeded

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

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

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

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

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

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 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		DER Disposition:	
Exception Description:			
1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203372232MS		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%)].	

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: ESHL
Batch ID: 1499835	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 379006(2015-2108),379010(2015-2089),379011(2015-2090),379012(2015-2087),379013(2015-2086),379017(2015-2088),379019(2015-2084),379136(2015-2127) Application Issues: Sample received out of holding			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Sample received out of holding: 379006 001,010 379010 001 379011 002,004 379012 001,003,005,007 379013 001 379017 006 379019 002,004,006,008,010 379136 001,003,005		1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified. 379006001 (WT_REF-15-102389) [See applicable report]. 379006010 (WT_REF-15-102390) [See applicable report]. 379010001 (Urban-15-102323) [See applicable report]. 379011002 (CASA-15-102647) [See applicable report]. 379011004 (CASA-15-102652) [See applicable report]. 379012001 (Urban-15-102320) [See applicable report]. 379012003 (Urban-15-102301) [See applicable report]. 379012005 (Urban-15-102315) [See applicable report]. 379012007 (Urban-15-102326) [See applicable report]. 379013001 (WTRON-15-99483) [See applicable report]. 379017006 (WTLAP-15-97588) [See applicable report]. 379019002 (CAMO-15-102604) [See applicable report]. 379019004 (CAMO-15-102559) [See applicable report]. 379019006 (CAMO-15-102605) [See applicable report]. 379019008 (CAMO-15-102608) [See applicable report]. 379019010 (CAMO-15-102609) [See applicable report]. 379136001 (Urban-15-102333) [See applicable report]. 379136003 (Urban-15-102325) [See applicable report]. 379136005 (Urban-15-102334) [See applicable report].	

Originator's Name:

Patrick Orgel 19-AUG-15

Data Validator/Group Leader:

Elzbieta Szulc 03-SEP-15