

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of field COCs
3. Validation Report
4. Laboratory analysis

Comments:



[illegible]



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CAMO-17-129291

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	02-10-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:11		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GST	
LOCATION ID:	R-13		FIELD PREP:	F	
LOCATION TYPE:	1A		FIELD QC TYPE:	REG	
TOP DEPTH:			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  
 pH \_\_\_\_\_ SU  
 Turbidity \_\_\_\_\_ NTU  
 Flow (in gpm) 0.1  
 Specific Conductance \_\_\_\_\_ uS/cm  
 GPM \_\_\_\_\_  
 uS/cm \_\_\_\_\_  
 Oxidation-Reduction Potential \_\_\_\_\_ mV  
 Temperature \_\_\_\_\_ deg C

COLLECTED BY (PRINT): T. Berham, A. Tosh

RELINQUISHED BY (Printed Name) (Signature)	Donner Hughes <i>[Signature]</i>	Date/Time 02-10-2017 13:05	RECEIVED BY (Printed Name) (Signature)	K. Greene <i>[Signature]</i>	Date/Time 2/10/17 1:05
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 01/18/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CAMO-17-129297

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	2/10/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1339		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-44 S1		FIELD PREP:	F	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
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: Sampled 50 ft. from running diesel generator

LOCATION COMMENTS: none

## FIELD PARAMETERS:

*AS 2/10/17*

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): W. Sanchez, K. Tol

RELINQUISHED BY (Printed Name) (Signature)	<i>Allyson Stanfield</i>	Date/Time <i>2/10/17</i> <i>15:45</i>	RECEIVED BY (Printed Name) (Signature)	<i>K. G. Carr</i>	Date/Time <i>2/10/17</i> <i>14:45</i>
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 01/18/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CAMO-17-129307

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	02-10-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:11		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-13		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			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
I	WSP-CN(T)	250 ML POLY	1	NAOH	I	I
I	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	I	I

## SAMPLE COMMENTS:

≈ 10 MPH wind during collection &amp; preservation

## LOCATION COMMENTS:

sampled ≈ 40 ft. from running diesel generator

## FIELD PARAMETERS:

Dissolved Oxygen	6.23	mg/L	Flow (in gpm)	5.45	GPM	Oxidation-Reduction Potential	230.2	mV
pH	8.34	SU	Specific Conductance	143.4	uS/cm	Temperature	20.5	deg C
Turbidity	0.14	NTU						

COLLECTED BY (PRINT): T. Bonham, A. Tosh

RELINQUISHED BY (Printed Name) (Signature)	Darren Hughes <i>[Signature]</i>	Date/Time 02-10-2017 13:05	RECEIVED BY (Printed Name) (Signature)	K. G. ... <i>[Signature]</i>	Date/Time 2/10/17 1:05
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 01/18/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CAMO-17-129313

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	2/10/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1339		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-44 S1		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	✓	✓	EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS: Sampled 50 ft from running diesel generator

LOCATION COMMENTS: none

## FIELD PARAMETERS:

Dissolved Oxygen	6.80	mg/L	Flow (in gpm)	3.53	GPM	Oxidation-Reduction Potential	1493	mV
pH	7.84	SU	Specific Conductance	135.1	uS/cm	Temperature	20.9	deg C
Turbidity	6.1	NTU						

COLLECTED BY (PRINT): W. Sanchez, K. Tow

RELINQUISHED BY (Printed Name) At 13m Stanfield	Date/Time 2/10/17 1445	RECEIVED BY (Printed Name) K. Greene	Date/Time 2/16/17 2145
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 01/18/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CASA-17-129323

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	2/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1143		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-11		FIELD PREP:	F	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / <u>NA</u>

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT):

A. Stacker, W. Sanchez

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 2/9/17 1525	RECEIVED BY (Printed Name) (Signature)	Date/Time 2/9/17 1525
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 01/18/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CASA-17-129324

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	2/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1143		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-11		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / (NA)

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

SAMPLE COMMENTS: Sampled 40 ft from running diesel generator

LOCATION COMMENTS: none

## FIELD PARAMETERS:

Dissolved Oxygen	6.99	mg/L	Flow (in gpm)	2.88	GPM	Oxidation-Reduction Potential	183.5	mV
pH	8.21	SU	Specific Conductance	226.6	uS/cm	Temperature	21.4	deg C
Turbidity	0.27	NTU						

COLLECTED BY (PRINT): A. Stocker, W. Sanchez

RELINQUISHED BY (Printed Name) Allyn Stanford (Signature)	Date/Time 2/9/17 1525	RECEIVED BY (Printed Name) S. Sherwood (Signature)	Date/Time 2/9/17 1528
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 01/18/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CASA-17-129326

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	2/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1400		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-35b		FIELD PREP:	F	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / (NA)

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

SAMPLE COMMENTS:

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): W. Sanchez

RELINQUISHED BY (Printed Name) Allison Stanford (Signature) <i>Allison Stanford</i>	Date/Time 2/9/17 1525	RECEIVED BY <i>Sherwood</i> (Printed Name) <i>Sherwood</i> (Signature) <i>Sherwood</i>	Date/Time 2/9/17 1525
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 01/18/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CASA-17-129332

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	2/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1400		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-35b		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / (NA)

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

SAMPLE COMMENTS: Sampled 40 ft. from running diesel generator

LOCATION COMMENTS: None

## FIELD PARAMETERS:

Dissolved Oxygen	6.05	mg/L	Flow (in gpm)	2.75	GPM	Oxidation-Reduction Potential	163.8	mV
pH	7.59	SU	Specific Conductance	170.0	uS/cm	Temperature	26.6	deg C
Turbidity	0.23	NTU						

COLLECTED BY (PRINT): W. Sanchez

RELINQUISHED BY (Printed Name) <u>Allyn Stanford</u> (Signature) <u>[Signature]</u>	Date/Time 2/9/17 1525	RECEIVED BY (Printed Name) <u>S. Sherwood</u> (Signature) <u>[Signature]</u>	Date/Time 2/9/17 1525
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 01/18/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CASA-17-129338

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	2/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1143		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-11		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	FD	
TOP DEPTH:	OK		SAMPLE USAGE:	QC	
BOTTOM DEPTH:	↓	✓	EXCAVATED:		YES / NO / <u>NA</u>

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

*AS 2/9/17*

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

COLLECTED BY (PRINT): A. Stocker, W. Sanchez

RELINQUISHED BY (Printed Name) <i>Allyn Spaulding</i> (Signature) <i>[Signature]</i>	Date/Time 2/9/17 1525	RECEIVED BY (Printed Name) <i>S. Sherwood</i> (Signature) <i>[Signature]</i>	Date/Time 2/9/17 1525
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 01/18/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CASA-17-129339

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	2/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1143		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-11		FIELD PREP:	F	
LOCATION TYPE:	Mon		FIELD QC TYPE:	FD	
TOP DEPTH:	OK		SAMPLE USAGE:	QC	
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): A. Stocker, W. Sanchez

RELINQUISHED BY (Printed Name) <i>Allynn Stanford</i> (Signature) <i>[Signature]</i>	Date/Time 2/9/17 1525	RECEIVED BY <i>S. Sherwood</i> (Printed Name) <i>[Signature]</i> (Signature) <i>[Signature]</i>	Date/Time 2/9/17 1525
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 01/18/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CAMO-17-129578

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	2/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1143		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-11		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	PEB	
TOP DEPTH:	OK		SAMPLE USAGE:	QC	
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-CN(T)	250 ML POLY	1	NAOH	↓	↓
↓	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
↓	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4	↓	↓
↓	WSP-TKN+TOC	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): W. Sanchez

RELINQUISHED BY (Printed Name) <i>A. H. B. yn, S. Sanchez</i> (Signature)	Date/Time 2/9/17 1525	RECEIVED BY <i>S. S. Woodward</i> (Printed Name) (Signature)	Date/Time 2/9/17 1525
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time



## DATA VALIDATION REPORT

Chain Of Custody No. 2017-1005

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
416572	EPA:120.1	2	1			
416572	EPA:120.1	2				
416572	EPA:150.1	2	1			
416572	EPA:150.1	2				
416572	EPA:160.1	2	1			
416572	EPA:160.1	2				
416572	EPA:245.2	4	2			
416572	EPA:245.2	4				
416572	EPA:300.0	2	1			
416572	EPA:300.0	2				
416572	EPA:310.1	2	1			
416572	EPA:310.1	2				
416572	EPA:335.4	2	1			
416572	EPA:335.4	2				
416572	EPA:350.1	2	1			
416572	EPA:350.1	2				
416572	EPA:351.2	2	1			
416572	EPA:351.2	2				
416572	EPA:353.2	2	1			
416572	EPA:353.2	2				
416572	EPA:365.4	2	1			
416572	EPA:365.4	2				
416572	SM:A2340B	2	1			
416572	SM:A2340B	2				
416572	SW-846:6010C	2	1			
416572	SW-846:6010C	2				
416572	SW-846:6020	2	1			
416572	SW-846:6020	2				
416572	SW-846:6850	2	1			
416572	SW-846:6850	2				
416572	SW-846:9060	2	1			



## DATA VALIDATION REPORT

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
416572	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
416572	EPA:120.1	1639323	1639323	4	1									1				1			
416572	EPA:150.1	1639321	1639321	4	1									1				2			
416572	EPA:160.1	1639401	1639401	4	1				1					1				2			
416572	EPA:245.2	1639580	1639579	8	2				1	1				1				1			
416572	EPA:300.0	1640555	1640555	4	1				1					1				1			
416572	EPA:310.1	1639313	1639313	4	1					2				1				2			
416572	EPA:335.4	1639328	1639327	4	1				1	1				1				1			
416572	EPA:350.1	1639241	1639240	4	1				1	1				1				1			
416572	EPA:351.2	1639245	1639244	4	1				1	2				1				2			
416572	EPA:353.2	1641424	1641424	4	1				1					1				2			
416572	EPA:365.4	1639243	1639242	4	1				1	1				1				1			
416572	SM:A2340B	1646837	1646837	4	1																
416572	SW-846:6010C	1639294	1639293	3	1				1	1				1				1			
416572	SW-846:6010C	1639457	1639456	1					1	1				1				1			
416572	SW-846:6020	1639308	1639307	3	1				1	1				1				1			
416572	SW-846:6020	1639459	1639458	1					1	1				1				1			
416572	SW-846:6850	1640036	1640034	4	1				1	1	1			1							
416572	SW-846:9060	1639272	1639272	4	1				1					1				1			

### 2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-129291	416572006	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-129297	1203728235	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-129297	416572010	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-17-129323	416572001	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:120.1	GENERAL CHEMISTRY	CASA-17-129326	416572008	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-17-129339	416572004	FD	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203728234	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-129291	416572006	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-129297	1203728233	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-129297	416572010	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-17-129323	416572001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-17-129326	416572008	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-17-129339	416572004	FD	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203728231	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	WST09-17-129397	1203728232	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-129291	416572006	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-129294	1203728895	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-129297	416572010	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-17-129323	416572001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-17-129325	1203728411	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-17-129326	416572008	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-17-129339	416572004	FD	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203728410	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203728409	MB	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-129291	416572006	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-129297	416572010	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-129307	416572007	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-129313	416572011	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-129578	416572005	PEB	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-129323	416572001	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-129324	416572002	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-129325	1203728807	DUP	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-129325	1203728809	MS	0	0	1	0
EPA:245.2	INORGANIC	CASA-17-129326	416572008	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-129332	416572009	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-129338	416572003	FD	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-129339	416572004	FD	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203728806	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203728805	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-129291	416572006	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-129297	416572010	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	4	0	0	0



# DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:300.0	GENERAL CHEMISTRY	CASA-17-129323	416572001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-17-129325	1203731278	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-17-129326	416572008	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-17-129339	416572004	FD	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203731277	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203731276	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-129291	416572006	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-129297	1203728224	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-129297	1203728226	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-129297	416572010	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-129323	416572001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-129326	416572008	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-129339	416572004	FD	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203728222	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	WST09-17-129397	1203728223	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	WST09-17-129397	1203728225	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-129307	416572007	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-129313	416572011	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-17-129324	416572002	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-17-129331	1203728257	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-17-129331	1203728261	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CASA-17-129332	416572009	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-17-129338	416572003	FD	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203728256	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203728255	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-129291	416572006	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-129297	416572010	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-129323	416572001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-129325	1203728032	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-129325	1203728034	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-129326	416572008	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-129339	416572004	FD	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203728031	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203728030	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-129307	416572007	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-129313	416572011	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	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:351.2	GENERAL CHEMISTRY	CASA-17-129324	1203728877	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-129324	1203728878	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-129324	416572002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-129331	1203728044	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-129331	1203728045	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-129332	416572009	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-129338	416572003	FD	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203728043	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203728042	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-129291	416572006	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-129297	416572010	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-17-129323	1203733272	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-17-129323	416572001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-17-129325	1203733271	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-17-129326	416572008	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-17-129339	416572004	FD	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203733270	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203733269	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-129291	416572006	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-129297	416572010	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-17-129323	416572001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-17-129325	1203728038	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-17-129325	1203728040	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-17-129326	416572008	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-17-129339	416572004	FD	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203728037	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203728036	MB	1	0	0	0
SM:A2340B	INORGANIC	CAMO-17-129291	416572006	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-17-129297	416572010	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-17-129578	416572005	PEB	1	0	0	0
SM:A2340B	INORGANIC	CASA-17-129323	416572001	REG	1	0	0	0
SM:A2340B	INORGANIC	CASA-17-129326	416572008	REG	1	0	0	0
SM:A2340B	INORGANIC	CASA-17-129339	416572004	FD	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-129291	416572006	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-129297	1203728514	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-129297	1203728515	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAMO-17-129297	416572010	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-129578	416572005	PEB	17	0	0	0



## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6010C	INORGANIC	CASA-17-129323	416572001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CASA-17-129325	1203728152	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CASA-17-129325	1203728153	MS	0	0	17	0
SW-846:6010C	INORGANIC	CASA-17-129326	416572008	REG	17	0	0	0
SW-846:6010C	INORGANIC	CASA-17-129339	416572004	FD	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203728151	LCS	0	0	17	0
SW-846:6010C	INORGANIC	LCS	1203728513	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203728150	MB	17	0	0	0
SW-846:6010C	INORGANIC	MB	1203728512	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-17-129291	416572006	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-17-129297	1203728519	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-17-129297	1203728520	MS	0	0	11	0
SW-846:6020	INORGANIC	CAMO-17-129297	416572010	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-17-129578	416572005	PEB	11	0	0	0
SW-846:6020	INORGANIC	CASA-17-129323	416572001	REG	11	0	0	0
SW-846:6020	INORGANIC	CASA-17-129325	1203728191	DUP	11	0	0	0
SW-846:6020	INORGANIC	CASA-17-129325	1203728192	MS	0	0	11	0
SW-846:6020	INORGANIC	CASA-17-129326	416572008	REG	11	0	0	0
SW-846:6020	INORGANIC	CASA-17-129339	416572004	FD	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203728190	LCS	0	0	11	0
SW-846:6020	INORGANIC	LCS	1203728518	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203728189	MB	11	0	0	0
SW-846:6020	INORGANIC	MB	1203728517	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-129291	416572006	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-129297	416572010	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-129578	416572005	PEB	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-129323	1203729925	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-129323	1203729926	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-129323	416572001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-129326	416572008	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-129339	416572004	FD	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203729924	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203729923	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-129307	416572007	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-129308	1203728544	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-129313	416572011	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-129578	416572005	PEB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-17-129324	416572002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-17-129332	416572009	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-17-129338	416572003	FD	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
SW-846:9060	GENERAL CHEMISTRY	LCS	1203728543	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203728542	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203728150	METHOD BLANK	SW-846:6010C	W	Potassium	-58.7	J	ug/L	150
MB	1203728512	METHOD BLANK	SW-846:6010C	W	Sodium	115	J	ug/L	300

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-17-129323	1203728150	METHOD BLANK	SW-846:6010C	Potassium	-58.7	ug/L	1310		150	Y			
CASA-17-129339	1203728150	METHOD BLANK	SW-846:6010C	Potassium	-58.7	ug/L	1320		150	Y			
CAMO-17-129578	1203728150	METHOD BLANK	SW-846:6010C	Potassium	-58.7	ug/L	150	U	150	N			
CAMO-17-129291	1203728150	METHOD BLANK	SW-846:6010C	Potassium	-58.7	ug/L	1160		150	Y			
CASA-17-129326	1203728150	METHOD BLANK	SW-846:6010C	Potassium	-58.7	ug/L	1820		150	Y			



## DATA VALIDATION REPORT

6. Any surrogate recoveries outside the control limits?

No.

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CASA-17-129331	1203728045		EPA:351.2	Total Kjeldahl Nitrogen	1639244	02-28-2017	W	80		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.



## DATA VALIDATION REPORT

None.

### Reason Code

### Description

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
CAMO-17-129291	R-13	REG	EPA:120.1	0	1
CAMO-17-129291	R-13	REG	EPA:150.1	0	1
CAMO-17-129291	R-13	REG	EPA:160.1	0	1
CAMO-17-129291	R-13	REG	EPA:245.2	0	1
CAMO-17-129291	R-13	REG	EPA:300.0	0	4
CAMO-17-129291	R-13	REG	EPA:310.1	0	2
CAMO-17-129291	R-13	REG	EPA:350.1	0	1
CAMO-17-129291	R-13	REG	EPA:353.2	0	1
CAMO-17-129291	R-13	REG	EPA:365.4	0	1
CAMO-17-129291	R-13	REG	SM:A2340B	0	1
CAMO-17-129291	R-13	REG	SW-846:6010C	0	17
CAMO-17-129291	R-13	REG	SW-846:6020	0	11
CAMO-17-129291	R-13	REG	SW-846:6850	0	1
CAMO-17-129297	R-44 S1	REG	EPA:120.1	0	1
CAMO-17-129297	R-44 S1	REG	EPA:150.1	0	1
CAMO-17-129297	R-44 S1	REG	EPA:160.1	0	1
CAMO-17-129297	R-44 S1	REG	EPA:245.2	0	1
CAMO-17-129297	R-44 S1	REG	EPA:300.0	0	4
CAMO-17-129297	R-44 S1	REG	EPA:310.1	0	2
CAMO-17-129297	R-44 S1	REG	EPA:350.1	0	1
CAMO-17-129297	R-44 S1	REG	EPA:353.2	0	1
CAMO-17-129297	R-44 S1	REG	EPA:365.4	0	1
CAMO-17-129297	R-44 S1	REG	SM:A2340B	0	1
CAMO-17-129297	R-44 S1	REG	SW-846:6010C	0	17
CAMO-17-129297	R-44 S1	REG	SW-846:6020	0	11
CAMO-17-129297	R-44 S1	REG	SW-846:6850	0	1



## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-17-129307	R-13	REG	EPA:245.2	0	1
CAMO-17-129307	R-13	REG	EPA:335.4	0	1
CAMO-17-129307	R-13	REG	EPA:351.2	0	1
CAMO-17-129307	R-13	REG	SW-846:9060	0	1
CAMO-17-129313	R-44 S1	REG	EPA:245.2	0	1
CAMO-17-129313	R-44 S1	REG	EPA:335.4	0	1
CAMO-17-129313	R-44 S1	REG	EPA:351.2	0	1
CAMO-17-129313	R-44 S1	REG	SW-846:9060	0	1
CAMO-17-129578	R-11	PEB	EPA:120.1	0	1
CAMO-17-129578	R-11	PEB	EPA:150.1	0	1
CAMO-17-129578	R-11	PEB	EPA:160.1	0	1
CAMO-17-129578	R-11	PEB	EPA:245.2	0	1
CAMO-17-129578	R-11	PEB	EPA:300.0	0	4
CAMO-17-129578	R-11	PEB	EPA:310.1	0	2
CAMO-17-129578	R-11	PEB	EPA:335.4	0	1
CAMO-17-129578	R-11	PEB	EPA:350.1	0	1
CAMO-17-129578	R-11	PEB	EPA:351.2	0	1
CAMO-17-129578	R-11	PEB	EPA:353.2	0	1
CAMO-17-129578	R-11	PEB	EPA:365.4	0	1
CAMO-17-129578	R-11	PEB	SM:A2340B	0	1
CAMO-17-129578	R-11	PEB	SW-846:6010C	0	17
CAMO-17-129578	R-11	PEB	SW-846:6020	0	11
CAMO-17-129578	R-11	PEB	SW-846:6850	0	1
CAMO-17-129578	R-11	PEB	SW-846:9060	0	1
CASA-17-129323	R-11	REG	EPA:120.1	0	1
CASA-17-129323	R-11	REG	EPA:150.1	0	1
CASA-17-129323	R-11	REG	EPA:160.1	0	1
CASA-17-129323	R-11	REG	EPA:245.2	0	1
CASA-17-129323	R-11	REG	EPA:300.0	0	4
CASA-17-129323	R-11	REG	EPA:310.1	0	2
CASA-17-129323	R-11	REG	EPA:350.1	0	1
CASA-17-129323	R-11	REG	EPA:353.2	0	1
CASA-17-129323	R-11	REG	EPA:365.4	0	1
CASA-17-129323	R-11	REG	SM:A2340B	0	1
CASA-17-129323	R-11	REG	SW-846:6010C	0	17
CASA-17-129323	R-11	REG	SW-846:6020	0	11
CASA-17-129323	R-11	REG	SW-846:6850	0	1



## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CASA-17-129324	R-11	REG	EPA:245.2	0	1
CASA-17-129324	R-11	REG	EPA:335.4	0	1
CASA-17-129324	R-11	REG	EPA:351.2	0	1
CASA-17-129324	R-11	REG	SW-846:9060	0	1
CASA-17-129326	R-35b	REG	EPA:120.1	0	1
CASA-17-129326	R-35b	REG	EPA:150.1	0	1
CASA-17-129326	R-35b	REG	EPA:160.1	0	1
CASA-17-129326	R-35b	REG	EPA:245.2	0	1
CASA-17-129326	R-35b	REG	EPA:300.0	0	4
CASA-17-129326	R-35b	REG	EPA:310.1	0	2
CASA-17-129326	R-35b	REG	EPA:350.1	0	1
CASA-17-129326	R-35b	REG	EPA:353.2	0	1
CASA-17-129326	R-35b	REG	EPA:365.4	0	1
CASA-17-129326	R-35b	REG	SM:A2340B	0	1
CASA-17-129326	R-35b	REG	SW-846:6010C	0	17
CASA-17-129326	R-35b	REG	SW-846:6020	0	11
CASA-17-129326	R-35b	REG	SW-846:6850	0	1
CASA-17-129332	R-35b	REG	EPA:245.2	0	1
CASA-17-129332	R-35b	REG	EPA:335.4	0	1
CASA-17-129332	R-35b	REG	EPA:351.2	0	1
CASA-17-129332	R-35b	REG	SW-846:9060	0	1
CASA-17-129338	R-11	FD	EPA:245.2	0	1
CASA-17-129338	R-11	FD	EPA:335.4	0	1
CASA-17-129338	R-11	FD	EPA:351.2	0	1
CASA-17-129338	R-11	FD	SW-846:9060	0	1
CASA-17-129339	R-11	FD	EPA:120.1	0	1
CASA-17-129339	R-11	FD	EPA:150.1	0	1
CASA-17-129339	R-11	FD	EPA:160.1	0	1
CASA-17-129339	R-11	FD	EPA:245.2	0	1
CASA-17-129339	R-11	FD	EPA:300.0	0	4
CASA-17-129339	R-11	FD	EPA:310.1	0	2
CASA-17-129339	R-11	FD	EPA:350.1	0	1
CASA-17-129339	R-11	FD	EPA:353.2	0	1
CASA-17-129339	R-11	FD	EPA:365.4	0	1
CASA-17-129339	R-11	FD	SM:A2340B	0	1
CASA-17-129339	R-11	FD	SW-846:6010C	0	17
CASA-17-129339	R-11	FD	SW-846:6020	0	11



## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CASA-17-129339	R-11	FD	SW-846:6850	0	1



March 10, 2017

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

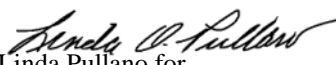
Re: LANL- WQH Water Samples  
Work Order: 416572  
SDG: 2017-1005

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on February 14, 2017, 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,

  
Linda Pullano for  
Valerie Davis  
Project Manager

Chain of Custody: 2017-1005  
Enclosures





**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 416572**  
**SDG: 2017-1005**



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# Case Narrative



**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 416572  
SDG # : 2017-1005**

**March 10, 2017**

**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 February 14, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
416572001	CASA-17-129323
416572002	CASA-17-129324
416572003	CASA-17-129338
416572004	CASA-17-129339
416572005	CAMO-17-129578
416572006	CAMO-17-129291
416572007	CAMO-17-129307
416572008	CASA-17-129326
416572009	CASA-17-129332
416572010	CAMO-17-129297
416572011	CAMO-17-129313

**Case Narrative**

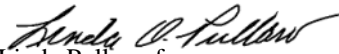
Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

**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.

  
Linda Pullano for  
Valerie Davis  
Project Manager



**List of current GEL Certifications as of 10 March 2017**

<b>State</b>	<b>Certification</b>
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
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	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122016-21
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404



# **Chain of Custody and Supporting Documentation**









## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <u>LANL</u>		SDG/AR/COC/Work Order: <u>416572</u>	
Received By: <u>EW</u>		Date Received: <u>2/14/17</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
COC/Samples marked as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0cpm</u>	
Classified Radioactive II or III by RSO?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?	
COC/Samples marked containing PCBs?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Package, COC, and/or Samples marked as beryllium or asbestos containing?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.	
Shipped as a DOT Hazardous?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hazard Class Shipped: UN#:	
Samples identified as Foreign Soil?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags <u>Blue ice</u> Dry ice None Other (describe) <u>See Below for Temps</u> *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials contain acid preservation?		<input checked="" type="checkbox"/>		(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
9 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?			<input checked="" type="checkbox"/>	Sample ID's affected: <u>Collect Time on NOPL60 - Samples is 10:03</u>
13 Number of containers received match number indicated on COC?			<input checked="" type="checkbox"/>	Sample ID's affected: <u>We rec'd one cont. for -297 and two for -313</u>
14 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16 Carrier and tracking number.				Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other  <u>5908 1761 7198-2°C</u> <u>5908 1761 7202-4°C</u> <u>5908 1761 7213-2°C</u>

Comments (Use Continuation Form if needed):

\*We rec'd two containers for Sample CAMO-17-129298 and one cont. for sample CAMO-17-129314 not on the COC's.

PM (or PMA) review: Initials AWDate 2/14/17Page 1 of 1



**Subject:** RE: 2017-1005

**From:** "Greene, Keith Robert" <kgreene@lanl.gov>

**Date:** 2/14/2017 12:57 PM

**To:** Valerie Davis <vsd@gel.com>

**CC:** LANL <LANL@amrad.com>, "team.DAVIS@GEL.COM" <team.DAVIS@GEL.COM>

Please log 298 as 297 and 314 as 313, txs

**From:** Valerie Davis [mailto:vsd@gel.com]

**Sent:** Tuesday, February 14, 2017 10:36 AM

**To:** Greene, Keith Robert <kgreene@lanl.gov>

**Cc:** LANL <LANL@amrad.com>; team.DAVIS@GEL.COM

**Subject:** 2017-1005

Keith,

For RN 2017-1005, we did not receive the Metals or GENINORG bottles for sample CAMO-17-129297, nor did we receive the Metals bottle for sample CAMO-17-129313. However, we did receive bottles for Metals and GENINORG for sample CAMO-17-129298, and a Metals bottle for sample CAMO-17-129314, which are not listed on the COC.

Please advise.

Thanks,

Valerie

--

**Valerie S. Davis**

**Project Manager**



Laboratories LLC

2040 Savage Road, Charleston, SC 29407 | PO Box 30712, Charleston, SC 29417

Office Direct: 843.769.7391 | Office Main: 843.556.8171 | Fax: 843.766.1178

E-Mail: [vsd@gel.com](mailto:vsd@gel.com) | Website: [www.gel.com](http://www.gel.com)

**Environmental | Engineering | Surveying | Analytical Testing**



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

SHIP DATL 13FEB17  
ACTWGT: 44.0 LB MAN  
CAD: 0014176/CAFE2916

BILL SENDER

LOS ALAMOS, NM 87545  
UNITED STATES US

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

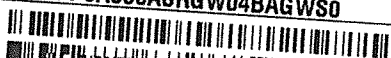
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538C1/338B/329B

CHARLESTON SC 29407

(843) 666-8171

REF: 6A000ASRGW04BAGWS0



FedEx  
Express



J1513150813011W

1 of 3  
TRK# 5908 1781 7198  
0201  
## MASTER ##

TUE - 14 FEB 10:30A  
PRIORITY OVERNIGHT

29407  
SC-US CHS

X7 CHSA



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

ACTWGT: 64.0 LB MAN  
CAD: 0014176/CAFE2916

BILL SENDER

LOS ALAMOS, NM 87545  
UNITED STATES US

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

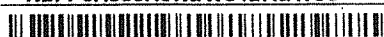
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538C1/338B/329B

CHARLESTON SC 29407

(843) 666-8171

REF: 6A000ASRGW04BAGWS0



FedEx  
Express



J1513150813011W

2 of 3  
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0263  
Mstr# 5908 1781 7198

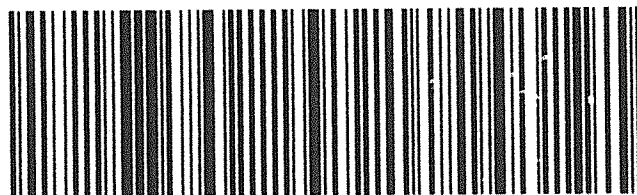
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TUE - 14 FEB 10:30A  
PRIORITY OVERNIGHT

29407  
SC-US CHS

X7 CHSA

Part # 156148V-434 RIT2 06/15 \*\*\*



538C1/338B/329B

SHIP DATE: 13FEB17  
ACTWGT: 25.0 LB MAN  
CAD: 0014176/CAFE2916

BILL SENDER

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

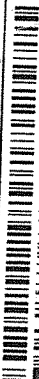
TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

2c

CHARLESTON SC 29407

(843) 666-8171

REF: 6A000ASRGW04BAGWS0



FedEx  
Express



J1513150813011W

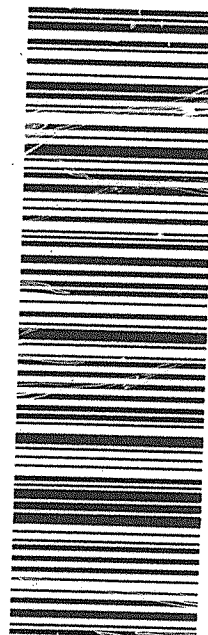
TUE - 14 FEB 10:30A  
PRIORITY OVERNIGHT

3 of 3  
MPS# 5908 1781 7213  
0263  
Mstr# 5903 1781 7198

0201

X7 CHSA

29407  
SC-US CHS



Part # 156148V-434 RIT2 03/15 \*\*\*



# **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 #: 2017-1005  
Work Order #: 416572**

**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: SW-846:6850

Prep Method: SW-846:6850

Analytical Batch Number: 1640036

Prep Batch Number: 1640034

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
416572001	416572001 (CASA-17-129323)
416572004	416572004 (CASA-17-129339)
416572005	416572005 (CAMO-17-129578)
416572006	416572006 (CAMO-17-129291)
416572008	416572008 (CASA-17-129326)
416572010	416572010 (CAMO-17-129297)
1203729927	Interference Check Sample (ICS)
1203729923	Method Blank (MB)
1203729924	Laboratory Control Sample (LCS)
1203729925	416572001(CASA-17-129323) Matrix Spike (MS)
1203729926	416572001(CASA-17-129323) 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# 14.

## **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 416572001 (CASA-17-129323) 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.

### **Internal Standard Area Acceptance**

The internal 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 DOD QSM 5.0, has been used. In addition to the isotopic ratio, the



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

### **Technical Information**

#### **Holding Time Specifications**

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

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

All procedures were performed as stated in the SOP.

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

#### **Sample Re-extraction/Re-analysis**

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

### **Miscellaneous Information**

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

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

#### **Manual Integrations**

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

#### **Method Comments**

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

#### **Additional Comments**

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

#### **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: 2017-1005 GEL Work Order: 416572

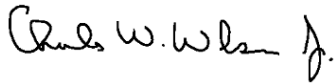
#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC 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: Charles Wilson

Date: 24 FEB 2017

Title: Analyst II



# **Sample Data Summary**



## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1640034Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-129323Date Received: 14-FEB-17GEL Job No (SDG): 2017-1005GEL Sample ID: 416572001Date Filtered: 16-FEB-17Injection 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	0.780	ug/L		1	16-FEB-17 17:53	per0216017a
	Perchlorate Isotope Ratio			3.03			1	16-FEB-17 17:53	per0216017a
14797-73-0	Perchlorate-101	.05	.2	0.782	ug/L		1	16-FEB-17 17:53	per0216017a
	Perchlorate-O(18)			0.520	ug/L		1	16-FEB-17 17:53	per0216017a

^ 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: 1640034Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-129339Date Received: 14-FEB-17GEL Job No (SDG): 2017-1005GEL Sample ID: 416572004Date Filtered: 16-FEB-17Injection 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	0.802	ug/L		1	16-FEB-17 18:15	per0216020a
	Perchlorate Isotope Ratio			3.11			1	16-FEB-17 18:15	per0216020a
14797-73-0	Perchlorate-101	.05	.2	0.783	ug/L		1	16-FEB-17 18:15	per0216020a
	Perchlorate-O(18)			0.502	ug/L		1	16-FEB-17 18:15	per0216020a

^ 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: 1640034Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-129578Date Received: 14-FEB-17GEL Job No (SDG): 2017-1005GEL Sample ID: 416572005Date Filtered: 16-FEB-17Injection 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	16-FEB-17 18:23	per0216021a
	Perchlorate Isotope Ratio						1	16-FEB-17 18:23	per0216021a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	16-FEB-17 18:23	per0216021a
	Perchlorate-O(18)			0.484	ug/L		1	16-FEB-17 18:23	per0216021a

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

\*Concentration =

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



## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

CAMO-17-129291Lab Code: GELDate Received: 14-FEB-17Instrument: LCMSMSGEL Job No (SDG): 2017-1005Method: SW846 6850 ModifiedGEL Sample ID: 416572006Matrix: WATERDate Filtered: 16-FEB-17Extraction Batch ID: 1640034Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL%Solids:     Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.422	ug/L		1	16-FEB-17 18:30	per0216022a
	Perchlorate Isotope Ratio			3.15			1	16-FEB-17 18:30	per0216022a
14797-73-0	Perchlorate-101	.05	.2	0.407	ug/L		1	16-FEB-17 18:30	per0216022a
	Perchlorate-O(18)			0.509	ug/L		1	16-FEB-17 18:30	per0216022a

^ 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: 1640034Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-129326Date Received: 14-FEB-17GEL Job No (SDG): 2017-1005GEL Sample ID: 416572008Date Filtered: 16-FEB-17Injection 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	0.574	ug/L		1	16-FEB-17 19:00	per0216026a
	Perchlorate Isotope Ratio			3.04			1	16-FEB-17 19:00	per0216026a
14797-73-0	Perchlorate-101	.05	.2	0.572	ug/L		1	16-FEB-17 19:00	per0216026a
	Perchlorate-O(18)			0.521	ug/L		1	16-FEB-17 19:00	per0216026a

^ 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: 1640034Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-129297Date Received: 14-FEB-17GEL Job No (SDG): 2017-1005GEL Sample ID: 416572010Date Filtered: 16-FEB-17Injection 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	0.455	ug/L		1	16-FEB-17 19:08	per0216027a
	Perchlorate Isotope Ratio			2.95			1	16-FEB-17 19:08	per0216027a
14797-73-0	Perchlorate-101	.05	.2	0.467	ug/L		1	16-FEB-17 19:08	per0216027a
	Perchlorate-O(18)			0.493	ug/L		1	16-FEB-17 19:08	per0216027a

^ 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):** 2017-1005

**Extract Batch Code:** 1640034

**Date Filtered:** 16-FEB-17

**Matrix:** WATER

**Sample ID:** 1203729924

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.207	ug/L	103		85 - 115
Perchlorate Isotope Ratio		2.96				-
Perchlorate-101	0.200	.212	ug/L	106		85 - 115
Perchlorate-O(18)		.482	ug/L			-

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



### Perchlorate Spike/Spike Duplicate Summary

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**Lab Name:** General Engineering Laboratories

**Lab Code:** GEL

**GEL Job No (SDG):** 2017-1005

**Extract Batch Code:** 1640034

**Date Extracted:** 16-FEB-17

**GEL MS/PS ID:** 1203729925

**Client ID:** CASA-17-129323

**GEL MSD/PSD ID:** 1203729926

**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	0.780	ug/L	1.00	112	.977	98	3	30	75 - 125
Perchlorate Isotope Ratio	0	3.03		3.04		3.03		1		-
Perchlorate-101	0.200	0.782	ug/L	1.00	109	.98	99	2	30	75 - 125
Perchlorate-O(18)	0	0.520	ug/L	0.502		.515		2		-

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



# Quality Control Data



## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1640034Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 16-FEB-17GEL Job No (SDG): 2017-1005GEL Sample ID: 1203729923Date Filtered: 16-FEB-17Injection 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	16-FEB-17 17:23	per0216013a
	Perchlorate Isotope Ratio						1	16-FEB-17 17:23	per0216013a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	16-FEB-17 17:23	per0216013a
	Perchlorate-O(18)			0.490	ug/L		1	16-FEB-17 17:23	per0216013a

^ 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: 1640034Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 16-FEB-17GEL Job No (SDG): 2017-1005GEL Sample ID: 1203729924Date Filtered: 16-FEB-17Injection 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	0.207	ug/L		1	16-FEB-17 17:31	per0216014a
	Perchlorate Isotope Ratio			2.96			1	16-FEB-17 17:31	per0216014a
14797-73-0	Perchlorate-101	.05	.2	0.212	ug/L		1	16-FEB-17 17:31	per0216014a
	Perchlorate-O(18)			0.482	ug/L		1	16-FEB-17 17:31	per0216014a

^ 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: 1640034Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1005GEL Sample ID: 1203729927Date Filtered: 16-FEB-17Injection 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	0.212	ug/L		1	16-FEB-17 17:38	per0216015a
	Perchlorate Isotope Ratio			3.13			1	16-FEB-17 17:38	per0216015a
14797-73-0	Perchlorate-101	.05	.2	0.206	ug/L		1	16-FEB-17 17:38	per0216015a
	Perchlorate-O(18)			0.521	ug/L		1	16-FEB-17 17:38	per0216015a

^ 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: 1640034Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-129323MSDate Received: 14-FEB-17GEL Job No (SDG): 2017-1005GEL Sample ID: 1203729925Date Filtered: 16-FEB-17Injection 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	1.00	ug/L		1	16-FEB-17 18:00	per0216018a
	Perchlorate Isotope Ratio			3.04			1	16-FEB-17 18:00	per0216018a
14797-73-0	Perchlorate-101	.05	.2	1.00	ug/L		1	16-FEB-17 18:00	per0216018a
	Perchlorate-O(18)			0.502	ug/L		1	16-FEB-17 18:00	per0216018a

^ 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: 1640034Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-129323MSDDate Received: 14-FEB-17GEL Job No (SDG): 2017-1005GEL Sample ID: 1203729926Date Filtered: 16-FEB-17Injection 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	0.977	ug/L		1	16-FEB-17 18:08	per0216019a
	Perchlorate Isotope Ratio			3.03			1	16-FEB-17 18:08	per0216019a
14797-73-0	Perchlorate-101	.05	.2	0.980	ug/L		1	16-FEB-17 18:08	per0216019a
	Perchlorate-O(18)			0.515	ug/L		1	16-FEB-17 18:08	per0216019a

^ 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 #: 2017-1005**  
**Work Order #: 416572**

<b>Sample ID</b>	<b>Client ID</b>
416572001	CASA-17-129323
416572002	CASA-17-129324
416572003	CASA-17-129338
416572004	CASA-17-129339
416572005	CAMO-17-129578
416572006	CAMO-17-129291
416572007	CAMO-17-129307
416572008	CASA-17-129326
416572009	CASA-17-129332
416572010	CAMO-17-129297
416572011	CAMO-17-129313
1203728150	Method Blank (MB) <b>ICP</b>
1203728512	Method Blank (MB) <b>ICP</b>
1203728151	Laboratory Control Sample (LCS)
1203728513	Laboratory Control Sample (LCS)
1203728154	416562001(CASA-17-129325L) Serial Dilution (SD)
1203728516	416572010(CAMO-17-129297L) Serial Dilution (SD)
1203728152	416562001(CASA-17-129325D) Sample Duplicate (DUP)
1203728514	416572010(CAMO-17-129297D) Sample Duplicate (DUP)
1203728153	416562001(CASA-17-129325S) Matrix Spike (MS)
1203728515	416572010(CAMO-17-129297S) Matrix Spike (MS)
1203728189	Method Blank (MB) <b>ICP-MS</b>
1203728517	Method Blank (MB) <b>ICP-MS</b>
1203728190	Laboratory Control Sample (LCS)
1203728518	Laboratory Control Sample (LCS)
1203728193	416562001(CASA-17-129325L) Serial Dilution (SD)
1203728521	416572010(CAMO-17-129297L) Serial Dilution (SD)
1203728191	416562001(CASA-17-129325D) Sample Duplicate (DUP)
1203728519	416572010(CAMO-17-129297D) Sample Duplicate (DUP)
1203728192	416562001(CASA-17-129325S) Matrix Spike (MS)
1203728520	416572010(CAMO-17-129297S) Matrix Spike (MS)
1203728805	Method Blank (MB) <b>CVAA</b>
1203728806	Laboratory Control Sample (LCS)
1203728811	416562001(CASA-17-129325L) Serial Dilution (SD)
1203728807	416562001(CASA-17-129325D) Sample Duplicate (DUP)
1203728809	416562001(CASA-17-129325S) Matrix Spike (MS)

**Sample Analysis**

Samples 416572001,002,003,004,005,006,007,008,009,010 and 011 in this SDG were analyzed for metals and mercury on an "as received" basis.

**Method/Analysis Information**



<b>Analytical Batch:</b>	1639294, 1639457, 1639308, 1639459, 1639580 and 1646837
<b>Prep Batch :</b>	1639293, 1639456, 1639307, 1639458 and 1639579
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 28, GL-MA-E-006 REV# 13, GL-MA-E-014 REV# 29, GL-MA-E-010 REV# 33 and GL-GC-E-107 REV# 10
<b>Analytical Method:</b>	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
<b>Prep Method :</b>	SW846 3005A and EPA 245.1/245.2 Prep

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

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

### **System Configuration**

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

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

The Metals analysis-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 or 6010D 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. 416572001 (CASA-17-129323), 416572004 (CASA-17-129339), 416572005 (CAMO-17-129578), 416572006 (CAMO-17-129291) and 416572008 (CASA-17-129326)-ICP. The PQL standard recoveries for SW846 6010C or 6010D 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. 416572010 (CAMO-17-129297)-ICP.

#### **ICSA/ICSAB Statement**

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria. However, the ICSA contained analyte concentrations which are verified trace impurities indigenous to the purchased standard.

#### **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: 416562001 (CASA-17-129325)-ICP, ICP-MS and CVAA and 416572010 (CAMO-17-129297)-ICP and ICP-MS.

**Matrix Spike (MS/MSD) Recovery Statement**

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

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

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

**Serial Dilution % Difference Statement**

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

Sample	Analyte	Value
1203728516 (CAMO-17-129297SDILT)	Sodium	16.8 *(0%-10%)

**Technical Information****Holding Time Specifications**

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

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Preparation Information**

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



## **Miscellaneous Information**

### **Electronic Packaging Comment**

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

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

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

A Data exception report (DER) was generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) 1606588 was generated for sample 1203728516 (CAMO-17-129297SDILT) in this SDG/batch.

### **Additional Comments**

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

Hardness = 2.497 (Ca) + 4.118 (Mg)

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

### **Certification Statement**

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



## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2017-1005 GEL Work Order: 416572

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

- \* A quality control analyte recovery is outside of specified acceptance criteria
- E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC 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: 13 MAR 2017

Title: Data Validator



# **Sample Data Summary**



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572001**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CASA-17-129323**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:26	021617W2-13	1639580



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

SDG No: 2017-1005

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 416572001

BASIS: As Received

DATE COLLECTED 09-FEB-17

CLIENT ID: CASA-17-129323

LEVEL: Low

DATE RECEIVED 14-FEB-17

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	02/16/17 14:41	021617B-6	1639294
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	03/09/17 06:29	170308-11	1639308
7440-38-2	Arsenic	2.63	ug/L	J	1.7	5	5	1	MS	PRB	03/08/17 18:37	170308-7	1639308
7440-39-3	Barium	38.3	ug/L		1	5	5	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7440-42-8	Boron	26.3	ug/L	J	15	50	50	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	03/08/17 18:37	170308-7	1639308
7440-70-2	Calcium	20800	ug/L		50	200	200	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7440-47-3	Chromium	16.3	ug/L		3	10	10	1	MS	PRB	03/08/17 18:37	170308-7	1639308
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	02/17/17 15:23	021717-4	1639294
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	03/09/17 02:06	170308-10	1639308
7439-95-4	Magnesium	5800	ug/L		110	300	300	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7439-98-7	Molybdenum	2.77	ug/L		0.3	0.5	0.5	1	MS	PRB	03/08/17 18:37	170308-7	1639308
7440-02-0	Nickel	2	ug/L	U	0.5	2	2	1	MS	PRB	03/08/17 18:37	170308-7	1639308
7440-09-7	Potassium	1310	ug/L		50	150	150	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	03/08/17 18:37	170308-7	1639308
7631-86-9	Silica	69800	ug/L		53	213	213	1	P	HSC	02/17/17 15:23	021717-4	1639294
7440-22-4	Silver	1	ug/L	U	0.4	1	1	1	MS	PRB	03/08/17 18:37	170308-7	1639308
7440-23-5	Sodium	12500	ug/L	E	100	300	300	1	P	HSC	02/17/17 15:23	021717-4	1639294
7440-24-6	Strontium	82.2	ug/L		1	5	5	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	03/09/17 02:06	170308-10	1639308
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7440-61-1	Uranium	0.762	ug/L		0.067	0.2	0.2	1	MS	PRB	03/09/17 12:59	170309-12	1639308
7440-62-2	Vanadium	6.17	ug/L		1	5	5	1	P	HSC	02/16/17 14:41	021617B-6	1639294
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	02/16/17 14:41	021617B-6	1639294



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 416572001**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CASA-17-129323**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	75.9	mg/L		0.453	1.24	1.24	1		TXT1	03/13/17 12:50		1646837

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639294	1639293	SW846 3005A	50	mL	50	mL	02/14/17	CXW4
1639308	1639307	SW846 3005A	50	mL	50	mL	02/14/17	CXW4
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

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



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572002**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CASA-17-129324**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:28	021617W2-13	1639580

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

AV EPA 245.1/245.2



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572003**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CASA-17-129338**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:29	021617W2-13	1639580

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

AV EPA 245.1/245.2



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572004**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CASA-17-129339**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:31	021617W2-13	1639580



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

SDG No: 2017-1005

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 416572004

BASIS: As Received

DATE COLLECTED 09-FEB-17

CLIENT ID: CASA-17-129339

LEVEL: Low

DATE RECEIVED 14-FEB-17

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	02/16/17 14:44	021617B-6	1639294
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	03/09/17 06:31	170308-11	1639308
7440-38-2	Arsenic	2.51	ug/L	J	1.7	5	5	1	MS	PRB	03/08/17 18:40	170308-7	1639308
7440-39-3	Barium	39.1	ug/L		1	5	5	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7440-42-8	Boron	26.5	ug/L	J	15	50	50	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	03/08/17 18:40	170308-7	1639308
7440-70-2	Calcium	21000	ug/L		50	200	200	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7440-47-3	Chromium	16.8	ug/L		3	10	10	1	MS	PRB	03/08/17 18:40	170308-7	1639308
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	02/17/17 15:26	021717-4	1639294
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	03/09/17 02:09	170308-10	1639308
7439-95-4	Magnesium	5930	ug/L		110	300	300	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7439-98-7	Molybdenum	2.24	ug/L		0.3	0.5	0.5	1	MS	PRB	03/08/17 18:40	170308-7	1639308
7440-02-0	Nickel	2	ug/L	U	0.5	2	2	1	MS	PRB	03/08/17 18:40	170308-7	1639308
7440-09-7	Potassium	1320	ug/L		50	150	150	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	03/08/17 18:40	170308-7	1639308
7631-86-9	Silica	69100	ug/L		53	213	213	1	P	HSC	02/17/17 15:26	021717-4	1639294
7440-22-4	Silver	1	ug/L	U	0.4	1	1	1	MS	PRB	03/08/17 18:40	170308-7	1639308
7440-23-5	Sodium	12500	ug/L	E	100	300	300	1	P	HSC	02/17/17 15:26	021717-4	1639294
7440-24-6	Strontium	83	ug/L		1	5	5	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	03/09/17 02:09	170308-10	1639308
7440-31-5	Tin	3.94	ug/L	J	2.5	10	10	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7440-61-1	Uranium	0.769	ug/L		0.067	0.2	0.2	1	MS	PRB	03/09/17 13:01	170309-12	1639308
7440-62-2	Vanadium	6.15	ug/L		1	5	5	1	P	HSC	02/16/17 14:44	021617B-6	1639294
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	02/16/17 14:44	021617B-6	1639294



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 416572004**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CASA-17-129339**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	77	mg/L		0.453	1.24	1.24	1		TXT1	03/13/17 12:50		1646837

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639294	1639293	SW846 3005A	50	mL	50	mL	02/14/17	CXW4
1639308	1639307	SW846 3005A	50	mL	50	mL	02/14/17	CXW4
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

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



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572005**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CAMO-17-129578**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:33	021617W2-13	1639580



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

SDG No: 2017-1005

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 416572005

BASIS: As Received

DATE COLLECTED 09-FEB-17

CLIENT ID: CAMO-17-129578

LEVEL: Low

DATE RECEIVED 14-FEB-17

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	02/16/17 14:48	021617B-6	1639294
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	03/09/17 06:32	170308-11	1639308
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	PRB	03/08/17 18:43	170308-7	1639308
7440-39-3	Barium	5	ug/L	U	1	5	5	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	03/08/17 18:43	170308-7	1639308
7440-70-2	Calcium	200	ug/L	U	50	200	200	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7440-47-3	Chromium	10	ug/L	U	3	10	10	1	MS	PRB	03/08/17 18:43	170308-7	1639308
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	02/17/17 15:30	021717-4	1639294
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	03/09/17 02:12	170308-10	1639308
7439-95-4	Magnesium	300	ug/L	U	110	300	300	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7439-98-7	Molybdenum	0.50	ug/L	U	0.3	0.5	0.5	1	MS	PRB	03/08/17 18:43	170308-7	1639308
7440-02-0	Nickel	2	ug/L	U	0.5	2	2	1	MS	PRB	03/08/17 18:43	170308-7	1639308
7440-09-7	Potassium	150	ug/L	U	50	150	150	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	03/08/17 18:43	170308-7	1639308
7631-86-9	Silica	213	ug/L	U	53	213	213	1	P	HSC	02/17/17 15:30	021717-4	1639294
7440-22-4	Silver	1	ug/L	U	0.4	1	1	1	MS	PRB	03/08/17 18:43	170308-7	1639308
7440-23-5	Sodium	300	ug/L	UE	100	300	300	1	P	HSC	02/17/17 15:30	021717-4	1639294
7440-24-6	Strontium	5	ug/L	U	1	5	5	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	03/09/17 02:12	170308-10	1639308
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7440-61-1	Uranium	0.20	ug/L	U	0.067	0.2	0.2	1	MS	PRB	03/09/17 13:02	170309-12	1639308
7440-62-2	Vanadium	5	ug/L	U	1	5	5	1	P	HSC	02/16/17 14:48	021617B-6	1639294
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	02/16/17 14:48	021617B-6	1639294



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 416572005**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CAMO-17-129578**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	1.24	mg/L	U	0.453	1.24	1.24	1		TXT1	03/13/17 12:50		1646837

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639294	1639293	SW846 3005A	50	mL	50	mL	02/14/17	CXW4
1639308	1639307	SW846 3005A	50	mL	50	mL	02/14/17	CXW4
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

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



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572006**BASIS:** As Received**DATE COLLECTED** 10-FEB-17**CLIENT ID:** CAMO-17-129291**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:34	021617W2-13	1639580



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

SDG No: 2017-1005

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 416572006

BASIS: As Received

DATE COLLECTED 10-FEB-17

CLIENT ID: CAMO-17-129291

LEVEL: Low

DATE RECEIVED 14-FEB-17

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	02/16/17 14:51	021617B-6	1639294
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	03/09/17 06:34	170308-11	1639308
7440-38-2	Arsenic	2.09	ug/L	J	1.7	5	5	1	MS	PRB	03/08/17 18:46	170308-7	1639308
7440-39-3	Barium	24.3	ug/L		1	5	5	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	03/08/17 18:46	170308-7	1639308
7440-70-2	Calcium	13000	ug/L		50	200	200	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7440-47-3	Chromium	4.34	ug/L	J	3	10	10	1	MS	PRB	03/08/17 18:46	170308-7	1639308
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	02/17/17 15:33	021717-4	1639294
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	03/09/17 02:15	170308-10	1639308
7439-95-4	Magnesium	3300	ug/L		110	300	300	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7439-98-7	Molybdenum	1.03	ug/L		0.3	0.5	0.5	1	MS	PRB	03/08/17 18:46	170308-7	1639308
7440-02-0	Nickel	2	ug/L	U	0.5	2	2	1	MS	PRB	03/08/17 18:46	170308-7	1639308
7440-09-7	Potassium	1160	ug/L		50	150	150	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	03/08/17 18:46	170308-7	1639308
7631-86-9	Silica	63900	ug/L		53	213	213	1	P	HSC	02/17/17 15:33	021717-4	1639294
7440-22-4	Silver	1	ug/L	U	0.4	1	1	1	MS	PRB	03/08/17 18:46	170308-7	1639308
7440-23-5	Sodium	10000	ug/L	E	100	300	300	1	P	HSC	02/17/17 15:33	021717-4	1639294
7440-24-6	Strontium	47.7	ug/L		1	5	5	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	03/09/17 02:15	170308-10	1639308
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7440-61-1	Uranium	0.436	ug/L		0.067	0.2	0.2	1	MS	PRB	03/09/17 13:04	170309-12	1639308
7440-62-2	Vanadium	4.39	ug/L	J	1	5	5	1	P	HSC	02/16/17 14:51	021617B-6	1639294
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	02/16/17 14:51	021617B-6	1639294



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 416572006**BASIS:** As Received**DATE COLLECTED** 10-FEB-17**CLIENT ID:** CAMO-17-129291**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	46	mg/L		0.453	1.24	1.24	1		TXT1	03/13/17 12:50		1646837

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639294	1639293	SW846 3005A	50	mL	50	mL	02/14/17	CXW4
1639308	1639307	SW846 3005A	50	mL	50	mL	02/14/17	CXW4
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

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



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572007**BASIS:** As Received**DATE COLLECTED** 10-FEB-17**CLIENT ID:** CAMO-17-129307**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:39	021617W2-13	1639580

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

AV EPA 245.1/245.2



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572008**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CASA-17-129326**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:41	021617W2-13	1639580



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

SDG No: 2017-1005

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 416572008

BASIS: As Received

DATE COLLECTED 09-FEB-17

CLIENT ID: CASA-17-129326

LEVEL: Low

DATE RECEIVED 14-FEB-17

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	02/16/17 14:54	021617B-6	1639294
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	03/09/17 06:35	170308-11	1639308
7440-38-2	Arsenic	2.93	ug/L	J	1.7	5	5	1	MS	PRB	03/08/17 18:49	170308-7	1639308
7440-39-3	Barium	36.6	ug/L		1	5	5	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7440-42-8	Boron	22.9	ug/L	J	15	50	50	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	03/08/17 18:49	170308-7	1639308
7440-70-2	Calcium	14400	ug/L		50	200	200	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7440-47-3	Chromium	5.1	ug/L	J	3	10	10	1	MS	PRB	03/08/17 18:49	170308-7	1639308
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	02/17/17 15:36	021717-4	1639294
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	03/09/17 02:18	170308-10	1639308
7439-95-4	Magnesium	4670	ug/L		110	300	300	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7439-98-7	Molybdenum	1.38	ug/L		0.3	0.5	0.5	1	MS	PRB	03/08/17 18:49	170308-7	1639308
7440-02-0	Nickel	3.03	ug/L		0.5	2	2	1	MS	PRB	03/08/17 18:49	170308-7	1639308
7440-09-7	Potassium	1820	ug/L		50	150	150	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	03/08/17 18:49	170308-7	1639308
7631-86-9	Silica	74000	ug/L		53	213	213	1	P	HSC	02/17/17 15:36	021717-4	1639294
7440-22-4	Silver	1	ug/L	U	0.4	1	1	1	MS	PRB	03/08/17 18:49	170308-7	1639308
7440-23-5	Sodium	11500	ug/L	E	100	300	300	1	P	HSC	02/17/17 15:36	021717-4	1639294
7440-24-6	Strontium	59.9	ug/L		1	5	5	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	03/09/17 02:18	170308-10	1639308
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7440-61-1	Uranium	0.291	ug/L		0.067	0.2	0.2	1	MS	PRB	03/09/17 13:06	170309-12	1639308
7440-62-2	Vanadium	12.4	ug/L		1	5	5	1	P	HSC	02/16/17 14:54	021617B-6	1639294
7440-66-6	Zinc	8.4	ug/L	J	3.3	10	10	1	P	HSC	02/16/17 14:54	021617B-6	1639294



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 416572008**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CASA-17-129326**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	55.2	mg/L		0.453	1.24	1.24	1		TXT1	03/13/17 12:50		1646837

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639294	1639293	SW846 3005A	50	mL	50	mL	02/14/17	CXW4
1639308	1639307	SW846 3005A	50	mL	50	mL	02/14/17	CXW4
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

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



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572009**BASIS:** As Received**DATE COLLECTED** 09-FEB-17**CLIENT ID:** CASA-17-129332**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:43	021617W2-13	1639580

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

AV EPA 245.1/245.2



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572010**BASIS:** As Received**DATE COLLECTED** 10-FEB-17**CLIENT ID:** CAMO-17-129297**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:44	021617W2-13	1639580



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

SDG No: 2017-1005

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 416572010

BASIS: As Received

DATE COLLECTED 10-FEB-17

CLIENT ID: CAMO-17-129297

LEVEL: Low

DATE RECEIVED 14-FEB-17

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	02/17/17 07:22	021717-1	1639457
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	03/09/17 06:45	170308-11	1639459
7440-38-2	Arsenic	1.71	ug/L	J	1.7	5	5	1	MS	PRB	03/08/17 19:08	170308-7	1639459
7440-39-3	Barium	19.5	ug/L		1	5	5	1	P	HSC	02/17/17 07:22	021717-1	1639457
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	02/17/17 07:22	021717-1	1639457
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	HSC	02/17/17 07:22	021717-1	1639457
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	03/08/17 19:08	170308-7	1639459
7440-70-2	Calcium	12000	ug/L		50	200	200	1	P	HSC	02/17/17 07:22	021717-1	1639457
7440-47-3	Chromium	13.5	ug/L		3	10	10	1	MS	PRB	03/08/17 19:08	170308-7	1639459
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	02/17/17 07:22	021717-1	1639457
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	02/17/17 07:22	021717-1	1639457
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	02/17/17 07:22	021717-1	1639457
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	03/09/17 02:37	170308-10	1639459
7439-95-4	Magnesium	3470	ug/L		110	300	300	1	P	HSC	02/17/17 07:22	021717-1	1639457
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	02/17/17 07:22	021717-1	1639457
7439-98-7	Molybdenum	0.906	ug/L		0.3	0.5	0.5	1	MS	PRB	03/08/17 19:08	170308-7	1639459
7440-02-0	Nickel	2	ug/L	U	0.5	2	2	1	MS	PRB	03/08/17 19:08	170308-7	1639459
7440-09-7	Potassium	1040	ug/L		50	150	150	1	P	HSC	02/20/17 13:03	022017-5	1639457
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	03/08/17 19:08	170308-7	1639459
7631-86-9	Silica	67900	ug/L		53	213	213	1	P	HSC	02/20/17 13:03	022017-5	1639457
7440-22-4	Silver	1	ug/L	U	0.4	1	1	1	MS	PRB	03/08/17 19:08	170308-7	1639459
7440-23-5	Sodium	9700	ug/L	E	100	300	300	1	P	HSC	02/20/17 13:03	022017-5	1639457
7440-24-6	Strontium	50.6	ug/L		1	5	5	1	P	HSC	02/17/17 07:22	021717-1	1639457
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	03/09/17 02:37	170308-10	1639459
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	02/17/17 07:22	021717-1	1639457
7440-61-1	Uranium	0.454	ug/L		0.067	0.2	0.2	1	MS	PRB	03/09/17 13:17	170309-12	1639459
7440-62-2	Vanadium	4.18	ug/L	J	1	5	5	1	P	HSC	02/17/17 07:22	021717-1	1639457
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	02/17/17 07:22	021717-1	1639457



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 416572010**BASIS:** As Received**DATE COLLECTED** 10-FEB-17**CLIENT ID:** CAMO-17-129297**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	44.2	mg/L		0.453	1.24	1.24	1		TXT1	03/13/17 12:50		1646837

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639457	1639456	SW846 3005A	50	mL	50	mL	02/15/17	SXW1
1639459	1639458	SW846 3005A	50	mL	50	mL	02/15/17	SXW1
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

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



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

**SDG No:** 2017-1005**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416572011**BASIS:** As Received**DATE COLLECTED** 10-FEB-17**CLIENT ID:** CAMO-17-129313**LEVEL:** Low**DATE RECEIVED** 14-FEB-17**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	02/16/17 11:46	021617W2-13	1639580

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1639580	1639579	EPA 245.1/245.2 Prep	20	mL	20	mL	02/15/17	AXS5

**\*Analytical Methods:**

AV EPA 245.1/245.2



# **Quality Control Summary**



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

SDG NO. 2017-1005

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>
1203728150	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
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Calcium	50	ug/L	+/-200	U	P	50	200
	Boron	15	ug/L	+/-50	U	P	15	50
	Copper	3	ug/L	+/-10	U	P	3	10
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Potassium	-58.7	ug/L	+/-150	J	P	50	150
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Strontium	1	ug/L	+/-5	U	P	1	5
	Sodium	100	ug/L	+/-300	U	P	100	300
	Silica	53	ug/L	+/-213	U	P	53	213
	Manganese	2	ug/L	+/-10	U	P	2	10
	Iron	30	ug/L	+/-100	U	P	30	100
1203728189	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	1.7	ug/L	+/-5	U	MS	1.7	5
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Molybdenum	0.3	ug/L	+/-0.5	U	MS	0.3	0.5
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
	Silver	0.4	ug/L	+/-1	U	MS	0.4	1
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
1203728512	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Aluminum	68	ug/L	+/-200	U	P	68	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Calcium	50	ug/L	+/-200	U	P	50	200
	Copper	3	ug/L	+/-10	U	P	3	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10



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

SDG NO. 2017-1005

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>
	Strontium	1	ug/L	+/-5	U	P	1	5
	Sodium	115	ug/L	+/-300	J	P	100	300
	Silica	53	ug/L	+/-213	U	P	53	213
	Potassium	50	ug/L	+/-150	U	P	50	150
	Manganese	2	ug/L	+/-10	U	P	2	10
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Iron	30	ug/L	+/-100	U	P	30	100
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Barium	1	ug/L	+/-5	U	P	1	5
1203728517								
	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	1.7	ug/L	+/-5	U	MS	1.7	5
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.3	ug/L	+/-0.5	U	MS	0.3	0.5
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.4	ug/L	+/-1	U	MS	0.4	1
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203728805								
	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

## \*Analytical Methods:

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



## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-1005 Client ID: CASA-17-129325S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 416562001 Spike ID: 1203728153

<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	4600		132	J	5000	89.3		P
Barium	ug/L	75-125	787		338		500	89.9		P
Beryllium	ug/L	75-125	464		1	U	500	92.8		P
Boron	ug/L	75-125	522		37.1	J	500	97.1		P
Calcium	ug/L		25900		21200		5000	93	N/A	P
Cobalt	ug/L	75-125	455		1	U	500	90.9		P
Copper	ug/L	75-125	480		3	U	500	95.9		P
Iron	ug/L	75-125	4730		33	J	5000	94		P
Magnesium	ug/L	75-125	10300		5690		5000	91.3		P
Manganese	ug/L	75-125	451		2	U	500	90.1		P
Potassium	ug/L	75-125	8480		3620		5000	97.2		P
Silica	ug/L		86500		77300		10700	86.2	N/A	P
Sodium	ug/L	75-125	22900		18300		5000	91.6		P
Strontium	ug/L	75-125	591		159		500	86.3		P
Tin	ug/L	75-125	464		2.66	J	500	92.2		P
Vanadium	ug/L	75-125	480		15.2		500	93		P
Zinc	ug/L	75-125	443		3.3	U	500	88.6		P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-1005 Client ID: CASA-17-129325S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 416562001 Spike ID: 1203728192

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Cadmium	ug/L	75-125	51.8		0.3	U	50	104		MS
Chromium	ug/L	75-125	58.5		4.59	J	50	108		MS
Lead	ug/L	75-125	47.9		0.5	U	50	95.7		MS
Molybdenum	ug/L	75-125	53.7		1.14		50	105		MS
Nickel	ug/L	75-125	58.4		6.49		50	104		MS
Selenium	ug/L	75-125	48.4		2	U	50	94.3		MS
Silver	ug/L	75-125	51.5		0.4	U	50	103		MS
Thallium	ug/L	75-125	46.6		0.6	U	50	92.6		MS
Uranium	ug/L	75-125	51.2		0.61		50	101		MS
Antimony	ug/L	75-125	51.8		1	U	50	103		MS
Arsenic	ug/L	75-125	53.2		3.37	J	50	99.7		MS

## \*Analytical Methods:

MS SW846 3005A/6020A



## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-1005 Client ID CAMO-17-129297S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 416572010 Spike ID: 1203728515

<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	4690		68	U	5000	93.6		P
Barium	ug/L	75-125	500		19.5		500	96		P
Beryllium	ug/L	75-125	487		1	U	500	97.3		P
Boron	ug/L	75-125	521		15	U	500	102		P
Calcium	ug/L	75-125	16700		12000		5000	93.9		P
Cobalt	ug/L	75-125	480		1	U	500	95.9		P
Copper	ug/L	75-125	500		3	U	500	100		P
Iron	ug/L	75-125	5020		30	U	5000	100		P
Magnesium	ug/L	75-125	8330		3470		5000	97.3		P
Manganese	ug/L	75-125	479		2	U	500	95.7		P
Potassium	ug/L	75-125	6210		1040		5000	103		P
Silica	ug/L		81000		67900		10700	123	N/A	P
Sodium	ug/L	75-125	15200		9700		5000	109		P
Strontium	ug/L	75-125	518		50.6		500	93.4		P
Tin	ug/L	75-125	488		2.5	U	500	97.5		P
Vanadium	ug/L	75-125	491		4.18	J	500	97.3		P
Zinc	ug/L	75-125	471		3.3	U	500	94.1		P

\*Analytical Methods:

P SW846 3005A/6010C



## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-1005

Client ID: CAMO-17-129297S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 416572010

Spike ID: 1203728520

<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	49.1		1	U	50	98.2		MS
Arsenic	ug/L	75-125	50.1		1.71	J	50	96.8		MS
Cadmium	ug/L	75-125	52.1		0.3	U	50	104		MS
Chromium	ug/L	75-125	63.8		13.5		50	101		MS
Lead	ug/L	75-125	50.1		0.5	U	50	100		MS
Molybdenum	ug/L	75-125	51.3		0.906		50	101		MS
Nickel	ug/L	75-125	51.3		0.5	U	50	102		MS
Selenium	ug/L	75-125	49.2		2	U	50	96.2		MS
Silver	ug/L	75-125	52.2		0.4	U	50	104		MS
Thallium	ug/L	75-125	47		0.6	U	50	93.4		MS
Uranium	ug/L	75-125	50.9		0.454		50	101		MS

## \*Analytical Methods:

MS SW846 3005A/6020A



## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-1005 Client ID: CASA-17-129325S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 416562001 Spike ID: 1203728809

<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	1.89		0.067	U	2	94.3		AV

## \*Analytical Methods:

AV EPA 245.1/245.2



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

SDG No.: 2017-1005

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-17-129325D

Matrix: WATER

Level: Low

Sample ID: 416562001

Duplicate ID: 1203728152

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		132 J		68 U		200		P
Barium	ug/L	+/-20%	338		336		.428		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	37.1 J		36.8 J		.729		P
Calcium	ug/L	+/-20%	21200		21200		.17		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		33 J		30 U		200		P
Magnesium	ug/L	+/-20%	5690		5590		1.79		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	3620		3710		2.26		P
Silica	ug/L	+/-20%	77300		78900		2.11		P
Sodium	ug/L	+/-20%	18300		18100		1.34		P
Strontium	ug/L	+/-20%	159		156		2.04		P
Tin	ug/L	+/-10	2.66 J		2.82 J		5.89		P
Vanadium	ug/L	+/-5	15.2		15.2		.0329		P
Zinc	ug/L		3.3 U		3.3 U				P

\*Analytical Methods:

P SW846 3005A/6010C



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

SDG No.: 2017-1005

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-17-129325D

Matrix: WATER

Level: Low

Sample ID: 416562001

Duplicate ID: 1203728191

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	3.37 J		3.21 J		5.02		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-10	4.59 J		4.66 J		1.67		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.14		1.11		2.67		MS
Nickel	ug/L	+/-2	6.49		6.6		1.73		MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.4 U		0.4 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.61		0.615		.816		MS

\*Analytical Methods:

MS SW846 3005A/6020A



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

SDG No.: 2017-1005

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-17-129297D

Matrix: WATER

Level: Low

Sample ID: 416572010

Duplicate ID: 1203728514

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-5	19.5		20		2.3		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	12000		12000		.133		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%	3470		3410		1.78		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1040		1110		6.65		P
Silica	ug/L	+/-20%	67900		68500		.842		P
Sodium	ug/L	+/-20%	9700		9860		1.67		P
Strontium	ug/L	+/-20%	50.6		49.6		1.92		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	4.18 J		4.29 J		2.44		P
Zinc	ug/L		3.3 U		3.3 U				P

\*Analytical Methods:

P SW846 3005A/6010C



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

SDG No.: 2017-1005

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-17-129297D

Matrix: WATER

Level: Low

Sample ID: 416572010

Duplicate ID: 1203728519

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	1.71 J		1.71 J		.0584		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-10	13.5		14.3		6.13		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.906		0.759		17.7		MS
Nickel	ug/L		0.5 U		0.5 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.4 U		0.4 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.454		0.444		2.23		MS

\*Analytical Methods:

MS SW846 3005A/6020A



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

**SDG No.:** 2017–1005**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CASA–17–129325D**Matrix:** WATER**Level:** Low**Sample ID:** 416562001**Duplicate ID:** 1203728807**Percent Solids for Dup:** N/A

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

\*Analytical Methods:

AV EPA 245.1/245.2



## METALS

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## Laboratory Control Sample Summary

SDG NO. 2017-1005

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>
1203728151								
	Aluminum	ug/L	5000	4790		95.8	80-120	P
	Barium	ug/L	500	469		93.8	80-120	P
	Beryllium	ug/L	500	464		92.8	80-120	P
	Boron	ug/L	500	482		96.4	80-120	P
	Calcium	ug/L	5000	4750		94.9	80-120	P
	Cobalt	ug/L	500	479		95.7	80-120	P
	Copper	ug/L	500	476		95.2	80-120	P
	Iron	ug/L	5000	5100		102	80-120	P
	Magnesium	ug/L	5000	4930		98.5	80-120	P
	Manganese	ug/L	500	466		93.2	80-120	P
	Potassium	ug/L	5000	4770		95.4	80-120	P
	Silica	ug/L	10700	10100		94.7	80-120	P
	Sodium	ug/L	5000	5250		105	80-120	P
	Strontium	ug/L	500	468		93.6	80-120	P
	Tin	ug/L	500	469		93.7	80-120	P
	Vanadium	ug/L	500	469		93.7	80-120	P
	Zinc	ug/L	500	461		92.2	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

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## Laboratory Control Sample Summary

SDG NO. 2017-1005

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>
1203728190								
	Antimony	ug/L	50	50.6		101	80-120	MS
	Arsenic	ug/L	50	50.6		101	80-120	MS
	Cadmium	ug/L	50	53.4		107	80-120	MS
	Chromium	ug/L	50	52.4		105	80-120	MS
	Lead	ug/L	50	51.6		103	80-120	MS
	Molybdenum	ug/L	50	53		106	80-120	MS
	Nickel	ug/L	50	53.2		106	80-120	MS
	Selenium	ug/L	50	49.3		98.7	80-120	MS
	Silver	ug/L	50	55		110	80-120	MS
	Thallium	ug/L	50	49.1		98.3	80-120	MS
	Uranium	ug/L	50	53.5		107	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A



## METALS

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## Laboratory Control Sample Summary

SDG NO. 2017-1005

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>
1203728513								
	Aluminum	ug/L	5000	4730		94.7	80-120	P
	Barium	ug/L	500	484		96.7	80-120	P
	Beryllium	ug/L	500	482		96.4	80-120	P
	Boron	ug/L	500	499		99.9	80-120	P
	Cobalt	ug/L	500	486		97.2	80-120	P
	Copper	ug/L	500	487		97.3	80-120	P
	Iron	ug/L	5000	5030		101	80-120	P
	Magnesium	ug/L	5000	5010		100	80-120	P
	Manganese	ug/L	500	481		96.1	80-120	P
	Potassium	ug/L	5000	4980		99.6	80-120	P
	Silica	ug/L	10700	10600		98.8	80-120	P
	Sodium	ug/L	5000	5330		107	80-120	P
	Strontium	ug/L	500	465		93.1	80-120	P
	Tin	ug/L	500	484		96.7	80-120	P
	Vanadium	ug/L	500	483		96.6	80-120	P
	Zinc	ug/L	500	468		93.5	80-120	P
	Calcium	ug/L	5000	4850		97	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

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## Laboratory Control Sample Summary

SDG NO. 2017-1005

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>
1203728518								
	Antimony	ug/L	50	51.9		104	80-120	MS
	Arsenic	ug/L	50	52.3		105	80-120	MS
	Cadmium	ug/L	50	52.4		105	80-120	MS
	Chromium	ug/L	50	51.4		103	80-120	MS
	Lead	ug/L	50	50		100	80-120	MS
	Molybdenum	ug/L	50	50.8		102	80-120	MS
	Nickel	ug/L	50	52.1		104	80-120	MS
	Selenium	ug/L	50	53.1		106	80-120	MS
	Silver	ug/L	50	54.6		109	80-120	MS
	Thallium	ug/L	50	48.2		96.3	80-120	MS
	Uranium	ug/L	50	49.5		99	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A



## METALS

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## Laboratory Control Sample Summary

SDG NO. 2017-1005

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>
1203728806	Mercury	ug/L	2	1.95		97.4	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2



## METALS

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## Serial Dilution Sample Summary

SDG NO. 2017-1005

Client ID: CASA-17-129325L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 416562001

Serial Dilution ID: 1203728154

<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	132	J	340	U	56.065			P
Barium	338		337		.096		10	P
Beryllium	1	U	5	U				P
Boron	37.1	J	75	U	5.026			P
Calcium	21200		21300		.12		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	33	J	150	U	.858			P
Magnesium	5690		5730		.74		10	P
Manganese	2	U	10	U				P
Potassium	3620		3760		3.929		10	P
Silica	77300		77600		.466		10	P
Sodium	18300		18800		2.49		10	P
Strontium	159		155		2.969		10	P
Tin	2.66	J	12.5	U	31.176			P
Vanadium	15.2		15	J	1.574			P
Zinc	3.3	U	16.5	U				P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

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## Serial Dilution Sample Summary

SDG NO. 2017-1005

Client ID: CASA-17-129325L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 416562001

Serial Dilution ID: 1203728193

<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	3.37	J	8.5	U	7.683			MS
Cadmium	.3	U	1.5	U				MS
Chromium	4.59	J	15	U	7.719			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.14		1.5	U	11.687			MS
Nickel	6.49		6.51	J	.386			MS
Selenium	2	U	10	U				MS
Silver	.4	U	2	U				MS
Thallium	.6	U	3	U				MS
Uranium	.61		.675	J	10.656			MS

## \*Analytical Methods:

MS SW846 3005A/6020A



## METALS

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## Serial Dilution Sample Summary

SDG NO. 2017-1005 Client ID CAMO-17-129297L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 416572010 Serial Dilution ID: 1203728516

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	19.5		18.7	J	4.005			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	12000		11300		5.71		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3470		3380		2.624			P
Manganese	2	U	10	U				P
Potassium	1040		1070		2.878			P
Silica	67900		70900		4.417		10	P
Sodium	9700		11300		16.787	E	10	P
Strontium	50.6		49.7		1.831		10	P
Tin	2.5	U	12.5	U				P
Vanadium	4.18	J	5	U	19.457			P
Zinc	3.3	U	21	J				P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2017-1005 **Client ID:** CAMO-17-129297L

**Contract:** ESHL00114

**Matrix:** LIQUID **Level:** Low

**Sample ID:** 416572010 **Serial Dilution ID:** 1203728521

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	1.71	J	8.5	U	4.787			MS
Cadmium	.3	U	1.5	U				MS
Chromium	13.5		15	U	2.86			MS
Lead	.5	U	2.5	U				MS
Molybdenum	.906		1.5	U	8.168			MS
Nickel	.5	U	2.5	U				MS
Selenium	2	U	10	U				MS
Silver	.4	U	2	U				MS
Thallium	.6	U	3	U				MS
Uranium	.454		.5	J	10.132			MS

## \*Analytical Methods:

MS SW846 3005A/6020A



## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2017-1005 **Client ID:** CASA-17-129325L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 416562001 **Serial Dilution ID:** 1203728811

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

## \*Analytical Methods:

AV EPA 245.1/245.2



# Miscellaneous



DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 21-FEB-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ICP	<b>Test / Method:</b> SW846 3005A/6010C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1639457	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 416572(2017-1005)</b> <b>Application Issues:</b> Failed difference for SDILT			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. Failed difference for SDILT: QC   1203728516SDILT		1. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified. 1203728516 (CAMO-17-129297SDILT) Sodium [16.8 *(0%-10%)].	

**Originator's Name:**  
Helen Camello      21-FEB-17

**Data Validator/Group Leader:**  
Travis Tola      13-MAR-17



# **General Chem Analysis**



# Case Narrative



**General Chemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2017-1005  
Work Order #: 416572**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1639272

**Method:** SW 9060 Total Organic Carbon

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW-846:9060:

<b>Sample ID</b>	<b>Client ID</b>
416572002	CASA-17-129324
416572003	CASA-17-129338
416572005	CAMO-17-129578
416572007	CAMO-17-129307
416572009	CASA-17-129332
416572011	CAMO-17-129313
1203728542	Method Blank (MB)
1203728543	Laboratory Control Sample (LCS)
1203728544	416111006(CAMO-17-129308) Sample Duplicate (DUP)
1203728546	416111006(CAMO-17-129308) 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# 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 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 416111006 (CAMO-17-129308) 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 where applicable.

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this SDG.



**Electronic Packaging Comment**

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

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



### **Method/Analysis Information**

<b>Product:</b>	<b>Cyanide and Total</b>		
<b>Analytical Batch:</b>	1639328	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1639327	<b>Method:</b>	EPA 335.4

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 335.4 1993:

<b>Sample ID</b>	<b>Client ID</b>
416572002	CASA-17-129324
416572003	CASA-17-129338
416572005	CAMO-17-129578
416572007	CAMO-17-129307
416572009	CASA-17-129332
416572011	CAMO-17-129313
1203728255	Method Blank (MB)
1203728256	Laboratory Control Sample (LCS)
1203728257	416562002(CASA-17-129331) Sample Duplicate (DUP)
1203728261	416562002(CASA-17-129331) 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# 18.

### **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 416562002 (CASA-17-129331) 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 where applicable.

**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:** Ion Chromatography

**Analytical Batch:** 1640555

**Method:** WSP-ANIONS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
416572001	CASA-17-129323
416572004	CASA-17-129339
416572005	CAMO-17-129578
416572006	CAMO-17-129291
416572008	CASA-17-129326
416572010	CAMO-17-129297
1203731276	Method Blank (MB)
1203731277	Laboratory Control Sample (LCS)
1203731278	416562001(CASA-17-129325) Sample Duplicate (DUP)
1203731279	416562001(CASA-17-129325) 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# 25.

### **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 416562001 (CASA-17-129325) 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 where applicable.

**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 1203731278 (CASA-17-129325DUP), 1203731279 (CASA-17-129325PS), 416572001 (CASA-17-129323), 416572004 (CASA-17-129339), 416572006 (CAMO-17-129291), 416572008 (CASA-17-129326) and 416572010 (CAMO-17-129297) 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:** 1639241 **Method:** NH3  
**Prep Batch :** 1639240 **Method:** EPA 350.1 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
416572001	CASA-17-129323
416572004	CASA-17-129339
416572005	CAMO-17-129578
416572006	CAMO-17-129291
416572008	CASA-17-129326
416572010	CAMO-17-129297
1203728030	Method Blank (MB)
1203728031	Laboratory Control Sample (LCS)
1203728032	416562001(CASA-17-129325) Sample Duplicate (DUP)
1203728034	416562001(CASA-17-129325) 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.

### **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 416562001 (CASA-17-129325) 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 where applicable.

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.



**Electronic Packaging Comment**

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

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



### **Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1639245	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1639244	<b>Method:</b>	EPA 351.2 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
416572002	CASA-17-129324
416572003	CASA-17-129338
416572005	CAMO-17-129578
416572007	CAMO-17-129307
416572009	CASA-17-129332
416572011	CAMO-17-129313
1203728042	Method Blank (MB)
1203728043	Laboratory Control Sample (LCS)
1203728044	416562002(CASA-17-129331) Sample Duplicate (DUP)
1203728877	416572002(CASA-17-129324) Sample Duplicate (DUP)
1203728045	416562002(CASA-17-129331) Matrix Spike (MS)
1203728878	416572002(CASA-17-129324) 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.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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



**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Samples 416562002 (CASA-17-129331) and 416572002 (CASA-17-129324) were selected for QC analysis.

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

The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity.

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203728045 (CASA-17-129331MS)	80* (90%-110%)

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**



Sample1203728042 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

### **Miscellaneous Information**

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

A data exception report (DER) 1608537 was generated for sample 1203728045 (CASA-17-129331MS) 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:** 1641424

**Method:** NO3NO2

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
416572001	CASA-17-129323
416572004	CASA-17-129339
416572005	CAMO-17-129578
416572006	CAMO-17-129291
416572008	CASA-17-129326
416572010	CAMO-17-129297
1203733269	Method Blank (MB)
1203733270	Laboratory Control Sample (LCS)
1203733271	416562001(CASA-17-129325) Sample Duplicate (DUP)
1203733272	416572001(CASA-17-129323) Sample Duplicate (DUP)
1203733273	416562001(CASA-17-129325) Post Spike (PS)
1203733274	416572001(CASA-17-129323) 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.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**



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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Samples 416562001 (CASA-17-129325) and 416572001 (CASA-17-129323) 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 where applicable.

**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 1203733272 (CASA-17-129323DUP), 1203733274 (CASA-17-129323PS), 416572001 (CASA-17-129323) and 416572004 (CASA-17-129339) were diluted because target analyte concentrations exceeded the calibration range. The following sample 416572008 (CASA-17-129326) in this sample group was diluted due to matrix interference. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	416572		
	001	004	008
Nitrogen, Nitrate/Nitrite	10X	10X	5X



**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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



### **Method/Analysis Information**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1639243	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1639242	<b>Method:</b>	EPA 365.4 Prep

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 365.4 1974:

<b>Sample ID</b>	<b>Client ID</b>
416572001	CASA-17-129323
416572004	CASA-17-129339
416572005	CAMO-17-129578
416572006	CAMO-17-129291
416572008	CASA-17-129326
416572010	CAMO-17-129297
1203728036	Method Blank (MB)
1203728037	Laboratory Control Sample (LCS)
1203728038	416562001(CASA-17-129325) Sample Duplicate (DUP)
1203728040	416562001(CASA-17-129325) Matrix Spike (MS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **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 416562001 (CASA-17-129325) 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 where applicable.

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

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample:

Analyte	Sample	Value
Phosphorus, Total as P	1203728038 (CASA-17-129325DUP)	abs(.022 - .089)* (+/- .05 mg/L)

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

Sample 416572005 (CAMO-17-129578) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

**Miscellaneous Information**



**Data Exception (DER) Documentation**

A data exception report (DER) 1608645 was generated for sample 1203728038 (CASA-17-129325DUP) 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:** Solids and Total Dissolved

**Analytical Batch:** 1639401

**Method:** TDS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
416572001	CASA-17-129323
416572004	CASA-17-129339
416572005	CAMO-17-129578
416572006	CAMO-17-129291
416572008	CASA-17-129326
416572010	CAMO-17-129297
1203728409	Method Blank (MB)
1203728410	Laboratory Control Sample (LCS)
1203728411	416562001(CASA-17-129325) Sample Duplicate (DUP)
1203728895	416658001(CAMO-17-129294) 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.

**Consecutive Weight Checks**

All consecutive weight checks were met.

**Quality Control (QC) Designation**

Samples 416562001 (CASA-17-129325) and 416658001 (CAMO-17-129294) were selected for QC analysis.

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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



### **Method/Analysis Information**

**Product:** Specific Conductivity

**Analytical Batch:** 1639323

**Method:** EPA120.1 Specific Conductivity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
416572001	CASA-17-129323
416572004	CASA-17-129339
416572005	CAMO-17-129578
416572006	CAMO-17-129291
416572008	CASA-17-129326
416572010	CAMO-17-129297
1203728234	Laboratory Control Sample (LCS)
1203728235	416572010(CAMO-17-129297) 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# 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 Titration and Ion analysis was performed on a Orion 160 Conductivity Meter.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **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 416572010 (CAMO-17-129297) 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:** 1639321 **Method:** PH

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 150.1 1982:

<b>Sample ID</b>	<b>Client ID</b>
416572001	CASA-17-129323
416572004	CASA-17-129339
416572005	CAMO-17-129578
416572006	CAMO-17-129291
416572008	CASA-17-129326
416572010	CAMO-17-129297
1203728231	Laboratory Control Sample (LCS)
1203728232	415847001(WST09-17-129397) Sample Duplicate (DUP)
1203728233	416572010(CAMO-17-129297) 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# 22.

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

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

### **Calibration Information**

The Titration and Ion analysis was performed on a Thermo Orion Star A111. Immediates

#### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

#### **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 415847001 (WST09-17-129397) and 416572010 (CAMO-17-129297) 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
1203728232 (WST09-17-129397DUP)	pH	Received 08-FEB-17, out of holding 06-FEB-17
1203728233 (CAMO-17-129297DUP)	pH	Received 14-FEB-17, out of holding 10-FEB-17
416572001 (CASA-17-129323)	pH	Received 14-FEB-17, out of holding 09-FEB-17
416572004 (CASA-17-129339)	pH	Received 14-FEB-17, out of holding 09-FEB-17
416572005 (CAMO-17-129578)	pH	Received 14-FEB-17, out of holding 09-FEB-17
416572006 (CAMO-17-129291)	pH	Received 14-FEB-17, out of holding 10-FEB-17
416572008 (CASA-17-129326)	pH	Received 14-FEB-17, out of holding 09-FEB-17
416572010 (CAMO-17-129297)	pH	Received 14-FEB-17, out of holding 10-FEB-17

**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) 1605726 was generated for samples 416572001 (CASA-17-129323), 416572004 (CASA-17-129339), 416572005 (CAMO-17-129578), 416572006 (CAMO-17-129291), 416572008 (CASA-17-129326), 416572010 (CAMO-17-129297), 1203728232 (WST09-17-129397DUP) and 1203728233 (CAMO-17-129297DUP) 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:** 1639313      **Method:** EPA 310.1 Total Alkalinity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
416572001	CASA-17-129323
416572004	CASA-17-129339
416572005	CAMO-17-129578
416572006	CAMO-17-129291
416572008	CASA-17-129326
416572010	CAMO-17-129297
1203728222	Laboratory Control Sample (LCS)
1203728223	415847001(WST09-17-129397) Sample Duplicate (DUP)
1203728224	416572010(CAMO-17-129297) Sample Duplicate (DUP)
1203728225	415847001(WST09-17-129397) Matrix Spike (MS)
1203728226	416572010(CAMO-17-129297) 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# 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 Titration and Ion analysis was performed on a manually operated buret.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **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 415847001 (WST09-17-129397) and 416572010 (CAMO-17-129297) 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 where applicable.

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Certification Statement**

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



## **GEL LABORATORIES LLC**

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

### **Qualifier Definition Report for**

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

Client SDG: 2017-1005 GEL Work Order: 416572

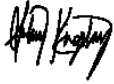
#### **The Qualifiers in this report are defined as follows:**

- \* 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, MDC 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:** Aubrey Kingsbury

**Date:** 13 MAR 2017

**Title:** Analyst I



# **Sample Data Summary**



# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CASA-17-129323  
Sample ID: 416572001  
Matrix: W  
Collect Date: 09-FEB-17 11:43  
Receive Date: 14-FEB-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	J	0.0809	0.067	0.200	mg/L		1	MXL2	02/17/17	1817	1640555	1
Chloride		4.07	0.067	0.200	mg/L		1					
Fluoride		0.345	0.033	0.100	mg/L		1					
Sulfate		10.4	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0535	0.017	0.050	mg/L	1.00	1	KLP1	03/01/17	1306	1639241	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		5.81	0.170	0.500	mg/L		10	KLP1	02/27/17	1333	1641424	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0294	0.020	0.050	mg/L	1.00	1	KLP1	02/28/17	1219	1639243	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		186	3.40	14.3	mg/L			KLP1	02/16/17	0924	1639401	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		77.0	1.45	4.00	mg/L			RXB5	02/16/17	1326	1639313	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		222	1.00	1.00	umhos/cm		1	RXB5	02/28/17	1202	1639323	7
PH "As Received"												
pH at Temp 18.1C	H	8.19	0.010	0.100	SU		1	RXB5	02/16/17	1324	1639321	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	02/28/17	1430	1639240
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	02/27/17	1900	1639242



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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CASA-17-129323  
Sample ID: 416572001

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
The following Analytical Methods were performed:												
Method	Description					Analyst Comments						
1	EPA:300.0											
2	EPA:350.1											
3	EPA:353.2											
4	EPA 365.4 1974											
5	EPA:160.1											
6	EPA:310.1											
7	EPA:120.1											
8	EPA 150.1 1982											

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit



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Report Date: March 13, 2017

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

Client SDG: 2017-1005

Client Sample ID: CASA-17-129324  
Sample ID: 416572002  
Matrix: W  
Collect Date: 09-FEB-17 11:43  
Receive Date: 14-FEB-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	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	02/16/17	0358	1639272	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	02/15/17	0937	1639328	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	02/28/17	1020	1639245	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	02/15/17	0842	1639327
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	02/27/17	1900	1639244

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:351.2	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



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Los Alamos, New Mexico 87545

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

Client SDG: 2017-1005

Client Sample ID: CASA-17-129338  
Sample ID: 416572003  
Matrix: W  
Collect Date: 09-FEB-17 11:43  
Receive Date: 14-FEB-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	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	02/16/17	0443	1639272	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	02/15/17	0938	1639328	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.160	0.033	0.100	mg/L	1.00	1	KLP1	02/28/17	1023	1639245	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	02/15/17	0842	1639327
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	02/27/17	1900	1639244

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:351.2	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CASA-17-129339  
Sample ID: 416572004  
Matrix: W  
Collect Date: 09-FEB-17 11:43  
Receive Date: 14-FEB-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	J	0.0867	0.067	0.200	mg/L		1	MXL2	02/17/17	1846	1640555	1
Chloride		4.13	0.067	0.200	mg/L		1					
Fluoride		0.343	0.033	0.100	mg/L		1					
Sulfate		10.3	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	U	ND	0.017	0.050	mg/L	1.00	1	KLP1	03/01/17	1307	1639241	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		6.22	0.170	0.500	mg/L		10	KLP1	02/27/17	1337	1641424	3
PO4 "As Received"												
Phosphorus, Total as P	U	ND	0.020	0.050	mg/L	1.00	1	KLP1	02/28/17	1220	1639243	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		177	3.40	14.3	mg/L			KLP1	02/16/17	0924	1639401	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		77.0	1.45	4.00	mg/L			RXB5	02/16/17	1329	1639313	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		223	1.00	1.00	umhos/cm		1	RXB5	02/28/17	1203	1639323	7
PH "As Received"												
pH at Temp 18.1C	H	8.21	0.010	0.100	SU		1	RXB5	02/16/17	1328	1639321	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	02/28/17	1430	1639240
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	02/27/17	1900	1639242



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

Client SDG: 2017-1005

Client Sample ID: CASA-17-129339  
Sample ID: 416572004

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
The following Analytical Methods were performed:												
Method	Description		Analyst Comments									
1	EPA:300.0											
2	EPA:350.1											
3	EPA:353.2											
4	EPA 365.4 1974											
5	EPA:160.1											
6	EPA:310.1											
7	EPA:120.1											
8	EPA 150.1 1982											

### Notes:

#### Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CAMO-17-129578  
Sample ID: 416572005  
Matrix: W  
Collect Date: 09-FEB-17 11:43  
Receive Date: 14-FEB-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	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	02/16/17	0551	1639272	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	02/15/17	0939	1639328	2
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	02/17/17	1916	1640555	3
Chloride	J	0.0932	0.067	0.200	mg/L		1					
Fluoride	U	ND	0.033	0.100	mg/L		1					
Sulfate	U	ND	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0192	0.017	0.050	mg/L	1.00	1	KLP1	03/01/17	1308	1639241	4
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite	U	ND	0.017	0.050	mg/L		1	KLP1	02/27/17	1338	1641424	5
PO4 "As Received"												
Phosphorus, Total as P	U	ND	0.020	0.050	mg/L	1.00	1	KLP1	02/28/17	1228	1639243	6
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.124	0.033	0.100	mg/L	1.00	1	KLP1	02/28/17	1024	1639245	7
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids	U	ND	3.40	14.3	mg/L			KLP1	02/16/17	0924	1639401	8
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3	U	ND	1.45	4.00	mg/L			RXB5	02/16/17	1331	1639313	9
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		2.08	1.00	1.00	umhos/cm		1	RXB5	02/28/17	1205	1639323	10
PH "As Received"												
pH at Temp 18.1C	H	5.94	0.010	0.100	SU		1	RXB5	02/16/17	1331	1639321	11

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CAMO-17-129578  
Sample ID: 416572005

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
EPA 335.4	EPA 335.4	Total Cyanide		AXH3	02/15/17		0842		1639327		
EPA 350.1 Prep	EPA 350.1	Ammonia Nitrogen Prep		AXH3	02/28/17		1430		1639240		
EPA 351.2 Prep	EPA 351.2	Total Kjeldahl Nitrogen Prep		KLP1	02/27/17		1900		1639244		
EPA 365.4 Prep	EPA 365.4	Phosphorus, Total in liquid PR		KLP1	02/27/17		1900		1639242		

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:300.0	
4	EPA:350.1	
5	EPA:353.2	
6	EPA 365.4 1974	
7	EPA:351.2	
8	EPA:160.1	
9	EPA:310.1	
10	EPA:120.1	
11	EPA 150.1 1982	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CAMO-17-129291  
Sample ID: 416572006  
Matrix: W  
Collect Date: 10-FEB-17 12:11  
Receive Date: 14-FEB-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	02/17/17	1945	1640555	1
Chloride		2.49	0.067	0.200	mg/L		1					
Fluoride		0.233	0.033	0.100	mg/L		1					
Sulfate		3.23	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0283	0.017	0.050	mg/L	1.00	1	KLP1	03/01/17	1309	1639241	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.709	0.017	0.050	mg/L		1	KLP1	02/27/17	1344	1641424	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0406	0.020	0.050	mg/L	1.00	1	KLP1	02/28/17	1222	1639243	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		133	3.40	14.3	mg/L			KLP1	02/16/17	0924	1639401	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		65.0	1.45	4.00	mg/L			RXB5	02/16/17	1335	1639313	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		141	1.00	1.00	umhos/cm		1	RXB5	02/28/17	1209	1639323	7
PH "As Received"												
pH at Temp 18.1C	H	8.27	0.010	0.100	SU		1	RXB5	02/16/17	1334	1639321	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	02/28/17	1430	1639240
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	02/27/17	1900	1639242



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

Client SDG: 2017-1005

Client Sample ID: CAMO-17-129291  
Sample ID: 416572006

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
The following Analytical Methods were performed:												
Method	Description					Analyst Comments						
1	EPA:300.0											
2	EPA:350.1											
3	EPA:353.2											
4	EPA 365.4 1974											
5	EPA:160.1											
6	EPA:310.1											
7	EPA:120.1											
8	EPA 150.1 1982											

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit



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Los Alamos, New Mexico 87545

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

Client SDG: 2017-1005

Client Sample ID: CAMO-17-129307

Project: ESHL00114

Sample ID: 416572007

Client ID: ARSL004

Matrix: W

Collect Date: 10-FEB-17 12:11

Receive Date: 14-FEB-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	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	02/16/17	0636	1639272	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	02/15/17	0940	1639328	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	J	0.0564	0.033	0.100	mg/L	1.00	1	KLP1	02/28/17	1029	1639245	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	02/15/17	0842	1639327
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	02/27/17	1900	1639244

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:351.2	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CASA-17-129326  
Sample ID: 416572008  
Matrix: W  
Collect Date: 09-FEB-17 14:00  
Receive Date: 14-FEB-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	02/17/17	2014	1640555	1
Chloride		2.74	0.067	0.200	mg/L		1					
Fluoride		0.453	0.033	0.100	mg/L		1					
Sulfate		3.46	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0212	0.017	0.050	mg/L	1.00	1	KLP1	03/01/17	1309	1639241	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		1.19	0.085	0.250	mg/L		5	KLP1	02/27/17	1345	1641424	3
PO4 "As Received"												
Phosphorus, Total as P		0.0597	0.020	0.050	mg/L	1.00	1	KLP1	02/28/17	1223	1639243	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		126	3.40	14.3	mg/L			KLP1	02/16/17	0924	1639401	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		76.0	1.45	4.00	mg/L			RXB5	02/16/17	1338	1639313	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		166	1.00	1.00	umhos/cm		1	RXB5	02/28/17	1210	1639323	7
PH "As Received"												
pH at Temp 18.4C	H	7.86	0.010	0.100	SU		1	RXB5	02/16/17	1337	1639321	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	02/28/17	1430	1639240
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	02/27/17	1900	1639242



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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CASA-17-129326  
Sample ID: 416572008

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
The following Analytical Methods were performed:												
Method	Description		Analyst Comments									
1	EPA:300.0											
2	EPA:350.1											
3	EPA:353.2											
4	EPA 365.4 1974											
5	EPA:160.1											
6	EPA:310.1											
7	EPA:120.1											
8	EPA 150.1 1982											

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: March 13, 2017

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

Los Alamos, New Mexico 87545

Contact: Mr. Keith Greene

Client SDG: 2017-1005

Project: LANL- WQH Water Samples

Client Sample ID: CASA-17-129332

Project: ESHL00114

Sample ID: 416572009

Client ID: ARSL004

Matrix: W

Collect Date: 09-FEB-17 14:00

Receive Date: 14-FEB-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	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	02/16/17	0721	1639272	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	02/15/17	0941	1639328	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	02/28/17	1030	1639245	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	02/15/17	0842	1639327
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	02/27/17	1900	1639244

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:351.2	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CAMO-17-129297  
Sample ID: 416572010  
Matrix: W  
Collect Date: 10-FEB-17 13:39  
Receive Date: 14-FEB-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	02/21/17	1126	1640555	1
Chloride		2.23	0.067	0.200	mg/L		1					
Fluoride		0.247	0.033	0.100	mg/L		1					
Sulfate		3.15	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0607	0.017	0.050	mg/L	1.00	1	KLP1	03/01/17	1314	1639241	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		1.05	0.017	0.050	mg/L		1	KLP1	02/27/17	1346	1641424	3
PO4 "As Received"												
Phosphorus, Total as P		0.125	0.020	0.050	mg/L	1.00	1	KLP1	02/28/17	1229	1639243	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		129	3.40	14.3	mg/L			KLP1	02/16/17	0924	1639401	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		58.0	1.45	4.00	mg/L			RXB5	02/16/17	1341	1639313	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		133	1.00	1.00	umhos/cm		1	RXB5	02/28/17	1212	1639323	7
PH "As Received"												
pH at Temp 18.3C	H	7.99	0.010	0.100	SU		1	RXB5	02/16/17	1341	1639321	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	02/28/17	1430	1639240
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	02/27/17	1900	1639242



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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CAMO-17-129297  
Sample ID: 416572010

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
The following Analytical Methods were performed:												
Method	Description		Analyst Comments									
1	EPA:300.0											
2	EPA:350.1											
3	EPA:353.2											
4	EPA 365.4 1974											
5	EPA:160.1											
6	EPA:310.1											
7	EPA:120.1											
8	EPA 150.1 1982											

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: March 13, 2017

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: 2017-1005

Client Sample ID: CAMO-17-129313  
Sample ID: 416572011  
Matrix: W  
Collect Date: 10-FEB-17 13:39  
Receive Date: 14-FEB-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	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	02/16/17	0806	1639272	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	02/15/17	0942	1639328	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	02/28/17	1030	1639245	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	02/15/17	0842	1639327
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	02/27/17	1900	1639244

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:351.2	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# **Quality Control Summary**



# GEL LABORATORIES LLC

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## QC Summary

Report Date: March 13, 2017

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

Contact: Mr. Keith Greene

Workorder: 416572

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1639272										
QC1203728544	416111006	DUP									
Total Organic Carbon Average		J	0.355	U	ND	mg/L	200	^	TSM	02/16/17	01:44
QC1203728543	LCS										
Total Organic Carbon Average	10.0				10.2	mg/L	102	(80%-120%)		02/15/17	23:17
QC1203728542	MB										
Total Organic Carbon Average			U	ND	mg/L					02/15/17	23:02
QC1203728546	416111006	PS									
Total Organic Carbon Average	10.0	J	0.355		10.8	mg/L	104	(75%-125%)		02/16/17	02:29
<b>Flow Injection Analysis</b>											
Batch	1639328										
QC1203728257	416562002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	02/15/17	09:14
QC1203728256	LCS										
Cyanide, Total	50.0				48.7	ug/L	97.4	(90%-110%)		02/15/17	09:09
QC1203728255	MB										
Cyanide, Total			U	ND	ug/L					02/15/17	09:08
QC1203728261	416562002	MS									
Cyanide, Total	100	U	ND		99.8	ug/L	99.8	(90%-110%)		02/15/17	09:15
<b>Ion Chromatography</b>											
Batch	1640555										
QC1203731278	416562001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	02/17/17	17:18



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## QC Summary

Workorder: 416572

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1640555										
Chloride		6.32		6.32	mg/L	0.0317		(0%-20%)	MXL2	02/17/17	17:18
Fluoride		0.249		0.250	mg/L	0.4	^	(+/-0.100)			
Sulfate		5.43		5.38	mg/L	0.969		(0%-20%)			
QC1203731277 LCS											
Bromide	1.25			1.18	mg/L		94.4	(80%-120%)		02/17/17	16:19
Chloride	5.00			4.89	mg/L		97.8	(80%-120%)			
Fluoride	2.50			2.54	mg/L		102	(80%-120%)			
Sulfate	10.0			9.80	mg/L		98	(80%-120%)			
QC1203731276 MB											
Bromide			U	ND	mg/L					02/17/17	15:50
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203731279 416562001 PS											
Bromide	1.25	U	ND	1.25	mg/L		94.9	(75%-125%)		02/17/17	17:47
Chloride	5.00		6.32	11.7	mg/L		108	(75%-125%)			
Fluoride	2.50		0.249	2.59	mg/L		93.8	(75%-125%)			
Sulfate	10.0		5.43	15.2	mg/L		97.9	(75%-125%)			



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## QC Summary

Workorder: 416572

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1639241										
QC1203728032	416562001	DUP									
Nitrogen, Ammonia		0.0724	J	0.0257	mg/L	95.2	^	(+/-0.050)	KLP1	03/01/17	13:05
QC1203728031	LCS										
Nitrogen, Ammonia	1.00			0.993	mg/L			99.3	(90%-110%)		03/01/17 13:03
QC1203728030	MB										
Nitrogen, Ammonia			U	ND	mg/L						03/01/17 13:02
QC1203728034	416562001	MS									
Nitrogen, Ammonia	1.00	0.0724		1.00	mg/L			92.8	(90%-110%)		03/01/17 13:05
Batch	1639243										
QC1203728038	416562001	DUP									
Phosphorus, Total as P		0.089	J	0.022	mg/L	121	*^	(+/-0.050)	KLP1	02/28/17	12:18
QC1203728037	LCS										
Phosphorus, Total as P	1.00			1.01	mg/L			101	(80%-124%)		02/28/17 12:16
QC1203728036	MB										
Phosphorus, Total as P			U	ND	mg/L						02/28/17 12:15
QC1203728040	416562001	MS									
Phosphorus, Total as P	1.00	0.089		1.06	mg/L			97.1	(63%-139%)		02/28/17 12:19
Batch	1639245										
QC1203728044	416562002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	02/28/17	10:19
QC1203728877	416572002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A				02/28/17 10:21
QC1203728043	LCS										
Nitrogen, Total Kjeldahl	1.00			1.08	mg/L			108	(90%-110%)		02/28/17 10:17



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## QC Summary

Workorder: 416572

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1639245										
QC1203728042	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L				KLP1	02/28/17	10:42
QC1203728045	416562002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	0.800	mg/L		80 *	(90%-110%)		02/28/17	10:20
QC1203728878	416572002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	0.909	mg/L		90.9	(90%-110%)		02/28/17	10:22
Batch	1641424										
QC1203733271	416562001	DUP									
Nitrogen, Nitrate/Nitrite		0.438		0.434	mg/L	0.917		(0%-20%)	KLP1	02/27/17	13:31
QC1203733272	416572001	DUP									
Nitrogen, Nitrate/Nitrite		5.81		5.30	mg/L	9.18		(0%-20%)		02/27/17	13:34
QC1203733270	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.937	mg/L		93.7	(90%-110%)		02/27/17	13:28
QC1203733269	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					02/27/17	13:27
QC1203733273	416562001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.438		1.39	mg/L		95.2	(90%-110%)		02/27/17	13:32
QC1203733274	416572001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.581		1.49	mg/L		90.9	(90%-110%)		02/27/17	13:35
<b>Solids Analysis</b>											
Batch	1639401										
QC1203728411	416562001	DUP									
Total Dissolved Solids		196		199	mg/L	1.43		(0%-5%)	KLP1	02/16/17	09:24



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## QC Summary

Workorder: 416572

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Solids Analysis</b>											
Batch	1639401										
QC1203728895	416658001	DUP									
Total Dissolved Solids		129		126	mg/L	2.25		(0%-5%)	KLP1	02/16/17	09:24
QC1203728410	LCS										
Total Dissolved Solids	300			294	mg/L		98.1	(95%-105%)		02/16/17	09:24
QC1203728409	MB										
Total Dissolved Solids			U	ND	mg/L					02/16/17	09:24
<b>Titration and Ion Analysis</b>											
Batch	1639313										
QC1203728223	415847001	DUP									
Alkalinity, Total as CaCO3		88.0		86.0	mg/L	2.3		(0%-20%)	RXB5	02/16/17	12:24
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1203728224	416572010	DUP									
Alkalinity, Total as CaCO3		58.0		59.0	mg/L	1.71		(0%-20%)		02/16/17	13:45
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1203728222	LCS										
Alkalinity, Total as CaCO3	100			110	mg/L		110	(90%-110%)		02/16/17	12:12
QC1203728225	415847001	MS									
Alkalinity, Total as CaCO3	100	88.0		177	mg/L		89	(80%-120%)		02/16/17	12:26
QC1203728226	416572010	MS									
Alkalinity, Total as CaCO3	100	58.0		165	mg/L		107	(80%-120%)		02/16/17	13:47
Batch	1639321										
QC1203728232	415847001	DUP									
pH		H	7.82	H	7.81	SU	0.128	(0%-5%)	RXB5	02/16/17	12:20



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## QC Summary

Workorder: 416572

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1639321										
QC1203728233	416572010	DUP									
pH		H	7.99	H	7.97	SU	0.251	(0%-5%)	RXB5	02/16/17	13:44
QC1203728231	LCS										
pH	7.00			6.97	SU		99.6	(99%-101%)		02/16/17	12:03
Batch	1639323										
QC1203728235	416572010	DUP									
Conductivity			133	134	umhos/cm	0.749		(0%-10%)	RXB5	02/28/17	12:15
QC1203728234	LCS										
Conductivity	1410			1380	umhos/cm		97.7	(95%-105%)		02/28/17	11:58

### 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, MDC 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



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## QC Summary

Workorder: 416572

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.  
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.  
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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



# Miscellaneous



# DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 16-FEB-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ELECTRODE	<b>Test / Method:</b> EPA 150.1	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1639321	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 415847(2017-978),415848(2017-977),415984(2017-986),415985(2017-985),416111(2017-993),416562(2017-1003),416572(2017-1005),416765(2017-1019) <b>Application Issues:</b> Sample received out of holding			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Sample received out of holding: 415847 001,005 415848 005 415984 002,004 415985 001,004 416111 001,003,005 416562 001 416572 001,004,005,006,008,010 416765 001 QC 1203728232DUP,1203728233DUP		1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified. 1203728232 (WST09-17-129397DUP) [Received 08-FEB-17, out of holding 06-FEB-17]. 1203728233 (CAMO-17-129297DUP) [Received 14-FEB-17, out of holding 10-FEB-17]. 415847001 (WST09-17-129397) [Received 08-FEB-17, out of holding 06-FEB-17]. 415847005 (WST09-17-129398) [Received 08-FEB-17, out of holding 06-FEB-17]. 415848005 (CTU6A-17-130110) [Received 08-FEB-17, out of holding 06-FEB-17]. 415984002 (CAMO-17-129411) [Received 09-FEB-17, out of holding 07-FEB-17]. 415984004 (CAMO-17-129412) [Received 09-FEB-17, out of holding 07-FEB-17]. 415985001 (CAMO-17-129293) [Received 09-FEB-17, out of holding 07-FEB-17]. 415985004 (CAMO-17-129322) [Received 09-FEB-17, out of holding 07-FEB-17]. 416111001 (CAMO-17-129289) [Received 10-FEB-17, out of holding 08-FEB-17]. 416111003 (CAMO-17-129290) [Received 10-FEB-17, out of holding 08-FEB-17]. 416111005 (CAMO-17-129292) [Received 10-FEB-17, out of holding 08-FEB-17]. 416562001 (CASA-17-129325) [Received 14-FEB-17, out of holding 09-FEB-17]. 416572001 (CASA-17-129323) [Received 14-FEB-17, out of holding 09-FEB-17]. 416572004 (CASA-17-129339) [Received 14-FEB-17, out of holding 09-FEB-17]. 416572005 (CAMO-17-129578) [Received 14-FEB-17, out of holding 09-FEB-17]. 416572006 (CAMO-17-129291) [Received 14-FEB-17, out of holding 10-FEB-17]. 416572008 (CASA-17-129326) [Received 14-FEB-17, out of holding 09-FEB-17]. 416572010 (CAMO-17-129297) [Received 14-FEB-17, out of holding 10-FEB-17]. 416765001 (CAMO-17-129353) [Received 16-FEB-17, out of holding 14-FEB-17].	

**Originator's Name:**

Rachael Bell 16-FEB-17

**Data Validator/Group Leader:**

Elzbieta Szulc 23-FEB-17



**Originator's Name:**

Rachael Bell 16-FEB-17

**Data Validator/Group Leader:**

Elzbieta Szulc 23-FEB-17



DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 28-FEB-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LACHAT Flow Injection Analyzer	<b>Test / Method:</b> EPA 351.2, EPA 351.2 SC	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1639245	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 416562(2017-1003),416572(2017-1005),416657(2017-1012),416658(2017-1011),416767(2017-1018),416771(2017-1017),416862(2017-1031),417067(2017-1053) <b>Application Issues:</b> Failed Recovery for MS/MSD, or PS/PSD			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203728045MS		1. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity. Nitrogen, Total Kjeldahl 1203728045 (CASA-17-129331MS) [80* (90%-110%)].	

**Originator's Name:**  
Kristen Mizzell 28-FEB-17

**Data Validator/Group Leader:**  
Aubrey Kingsbury 28-FEB-17



DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 28-FEB-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LACHAT Flow Injection Analyzer	<b>Test / Method:</b> EPA 365.4	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1639243	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 416562(2017-1003),416572(2017-1005),416958(2017-1050) <b>Application Issues:</b> Failed RPD for DUP			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. Failed RPD for DUP: QC   1203728038DUP		1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: Phosphorus, Total as P 1203728038 (CASA-17-129325DUP) [abs(.022 - .089)* (+/- .05 mg/L)].	

**Originator's Name:**  
Kristen Mizzell      28-FEB-17

**Data Validator/Group Leader:**  
Aubrey Kingsbury      28-FEB-17