

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: 11212

EVENT NAME: Mortandad/Sandia (Cr Inv/MDA C)  
MY2017 Q3

SAMPLE ID: CASA-17-132323

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05-08-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1215		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-43 S1		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <del>NA</del>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP-CR52/53	1 LITER POLY	1	ICE		
	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:

Sample Time \_\_\_\_\_ HH:MM Dissolved Oxygen \_\_\_\_\_ Flow (in gpm) \_\_\_\_\_  
Oxidation-Reduction Potential \_\_\_\_\_ pH \_\_\_\_\_ Specific Conductance \_\_\_\_\_  
Temperature \_\_\_\_\_ Turbidity \_\_\_\_\_

COLLECTED BY (PRINT): T. Walker, A. Stanfield

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 1550 5/8/2017	RECEIVED BY (Printed Name) (Signature)	Date/Time 5/8/17 1550
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 05/02/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11212

EVENT NAME: Mortandad/Sandia (Cr Inv/MDA C)  
MY2017 Q3

SAMPLE ID: CASA-17-132324

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	5/18/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1409		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-43 S2		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:		OK	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 approx. 50 ft. from a running diesel generator

## LOCATION COMMENTS:

None.

## FIELD PARAMETERS:

Sample Time 1409 HH:MM Dissolved Oxygen TL 5/18/17 Flow (in gpm) \_\_\_\_\_

Oxidation-Reduction Potential 173.1 pH \_\_\_\_\_ Specific Conductance \_\_\_\_\_

Temperature \_\_\_\_\_ Turbidity \_\_\_\_\_

## COLLECTED BY (PRINT):

A. Vigil

RELINQUISHED BY (Printed Name) ANDREW NIGIL (Signature) <i>Andrew Vigil</i>	Date/Time 05/08/2017 1550	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>S. Sherwood</i>	Date/Time 5/8/17 1550
RELINQUISHED BY (Printed Name) T.B. Walker (Signature) <i>Tom Walker</i>	Date/Time 5/8/2017 1555	RECEIVED BY (Printed Name) (Signature)	Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11212

EVENT NAME: Mortandad/Sandia (Cr Inv/MDA C)  
MY2017 Q3

SAMPLE ID: CASA-17-132332

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05-08-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1215		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-43 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <input checked="" type="radio"/> 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  $\approx$  50' from running diesel gen motor. Gusty wind ( $\approx$  20 mph) during sampling.

## LOCATION COMMENTS:

None

## FIELD PARAMETERS:

Sample Time	13:15	HH:MM	Dissolved Oxygen	6.89	Flow (in gpm)	1.36
Oxidation-Reduction Potential	242.9		pH	8.01	Specific Conductance	198.4
Temperature	20.2		Turbidity	0.44		

COLLECTED BY (PRINT): T. Walker, A. Stambold

RELINQUISHED BY (Printed Name) (Signature)	T. Walker <i>T. Walker</i>	Date/Time 1550 5/8/17	RECEIVED BY (Printed Name) (Signature)	S. Sherwood <i>S. Sherwood</i>	Date/Time 5/8/17 15:50
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 05/02/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11212

EVENT NAME: Mortandad/Sandia (Cr Inv/MDA C)  
MY2017 Q3

SAMPLE ID: CASA-17-132333

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	5/8/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1409		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-43 S2		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
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

## SAMPLE COMMENTS:

Sampled approx. 50 ft from a running diesel generator.

## LOCATION COMMENTS:

none.

## FIELD PARAMETERS:

Sample Time	1409	HH:MM	Dissolved Oxygen	3.42	Flow (in gpm)	1.52
Oxidation-Reduction Potential	173.1		pH	8.72	Specific Conductance	194.1
Temperature	19.8		Turbidity	0.19		

## COLLECTED BY (PRINT):

A. Vigil

RELINQUISHED BY (Printed Name) ANDREW VIGIL (Signature) Andrew Vigil	Date/Time 05/08/2017 1550	RECEIVED BY (Printed Name) S. Sherwood (Signature) S. Sherwood	Date/Time 5/8/17 1520
RELINQUISHED BY (Printed Name) TOM WATKINS (Signature) T. Watkins	Date/Time 05/08/2015 1555	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 05/02/2017

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11212

EVENT NAME: Mortandad/Sandia (Cr Inv/MDA C)  
MY2017 Q3

SAMPLE ID: CAMO-17-132524

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05/08/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1315	OK	MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	G-SP	
LOCATION ID:	R-62		FIELD PREP:	F	
LOCATION TYPE:	NA		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-CR52/53	1 LITER POLY	1	ICE		
	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:

Sample Time \_\_\_\_\_ HH:MM \_\_\_\_\_ Dissolved Oxygen \_\_\_\_\_ Flow (in gpm) \_\_\_\_\_  
 Oxidation-Reduction Potential \_\_\_\_\_ pH \_\_\_\_\_ Specific Conductance \_\_\_\_\_  
 Temperature \_\_\_\_\_ Turbidity \_\_\_\_\_

COLLECTED BY (PRINT): A. Uijl, D. Jernick

RELINQUISHED BY (Printed Name) <i>Daniel Jernick</i> (Signature) <i>DJ</i>	Date/Time 5/8/17 1600	RECEIVED BY (Printed Name) <i>Sherwood</i> (Signature) <i>Sherwood</i>	Date/Time 5/8/17 1600
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11212

EVENT NAME: Mortandad/Sandia (Cr Inv/MDA C)  
MY2017 Q3

SAMPLE ID: CAMO-17-132526

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05/08/2017	ck	FIELD MATRIX:	WG	ck
TIME COLLECTED (HH:MM):	1315	ck	MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	CSP	
LOCATION ID:	R-62		FIELD PREP:	UF	
LOCATION TYPE:	NA		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	MSGP-Hg	1 LITER POLY	1	HNO3	Y	NA
↓	WSP-CN(T)	250 ML POLY	1	NAOH	↓	↓
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: None

LOCATION COMMENTS: Sampled 50 ft from runway debris generator

## FIELD PARAMETERS:

Sample Time	1315	HH:MM	Dissolved Oxygen	6.19	Flow (in gpm)	1.55
Oxidation-Reduction Potential	163.3		pH	8.39	Specific Conductance	224.9
Temperature	19.2		Turbidity	0.24		

COLLECTED BY (PRINT): D. Jeranko A. Vigil

RELINQUISHED BY (Printed Name) Daniel Jeranko (Signature) [Signature]	Date/Time 5/8/17 1600	RECEIVED BY (Printed Name) S. Sherwood (Signature) [Signature]	Date/Time 5/8/17 1600
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 04/25/2017



## DATA VALIDATION REPORT

Chain Of Custody No. 2017-1496

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
422730	EPA:120.1	3				
422730	EPA:150.1	3				
422730	EPA:160.1	3				
422730	EPA:170.0	6				
422730	EPA:245.2	6				
422730	EPA:300.0	3				
422730	EPA:310.1	3				
422730	EPA:335.4	3				
422730	EPA:350.1	3				
422730	EPA:351.2	3				
422730	EPA:353.2	3				
422730	EPA:365.4	3				
422730	SM:A2340B	3				
422730	SW-846:6010C	3				
422730	SW-846:6020	3				
422730	SW-846:6850	3				
422730	SW-846:9060	3				

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
422730	EPA:120.1	1663951	1663951	3										1			1				
422730	EPA:150.1	1666469	1666469	3										1			1				
422730	EPA:160.1	1664155	1664155	3					1					1			1				
422730	EPA:170.0	NA	NA	6																	
422730	EPA:245.2	1664099	1664093	6					1	1				1			1				
422730	EPA:300.0	1664539	1664539	3					1					1			1				
422730	EPA:310.1	1666465	1666465	3						1				1			1				

## DATA VALIDATION REPORT

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
422730	EPA:335.4	1663020	1663019	3					1	1				1				1			
422730	EPA:350.1	1664592	1664591	3					1	1				1				1			
422730	EPA:351.2	1665040	1665039	3					1	1				1				1			
422730	EPA:353.2	1664158	1664158	3					1					1				1			
422730	EPA:365.4	1663545	1663543	3					1	1				1				1			
422730	SM:A2340B	1669979	1669979	3																	
422730	SW-846:6010C	1663689	1663688	3					1	1				1				1			
422730	SW-846:6020	1663773	1663772	3					1	1				1				1			
422730	SW-846:6850	1666241	1666240	3					1	1	1			1							
422730	SW-846:9060	1665822	1665822	3					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-17-132524	422730005	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-17-132323	1203786729	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-17-132323	422730001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-17-132324	422730003	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203786728	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-132524	422730005	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-17-132323	1203792737	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-17-132323	422730001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-17-132324	422730003	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203792736	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-132213	1203787280	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-132524	422730005	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-17-132323	422730001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-17-132324	422730003	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203787278	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203787277	MB	1	0	0	0
EPA:170.0	VOC	CAMO-17-132524	422730005	REG	1	0	0	0
EPA:170.0	VOC	CAMO-17-132526	422730006	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:170.0	VOC	CASA-17-132323	422730001	REG	1	0	0	0
EPA:170.0	VOC	CASA-17-132324	422730003	REG	1	0	0	0
EPA:170.0	VOC	CASA-17-132332	422730002	REG	1	0	0	0
EPA:170.0	VOC	CASA-17-132333	422730004	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132524	422730005	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132526	422730006	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-132323	1203787068	DUP	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-132323	1203787069	MS	0	0	1	0
EPA:245.2	INORGANIC	CASA-17-132323	422730001	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-132324	422730003	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-132332	422730002	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-132333	422730004	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203787067	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203787066	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132213	1203788155	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132524	422730005	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-17-132323	422730001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-17-132324	422730003	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203788154	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203788153	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-132524	422730005	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-132323	1203792717	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-132323	1203792720	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-132323	422730001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-132324	422730003	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203792713	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-132526	422730006	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-17-132331	1203785527	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-17-132331	1203785529	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CASA-17-132332	422730002	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CASA-17-132333	422730004	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203784604	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203784603	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-132524	422730005	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-132323	1203788278	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-132323	1203788279	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-132323	422730001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-132324	422730003	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203788275	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203788274	MB	1	0	0	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-132526	422730006	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-132332	1203789381	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-132332	1203789383	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-132332	422730002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-132333	422730004	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203789378	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203789377	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-132524	422730005	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-17-132322	1203787269	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-17-132323	422730001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-17-132324	422730003	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203787256	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203787255	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-132524	422730005	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-17-132322	1203785851	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-17-132322	1203785852	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-17-132323	422730001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-17-132324	422730003	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203785846	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203785845	MB	1	0	0	0
SM:A2340B	INORGANIC	CAMO-17-132524	422730005	REG	1	0	0	0
SM:A2340B	INORGANIC	CASA-17-132323	422730001	REG	1	0	0	0
SM:A2340B	INORGANIC	CASA-17-132324	422730003	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-132524	422730005	REG	17	0	0	0
SW-846:6010C	INORGANIC	CASA-17-132323	1203786190	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CASA-17-132323	1203786191	MS	0	0	17	0
SW-846:6010C	INORGANIC	CASA-17-132323	422730001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CASA-17-132324	422730003	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203786189	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203786188	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-17-132524	422730005	REG	11	0	0	0
SW-846:6020	INORGANIC	CASA-17-132323	1203786385	DUP	11	0	0	0
SW-846:6020	INORGANIC	CASA-17-132323	1203786386	MS	0	0	11	0
SW-846:6020	INORGANIC	CASA-17-132323	422730001	REG	11	0	0	0
SW-846:6020	INORGANIC	CASA-17-132324	422730003	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203786384	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203786383	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-132524	422730005	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-132322	1203792176	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-132322	1203792177	MSD	0	0	1	0



## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-132323	422730001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-132324	422730003	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203792175	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203792174	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-132526	422730006	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-17-132331	1203791710	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-17-132332	422730002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-17-132333	422730004	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203791231	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203791230	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	1203786188	METHOD BLANK	SW-846:6010C	W	Potassium	-65.9	J	ug/L	150
MB	1203786188	METHOD BLANK	SW-846:6010C	W	Zinc	-4.9	J	ug/L	10.0
MB	1203786383	METHOD BLANK	SW-846:6020	W	Arsenic	2.09	J	ug/L	5.00
MB	1203788274	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0497	J	mg/L	0.050

## DATA VALIDATION REPORT

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-17-132323	1203788274	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0497	mg/L	0.0457	J	0.050	Y	5	100	Y
CASA-17-132324	1203788274	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0497	mg/L	0.101		0.050	Y	5	100	Y
CAMO-17-132524	1203788274	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0497	mg/L	0.0497	J	0.050	Y	5	100	Y
CASA-17-132323	1203786188	METHOD BLANK	SW-846:6010C	Potassium	-65.9	ug/L	1420		150	Y			
CASA-17-132324	1203786188	METHOD BLANK	SW-846:6010C	Potassium	-65.9	ug/L	1250		150	Y			
CAMO-17-132524	1203786188	METHOD BLANK	SW-846:6010C	Potassium	-65.9	ug/L	1240		150	Y			
CASA-17-132323	1203786188	METHOD BLANK	SW-846:6010C	Zinc	-4.9	ug/L	4.39	J	10.0	Y			
CASA-17-132324	1203786188	METHOD BLANK	SW-846:6010C	Zinc	-4.9	ug/L	10.0	U	10.0	N			
CAMO-17-132524	1203786188	METHOD BLANK	SW-846:6010C	Zinc	-4.9	ug/L	10.0	U	10.0	N			
CASA-17-132323	1203786383	METHOD BLANK	SW-846:6020	Arsenic	2.09	ug/L	2.23	J	5.00	Y	5	100	Y
CASA-17-132324	1203786383	METHOD BLANK	SW-846:6020	Arsenic	2.09	ug/L	3.31	J	5.00	Y	5	100	Y
CAMO-17-132524	1203786383	METHOD BLANK	SW-846:6020	Arsenic	2.09	ug/L	2.07	J	5.00	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

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

No.

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.



## DATA VALIDATION REPORT

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Paramter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-62	2017-1496	CAMO-17-132524	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N	0.0497	mg/L	0.0497	mg/L			W	05/08/2017		1664592	VAL	Y
R-62	2017-1496	CAMO-17-132524	REG	INIT	INORGANIC	SW-846:6020	Arsenic	J	U	I4	N	2.07	ug/L	2.07	ug/L			W	05/08/2017		1663773	VAL	Y
R-43 S1	2017-1496	CASA-17-132323	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N	0.0457	mg/L	0.0457	mg/L			W	05/08/2017		1664592	VAL	Y
R-43 S1	2017-1496	CASA-17-132323	REG	INIT	INORGANIC	SW-846:6020	Arsenic	J	U	I4	N	2.23	ug/L	2.23	ug/L			W	05/08/2017		1663773	VAL	Y
R-43 S2	2017-1496	CASA-17-132324	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N	0.101	mg/L	0.101	mg/L			W	05/08/2017		1664592	VAL	Y
R-43 S2	2017-1496	CASA-17-132324	REG	INIT	INORGANIC	SW-846:6020	Arsenic	J	U	I4	N	3.31	ug/L	3.31	ug/L			W	05/08/2017		1663773	VAL	Y

### Reason Code

### Description

I4

the sample result is =<5x the concentration of related analyte in the method blank.

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 qualify. 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-17-132524	R-62	REG	EPA:120.1	0	1

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-17-132524	R-62	REG	EPA:150.1	0	1
CAMO-17-132524	R-62	REG	EPA:160.1	0	1
CAMO-17-132524	R-62	REG	EPA:170.0	0	1
CAMO-17-132524	R-62	REG	EPA:245.2	0	1
CAMO-17-132524	R-62	REG	EPA:300.0	0	4
CAMO-17-132524	R-62	REG	EPA:310.1	0	2
CAMO-17-132524	R-62	REG	EPA:350.1	0	1
CAMO-17-132524	R-62	REG	EPA:353.2	0	1
CAMO-17-132524	R-62	REG	EPA:365.4	0	1
CAMO-17-132524	R-62	REG	SM:A2340B	0	1
CAMO-17-132524	R-62	REG	SW-846:6010C	0	17
CAMO-17-132524	R-62	REG	SW-846:6020	0	11
CAMO-17-132524	R-62	REG	SW-846:6850	0	1
CAMO-17-132526	R-62	REG	EPA:170.0	0	1
CAMO-17-132526	R-62	REG	EPA:245.2	0	1
CAMO-17-132526	R-62	REG	EPA:335.4	0	1
CAMO-17-132526	R-62	REG	EPA:351.2	0	1
CAMO-17-132526	R-62	REG	SW-846:9060	0	1
CASA-17-132323	R-43 S1	REG	EPA:120.1	0	1
CASA-17-132323	R-43 S1	REG	EPA:150.1	0	1
CASA-17-132323	R-43 S1	REG	EPA:160.1	0	1
CASA-17-132323	R-43 S1	REG	EPA:170.0	0	1
CASA-17-132323	R-43 S1	REG	EPA:245.2	0	1
CASA-17-132323	R-43 S1	REG	EPA:300.0	0	4
CASA-17-132323	R-43 S1	REG	EPA:310.1	0	2
CASA-17-132323	R-43 S1	REG	EPA:350.1	0	1
CASA-17-132323	R-43 S1	REG	EPA:353.2	0	1
CASA-17-132323	R-43 S1	REG	EPA:365.4	0	1
CASA-17-132323	R-43 S1	REG	SM:A2340B	0	1
CASA-17-132323	R-43 S1	REG	SW-846:6010C	0	17
CASA-17-132323	R-43 S1	REG	SW-846:6020	0	11
CASA-17-132323	R-43 S1	REG	SW-846:6850	0	1
CASA-17-132324	R-43 S2	REG	EPA:120.1	0	1
CASA-17-132324	R-43 S2	REG	EPA:150.1	0	1
CASA-17-132324	R-43 S2	REG	EPA:160.1	0	1
CASA-17-132324	R-43 S2	REG	EPA:170.0	0	1
CASA-17-132324	R-43 S2	REG	EPA:245.2	0	1

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CASA-17-132324	R-43 S2	REG	EPA:300.0	0	4
CASA-17-132324	R-43 S2	REG	EPA:310.1	0	2
CASA-17-132324	R-43 S2	REG	EPA:350.1	0	1
CASA-17-132324	R-43 S2	REG	EPA:353.2	0	1
CASA-17-132324	R-43 S2	REG	EPA:365.4	0	1
CASA-17-132324	R-43 S2	REG	SM:A2340B	0	1
CASA-17-132324	R-43 S2	REG	SW-846:6010C	0	17
CASA-17-132324	R-43 S2	REG	SW-846:6020	0	11
CASA-17-132324	R-43 S2	REG	SW-846:6850	0	1
CASA-17-132332	R-43 S1	REG	EPA:170.0	0	1
CASA-17-132332	R-43 S1	REG	EPA:245.2	0	1
CASA-17-132332	R-43 S1	REG	EPA:335.4	0	1
CASA-17-132332	R-43 S1	REG	EPA:351.2	0	1
CASA-17-132332	R-43 S1	REG	SW-846:9060	0	1
CASA-17-132333	R-43 S2	REG	EPA:170.0	0	1
CASA-17-132333	R-43 S2	REG	EPA:245.2	0	1
CASA-17-132333	R-43 S2	REG	EPA:335.4	0	1
CASA-17-132333	R-43 S2	REG	EPA:351.2	0	1
CASA-17-132333	R-43 S2	REG	SW-846:9060	0	1

May 31, 2017

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

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

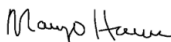
Re: LANL- WQH Water Samples  
Work Order: 422730  
SDG: 2017-1496

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on May 10, 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,

  
Margo Herron for  
Valerie Davis  
Project Manager

Chain of Custody: 2017-1496  
Enclosures





**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 422730**  
**SDG: 2017-1496**

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# Case Narrative

**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 422730  
SDG # : 2017-1496**

**May 31, 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 May 10, 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>
422730001	CASA-17-132323
422730002	CASA-17-132332
422730003	CASA-17-132324
422730004	CASA-17-132333
422730005	CAMO-17-132524
422730006	CAMO-17-132526

**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.



*Margo Herron*  
Margo Herron for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 31 May 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	SC000122017-1
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	SC000122017-22
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# **Chain of Custody and Supporting Documentation**







Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <b>ESHL</b>		SDG/AR/COC/Work Order: <b>422732</b>	
Received By: <b>ZKW</b>		Date Received: <b>5/10/17</b>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="radio"/> FedEx Express <input type="radio"/> FedEx Ground <input type="radio"/> UPS <input type="radio"/> Field Services <input type="radio"/> Courier <input type="radio"/> Other	
		<b>5908 1782 0551</b> <b>5908 1782 0540</b>	
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.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <b>0</b> <input checked="" type="radio"/> CPM/mR/Hr Classified as: Rad 1    Rad 2    Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's    Flammable    Foreign Soil    RCRA    Asbestos    Beryllium    Other: _____	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice <input checked="" type="radio"/> Ice Packs    Dry ice    None    Other: _____ *all temperatures are recorded in Celsius <b>TEMP: 3°C</b>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <b>IR3-16</b> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and Containers Affected: <b>Sample - 132581 rec'd unpreserved</b> If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes _____ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No _____ N/A _____ (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No _____ N/A _____ Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: <b>See Below</b>
11 Number of containers received match number indicated on COC?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: <b>See Below</b>
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

\* Samples -132323 and -132382 have a collect time of 13:15.  
 \* Samples -132324 and -132333 have a collect time of 1509  
 \* We rec'd samples WST15-17-135040, WST15-17-135039, and WST15-17-135041 for VOA Analysis not on any COC's

PM (or PMA) review: Initials

**ZKP**

Date

**5/11/17**

Page

1

of 1

GL-CHL-SR-001 Rev 5

**Subject:** RE: Samples Received on 5/10/17  
**From:** "Greene, Keith Robert" <kgreene@lanl.gov>  
**Date:** 5/10/2017 11:47 AM  
**To:** Linda Pullano <lop@gel.com>, "team.davis" <team.davis@gel.com>

1496 go from coc, 1500 yes please preserve and will receive coc for wst15 tomorrow

**From:** Linda Pullano [mailto:lop@gel.com]  
**Sent:** Wednesday, May 10, 2017 9:45 AM  
**To:** Greene, Keith Robert <kgreene@lanl.gov>; team.davis <team.davis@gel.com>  
**Subject:** Samples Received on 5/10/17

Hi Keith,

We received samples today for five Chains of Custody and have identified a couple of items needing attention:

**COC 2017-1496:** Which time is correct for these samples?  
CASA-17-132323 and CASA-17-132332 have collection times of 13:15 on the containers and 12:15 on the COC  
CASA-17-132324 and CASA-17-132333 have collection times of 15:09 on the containers and 14:09 on the COC

**COC 2017-1500**  
NP160-17-132581 for copper analysis was received unpreserved, do you want GEL to preserve the sample?

Also, several containers were received that were not associated with any of the Chains. These containers are labelled:  
WST15-17-135039, WST15-17-135040 and WST15-17-135041. Do you have a COC that these samples are associated with that you can forward to me?

Regards,  
**Linda O. Pullano**  
Project Manager Assistant



Laboratories LLC

2040 Savage Road, Charleston, SC 29407 | PO Box 30712, Charleston, SC 29417  
Office Main: 843.556.8171 ext. 4409 | Fax: 843.766.1178  
E-Mail: [lop@gel.com](mailto:lop@gel.com) | Website: [www.gel.com](http://www.gel.com)  
Environmental | Engineering | Surveying | Analytical Testing

Ask me about GEL's new testing capability for Perfluorinated chemicals (PFCs)!  
<http://www.gellaboratories.com>

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

SHIP DATE: 09MAY17  
ACTWGT: 53.0 LB MAN  
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545  
UNITED STATES US

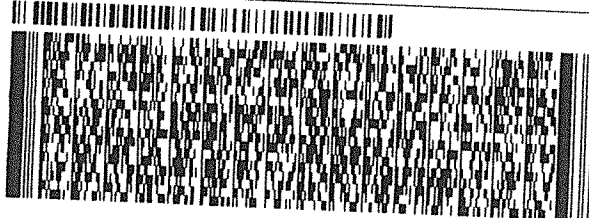
BILL SENDER

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

**CHARLESTON SC 29407**

(843) 566-8171

REF: 21PD0ASRGW04BAGWE0



FedEx  
Express



JT513150613011W

1 of 2  
TRK# 5908 1782 0540  
0201  
## MASTER ##

WED - 10 MAY 10:30A  
PRIORITY OVERNIGHT

**X7 RBWA**

29407  
SC-US CHS



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

SHIP DATE: 09MAY17  
ACTWGT: 53.0 LB MAN  
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545  
UNITED STATES US

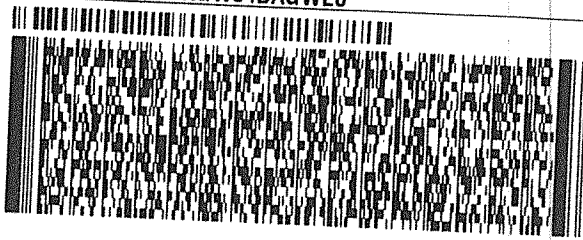
BILL SENDER

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FedEx  
Expr



2 of 2  
MPS# 5908 1782 0551  
0263  
Mstr# 5908 1782 0540

WED - 10 MAY 10:31A  
PRIORITY OVERNIGHT

**X7 RBWA**

2940  
SC-US CH



Part# 156148V-434 FIT2 05/15

# **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 #: 2017-1496  
Work Order #: 422730**

**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: 1666241

Prep Batch Number: 1666240

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
422730001	422730001 (CASA-17-132323)
422730003	422730003 (CASA-17-132324)
422730005	422730005 (CAMO-17-132524)
1203792178	Interference Check Sample (ICS)
1203792174	Method Blank (MB)
1203792175	Laboratory Control Sample (LCS)
1203792176	422637001(CASA-17-132322) Matrix Spike (MS)
1203792177	422637001(CASA-17-132322) 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 422637001 (CASA-17-132322) was chosen for matrix spike and matrix spike duplicate analysis.

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

In sample 1203792176 (MS) a low recovery of 65% was observed for Perchlorate-101. In sample 1203792177 (MSD) a low recovery of 71% and 50% were observed for Perchlorate and Perchlorate-101, respectively. The acceptance range is from 75-125%. The outliers observed for the matrix spikes may be due to the background concentration in the parent sample, 422637001 (CASA-17-132322). Recoveries in 1203792175 (LCS) and 1203792178 (ICS) were acceptable. 1203792176 (CASA-17-132322MS) and 1203792177 (CASA-17-132322MSD).

### **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**

A data exception report (DER) 1635606 was generated for samples 1203792176 (CASA-17-132322MS) and 1203792177 (CASA-17-132322MSD) in this SDG/batch.

### **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: 2017-1496 GEL Work Order: 422730

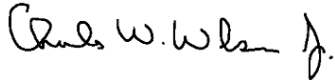
#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, 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: 31 MAY 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-132323Date Received: 10-MAY-17GEL Job No (SDG): 2017-1496GEL Sample ID: 422730001Date Filtered: 18-MAY-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	0.878	ug/L		1	19-MAY-17 17:43	per0519020a
	Perchlorate Isotope Ratio			2.84			1	19-MAY-17 17:43	per0519020a
14797-73-0	Perchlorate-101	.05	.2	0.873	ug/L		1	19-MAY-17 17:43	per0519020a
	Perchlorate-O(18)			0.503	ug/L		1	19-MAY-17 17:43	per0519020a

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-132324Date Received: 10-MAY-17GEL Job No (SDG): 2017-1496GEL Sample ID: 422730003Date Filtered: 18-MAY-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	0.892	ug/L		1	19-MAY-17 17:52	per0519021a
	Perchlorate Isotope Ratio			2.99			1	19-MAY-17 17:52	per0519021a
14797-73-0	Perchlorate-101	.05	.2	0.842	ug/L		1	19-MAY-17 17:52	per0519021a
	Perchlorate-O(18)			0.503	ug/L		1	19-MAY-17 17:52	per0519021a

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-132524Date Received: 10-MAY-17GEL Job No (SDG): 2017-1496GEL Sample ID: 422730005Date Filtered: 18-MAY-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	0.820	ug/L		1	19-MAY-17 18:01	per0519022a
	Perchlorate Isotope Ratio			2.84			1	19-MAY-17 18:01	per0519022a
14797-73-0	Perchlorate-101	.05	.2	0.815	ug/L		1	19-MAY-17 18:01	per0519022a
	Perchlorate-O(18)			0.513	ug/L		1	19-MAY-17 18:01	per0519022a

^ 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):** 2017-1496

**Extract Batch Code:** 1666240

**Date Filtered:** 18-MAY-17

**Matrix:** WATER

**Sample ID:** 1203792175

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.201	ug/L	101		85 - 115
Perchlorate Isotope Ratio		2.89				-
Perchlorate-101	0.200	.197	ug/L	99		85 - 115
Perchlorate-O(18)		.473	ug/L			-

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

### Perchlorate Spike/Spike Duplicate Summary

**Lab Name:** General Engineering Laboratories

**Lab Code:** GEL

**GEL Job No (SDG):** 2017-1496

**Extract Batch Code:** 1666240

**Date Extracted:** 18-MAY-17

**GEL MS/PS ID:** 1203792176

**Client ID:** CASA-17-132322

**GEL MSD/PSD ID:** 1203792177

**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	1.57	ug/L	1.72	79	1.71	71 *	1	30	75 - 125
Perchlorate Isotope Ratio	0	2.91		2.95		2.98		1		-
Perchlorate-101	0.200	1.52	ug/L	1.65	65 *	1.62	50 *	2	30	75 - 125
Perchlorate-O(18)	0	0.505	ug/L	0.501		.527		5		-

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 18-MAY-17GEL Job No (SDG): 2017-1496GEL Sample ID: 1203792174Date Filtered: 18-MAY-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	19-MAY-17 16:40	per0519013a
	Perchlorate Isotope Ratio						1	19-MAY-17 16:40	per0519013a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	19-MAY-17 16:40	per0519013a
	Perchlorate-O(18)			0.478	ug/L		1	19-MAY-17 16:40	per0519013a

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 18-MAY-17GEL Job No (SDG): 2017-1496GEL Sample ID: 1203792175Date Filtered: 18-MAY-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	0.201	ug/L		1	19-MAY-17 16:49	per0519014a
	Perchlorate Isotope Ratio			2.89			1	19-MAY-17 16:49	per0519014a
14797-73-0	Perchlorate-101	.05	.2	0.197	ug/L	J	1	19-MAY-17 16:49	per0519014a
	Perchlorate-O(18)			0.473	ug/L		1	19-MAY-17 16:49	per0519014a

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1496GEL Sample ID: 1203792178Date Filtered: 18-MAY-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	0.202	ug/L		1	19-MAY-17 16:58	per0519015a
	Perchlorate Isotope Ratio			3.12			1	19-MAY-17 16:58	per0519015a
14797-73-0	Perchlorate-101	.05	.2	0.183	ug/L	J	1	19-MAY-17 16:58	per0519015a
	Perchlorate-O(18)			0.521	ug/L		1	19-MAY-17 16:58	per0519015a

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-132322MSDate Received: 09-MAY-17GEL Job No (SDG): 2017-1496GEL Sample ID: 1203792176Date Filtered: 18-MAY-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	1.72	ug/L		1	19-MAY-17 17:16	per0519017a
	Perchlorate Isotope Ratio			2.95			1	19-MAY-17 17:16	per0519017a
14797-73-0	Perchlorate-101	.05	.2	1.65	ug/L		1	19-MAY-17 17:16	per0519017a
	Perchlorate-O(18)			0.501	ug/L		1	19-MAY-17 17:16	per0519017a

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-132322MSDDate Received: 09-MAY-17GEL Job No (SDG): 2017-1496GEL Sample ID: 1203792177Date Filtered: 18-MAY-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	1.71	ug/L		1	19-MAY-17 17:25	per0519018a
	Perchlorate Isotope Ratio			2.98			1	19-MAY-17 17:25	per0519018a
14797-73-0	Perchlorate-101	.05	.2	1.62	ug/L		1	19-MAY-17 17:25	per0519018a
	Perchlorate-O(18)			0.527	ug/L		1	19-MAY-17 17:25	per0519018a

^ 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 =

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

# Miscellaneous

### DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 25-MAY-17	<b>Division:</b> Federal	<b>Quality Criteria:</b> Others	<b>Type:</b> Process
<b>Instrument Type:</b> LC-MS/MS	<b>Test / Method:</b> SW846-6850 Modified	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ARSL004
<b>Batch ID:</b> 1666241	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 422637(2017-1489),422638(2017-1490),422730(2017-1496),422853(2017-1506),422859(2017-1505),422869(2017-1504),423072(2017-1517),423077(2017-1516),423224(2017-1524) <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. In sample 1203792176 (MS) a low recovery of 65% was observed for Perchlorate-101. In sample 1203792177 (MSD) a low recovery of 71% and 50% were observed for Perchlorate and Perchlorate-101, respectively. The acceptance range is from 75-125%.		1. The outliers observed for the matrix spikes may be due to the background concentration in the parent sample, 422637001 (CASA-17-132322). Recoveries in 1203792175 (LCS) and 1203792178 (ICS) were acceptable. Will report data and note in case narrative.	

**Originator's Name:**

Grace Cappelmann 25-MAY-17

**Data Validator/Group Leader:**

Charles Wilson 31-MAY-17



# **Metals Analysis**

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2017-1496**  
**Work Order #: 422730**

<b>Sample ID</b>	<b>Client ID</b>
422730001	CASA-17-132323
422730002	CASA-17-132332
422730003	CASA-17-132324
422730004	CASA-17-132333
422730005	CAMO-17-132524
422730006	CAMO-17-132526
1203786188	Method Blank (MB) <b>ICP</b>
1203786189	Laboratory Control Sample (LCS)
1203786192	422730001(CASA-17-132323L) Serial Dilution (SD)
1203786190	422730001(CASA-17-132323D) Sample Duplicate (DUP)
1203786191	422730001(CASA-17-132323S) Matrix Spike (MS)
1203786383	Method Blank (MB) <b>ICP-MS</b>
1203786384	Laboratory Control Sample (LCS)
1203786387	422730001(CASA-17-132323L) Serial Dilution (SD)
1203786385	422730001(CASA-17-132323D) Sample Duplicate (DUP)
1203786386	422730001(CASA-17-132323S) Matrix Spike (MS)
1203787066	Method Blank (MB) <b>CVAA</b>
1203787067	Laboratory Control Sample (LCS)
1203787070	422730001(CASA-17-132323L) Serial Dilution (SD)
1203787068	422730001(CASA-17-132323D) Sample Duplicate (DUP)
1203787069	422730001(CASA-17-132323S) Matrix Spike (MS)

**Sample Analysis**

Samples 422730001,002,003,004,005 and 006 in this SDG were analyzed for metals and mercury on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1663689, 1663773, 1664099 and 1669979
<b>Prep Batch :</b>	1663688, 1663772 and 1664093
<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# 34 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-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

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

### **Calibration Information**

#### **Instrument Calibration**

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

#### **CRDL/PQL Requirements**

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

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

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

An LCSD was not used in place of matrix QC.

#### **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: 422730001 (CASA-17-132323)-ICP, ICP-MS and CVAA.

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

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

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

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

#### **Serial Dilution % Difference Statement**

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

#### **Technical Information**

##### **Holding Time Specifications**

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

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

All procedures were performed as stated in the SOP.

##### **Sample Dilutions**

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. Samples 422730001 (CASA-17-132323) and 422730005 (CAMO-17-132524)-ICP-MS were diluted to ensure that the analyte concentrations were within the linear calibration range of the instrument.

Analyte	422730	
	001	005
Chromium	5X	5X

##### **Preparation Information**

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

#### **Miscellaneous Information**

##### **Electronic Packaging Comment**

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

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

electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**Data Exception (DER) Documentation**

A data exception report was not required for this SDG.

**Additional Comments**

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

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: 2017-1496 GEL Work Order: 422730

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

- \* A quality control analyte recovery is outside of specified acceptance criteria
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, 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: 05 JUN 2017**

**Title: Data Validator**

# **Sample Data Summary**



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

**SDG No:** 2017-1496**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 422730001**BASIS:** As Received**DATE COLLECTED** 08-MAY-17**CLIENT ID:** CASA-17-132323**LEVEL:** Low**DATE RECEIVED** 10-MAY-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	AXS5	05/12/17 10:58	051217W1-10	1664099

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

SDG No: 2017-1496

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 422730001

BASIS: As Received

DATE COLLECTED 08-MAY-17

CLIENT ID: CASA-17-132323

LEVEL: Low

DATE RECEIVED 10-MAY-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	05/15/17 18:11	051517-1	1663689
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	05/11/17 23:27	170511-5	1663773
7440-38-2	Arsenic	2.23	ug/L	J	2	5	5	1	MS	PRB	05/11/17 17:59	170511-3	1663773
7440-39-3	Barium	23.3	ug/L		1	5	5	1	P	HSC	05/15/17 18:11	051517-1	1663689
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	05/15/17 18:11	051517-1	1663689
7440-42-8	Boron	16	ug/L	J	15	50	50	1	P	HSC	05/15/17 18:11	051517-1	1663689
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	05/11/17 17:59	170511-3	1663773
7440-70-2	Calcium	18400	ug/L		50	200	200	1	P	HSC	05/15/17 18:11	051517-1	1663689
7440-47-3	Chromium	172	ug/L		15	50	50	5	MS	PRB	05/12/17 15:09	170512-9	1663773
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	05/15/17 18:11	051517-1	1663689
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	05/15/17 18:11	051517-1	1663689
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	05/15/17 18:11	051517-1	1663689
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	05/12/17 11:10	170511-8	1663773
7439-95-4	Magnesium	3970	ug/L		110	300	300	1	P	HSC	05/15/17 18:11	051517-1	1663689
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	05/15/17 18:11	051517-1	1663689
7439-98-7	Molybdenum	1.18	ug/L		0.2	0.5	0.5	1	MS	PRB	05/12/17 11:10	170511-8	1663773
7440-02-0	Nickel	5.95	ug/L		0.6	2	2	1	MS	PRB	05/12/17 13:45	170512-9	1663773
7440-09-7	Potassium	1420	ug/L		50	150	150	1	P	HSC	05/15/17 18:11	051517-1	1663689
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	05/11/17 17:59	170511-3	1663773
7631-86-9	Silica	70400	ug/L		53	213	213	1	P	HSC	05/15/17 18:11	051517-1	1663689
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	PRB	05/11/17 17:59	170511-3	1663773
7440-23-5	Sodium	10900	ug/L		100	300	300	1	P	HSC	05/16/17 11:20	051617-2	1663689
7440-24-6	Strontium	77.6	ug/L		1	5	5	1	P	HSC	05/15/17 18:11	051517-1	1663689
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	05/12/17 11:10	170511-8	1663773
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	05/15/17 18:11	051517-1	1663689
7440-61-1	Uranium	0.104	ug/L	J	0.067	0.2	0.2	1	MS	PRB	05/12/17 11:10	170511-8	1663773
7440-62-2	Vanadium	5.74	ug/L		1	5	5	1	P	HSC	05/15/17 18:11	051517-1	1663689
7440-66-6	Zinc	4.39	ug/L	J	3.3	10	10	1	P	HSC	05/16/17 11:20	051617-2	1663689

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

**SDG No:** 2017-1496**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 422730001**BASIS:** As Received**DATE COLLECTED** 08-MAY-17**CLIENT ID:** CASA-17-132323**LEVEL:** Low**DATE RECEIVED** 10-MAY-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	62.3	mg/L		0.453	1.24	1.24	1		TXT1	05/31/17 15:23		1669979

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1663689	1663688	SW846 3005A	50	mL	50	mL	05/10/17	CXW4
1663773	1663772	SW846 3005A	50	mL	50	mL	05/10/17	CXW4
1664099	1664093	EPA 245.1/245.2 Prep	20	mL	20	mL	05/11/17	JXH5

**\*Analytical Methods:**

**P** SW846 3005A/6010C  
**MS** SW846 3005A/6020A  
**AV** EPA 245.2 1974

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

**SDG No:** 2017-1496**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 422730002**BASIS:** As Received**DATE COLLECTED** 08-MAY-17**CLIENT ID:** CASA-17-132332**LEVEL:** Low**DATE RECEIVED** 10-MAY-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	AXS5	05/12/17 11:06	051217W1-10	1664099

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1664099	1664093	EPA 245.1/245.2 Prep	20	mL	20	mL	05/11/17	JXH5

**\*Analytical Methods:**

AV EPA 245.2 1974

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

**SDG No:** 2017-1496**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 422730003**BASIS:** As Received**DATE COLLECTED** 08-MAY-17**CLIENT ID:** CASA-17-132324**LEVEL:** Low**DATE RECEIVED** 10-MAY-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	AXS5	05/12/17 11:08	051217W1-10	1664099

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

SDG No: 2017-1496

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 422730003

BASIS: As Received

DATE COLLECTED 08-MAY-17

CLIENT ID: CASA-17-132324

LEVEL: Low

DATE RECEIVED 10-MAY-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	05/15/17 18:04	051517-1	1663689
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	05/11/17 23:36	170511-5	1663773
7440-38-2	Arsenic	3.31	ug/L	J	2	5	5	1	MS	PRB	05/11/17 18:15	170511-3	1663773
7440-39-3	Barium	22.7	ug/L		1	5	5	1	P	HSC	05/15/17 18:04	051517-1	1663689
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	05/15/17 18:04	051517-1	1663689
7440-42-8	Boron	32.2	ug/L	J	15	50	50	1	P	HSC	05/15/17 18:04	051517-1	1663689
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	05/11/17 18:15	170511-3	1663773
7440-70-2	Calcium	16600	ug/L		50	200	200	1	P	HSC	05/15/17 18:04	051517-1	1663689
7440-47-3	Chromium	14.5	ug/L		3	10	10	1	MS	PRB	05/12/17 13:54	170512-9	1663773
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	05/15/17 18:04	051517-1	1663689
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	05/15/17 18:04	051517-1	1663689
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	05/15/17 18:04	051517-1	1663689
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	05/12/17 11:19	170511-8	1663773
7439-95-4	Magnesium	3980	ug/L		110	300	300	1	P	HSC	05/15/17 18:04	051517-1	1663689
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	05/15/17 18:04	051517-1	1663689
7439-98-7	Molybdenum	1.37	ug/L		0.2	0.5	0.5	1	MS	PRB	05/12/17 11:19	170511-8	1663773
7440-02-0	Nickel	2	ug/L	U	0.6	2	2	1	MS	PRB	05/12/17 13:54	170512-9	1663773
7440-09-7	Potassium	1250	ug/L		50	150	150	1	P	HSC	05/15/17 18:04	051517-1	1663689
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	05/11/17 18:15	170511-3	1663773
7631-86-9	Silica	66000	ug/L		53	213	213	1	P	HSC	05/15/17 18:04	051517-1	1663689
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	PRB	05/11/17 18:15	170511-3	1663773
7440-23-5	Sodium	15200	ug/L		100	300	300	1	P	HSC	05/16/17 11:24	051617-2	1663689
7440-24-6	Strontium	106	ug/L		1	5	5	1	P	HSC	05/15/17 18:04	051517-1	1663689
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	05/12/17 11:19	170511-8	1663773
7440-31-5	Tin	3.38	ug/L	J	2.5	10	10	1	P	HSC	05/15/17 18:04	051517-1	1663689
7440-61-1	Uranium	0.434	ug/L		0.067	0.2	0.2	1	MS	PRB	05/12/17 11:19	170511-8	1663773
7440-62-2	Vanadium	7.03	ug/L		1	5	5	1	P	HSC	05/15/17 18:04	051517-1	1663689
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	05/16/17 11:24	051617-2	1663689

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

**SDG No:** 2017-1496**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 422730003**BASIS:** As Received**DATE COLLECTED** 08-MAY-17**CLIENT ID:** CASA-17-132324**LEVEL:** Low**DATE RECEIVED** 10-MAY-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	57.8	mg/L		0.453	1.24	1.24	1		TXT1	05/31/17 15:23		1669979

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1663689	1663688	SW846 3005A	50	mL	50	mL	05/10/17	CXW4
1663773	1663772	SW846 3005A	50	mL	50	mL	05/10/17	CXW4
1664099	1664093	EPA 245.1/245.2 Prep	20	mL	20	mL	05/11/17	JXH5

**\*Analytical Methods:**

**P** SW846 3005A/6010C  
**MS** SW846 3005A/6020A  
**AV** EPA 245.2 1974

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

**SDG No:** 2017-1496**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 422730004**BASIS:** As Received**DATE COLLECTED** 08-MAY-17**CLIENT ID:** CASA-17-132333**LEVEL:** Low**DATE RECEIVED** 10-MAY-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	AXS5	05/12/17 11:10	051217W1-10	1664099

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1664099	1664093	EPA 245.1/245.2 Prep	20	mL	20	mL	05/11/17	JXH5

**\*Analytical Methods:**

AV EPA 245.2 1974



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

**SDG No:** 2017-1496**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 422730005**BASIS:** As Received**DATE COLLECTED** 08-MAY-17**CLIENT ID:** CAMO-17-132524**LEVEL:** Low**DATE RECEIVED** 10-MAY-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	AXS5	05/12/17 11:11	051217W1-10	1664099

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

SDG No: 2017-1496

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 422730005

BASIS: As Received

DATE COLLECTED 08-MAY-17

CLIENT ID: CAMO-17-132524

LEVEL: Low

DATE RECEIVED 10-MAY-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	05/15/17 18:08	051517-1	1663689
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	05/11/17 23:38	170511-5	1663773
7440-38-2	Arsenic	2.07	ug/L	J	2	5	5	1	MS	PRB	05/11/17 18:18	170511-3	1663773
7440-39-3	Barium	36.6	ug/L		1	5	5	1	P	HSC	05/15/17 18:08	051517-1	1663689
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	05/15/17 18:08	051517-1	1663689
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	HSC	05/15/17 18:08	051517-1	1663689
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	05/11/17 18:18	170511-3	1663773
7440-70-2	Calcium	21500	ug/L		50	200	200	1	P	HSC	05/15/17 18:08	051517-1	1663689
7440-47-3	Chromium	228	ug/L		15	50	50	5	MS	PRB	05/12/17 15:18	170512-9	1663773
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	05/15/17 18:08	051517-1	1663689
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	05/15/17 18:08	051517-1	1663689
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	05/15/17 18:08	051517-1	1663689
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	05/12/17 11:21	170511-8	1663773
7439-95-4	Magnesium	5750	ug/L		110	300	300	1	P	HSC	05/15/17 18:08	051517-1	1663689
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	05/15/17 18:08	051517-1	1663689
7439-98-7	Molybdenum	0.610	ug/L		0.2	0.5	0.5	1	MS	PRB	05/12/17 11:21	170511-8	1663773
7440-02-0	Nickel	3.43	ug/L		0.6	2	2	1	MS	PRB	05/12/17 13:56	170512-9	1663773
7440-09-7	Potassium	1240	ug/L		50	150	150	1	P	HSC	05/15/17 18:08	051517-1	1663689
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	05/11/17 18:18	170511-3	1663773
7631-86-9	Silica	60300	ug/L		53	213	213	1	P	HSC	05/15/17 18:08	051517-1	1663689
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	PRB	05/11/17 18:18	170511-3	1663773
7440-23-5	Sodium	11900	ug/L		100	300	300	1	P	HSC	05/16/17 11:17	051617-2	1663689
7440-24-6	Strontium	105	ug/L		1	5	5	1	P	HSC	05/15/17 18:08	051517-1	1663689
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	05/12/17 11:21	170511-8	1663773
7440-31-5	Tin	3.7	ug/L	J	2.5	10	10	1	P	HSC	05/15/17 18:08	051517-1	1663689
7440-61-1	Uranium	0.739	ug/L		0.067	0.2	0.2	1	MS	PRB	05/12/17 11:21	170511-8	1663773
7440-62-2	Vanadium	2.68	ug/L	J	1	5	5	1	P	HSC	05/15/17 18:08	051517-1	1663689
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	05/16/17 11:17	051617-2	1663689

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

**SDG No:** 2017-1496**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 422730005**BASIS:** As Received**DATE COLLECTED** 08-MAY-17**CLIENT ID:** CAMO-17-132524**LEVEL:** Low**DATE RECEIVED** 10-MAY-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	77.5	mg/L		0.453	1.24	1.24	1		TXT1	05/31/17 15:23		1669979

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1663689	1663688	SW846 3005A	50	mL	50	mL	05/10/17	CXW4
1663773	1663772	SW846 3005A	50	mL	50	mL	05/10/17	CXW4
1664099	1664093	EPA 245.1/245.2 Prep	20	mL	20	mL	05/11/17	JXH5

**\*Analytical Methods:**

**P** SW846 3005A/6010C  
**MS** SW846 3005A/6020A  
**AV** EPA 245.2 1974

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

**SDG No:** 2017-1496**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 422730006**BASIS:** As Received**DATE COLLECTED** 08-MAY-17**CLIENT ID:** CAMO-17-132526**LEVEL:** Low**DATE RECEIVED** 10-MAY-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	AXS5	05/12/17 11:13	051217W1-10	1664099

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1664099	1664093	EPA 245.1/245.2 Prep	20	mL	20	mL	05/11/17	JXH5

**\*Analytical Methods:**

AV EPA 245.2 1974

# **Quality Control Summary**

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

SDG NO. 2017-1496

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>
1203786188	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	-65.9	ug/L	+/-150	J	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	-4.9	ug/L	+/-10	J	P	3.3	10
1203786383	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	2.09	ug/L	+/-5	J	MS	2	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	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	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
1203787066	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. 2017-1496 Client ID: CASA-17-132323S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 422730001 Spike ID: 1203786191

<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>
Sodium	ug/L	75-125	16500		10900		5000	111		P
Strontium	ug/L	75-125	590		77.6		500	102		P
Tin	ug/L	75-125	482		2.5	U	500	95.9		P
Vanadium	ug/L	75-125	500		5.74		500	98.9		P
Zinc	ug/L	75-125	465		4.39	J	500	92.2		P
Aluminum	ug/L	75-125	4820		68	U	5000	95.6		P
Barium	ug/L	75-125	503		23.3		500	96		P
Beryllium	ug/L	75-125	483		1	U	500	96.6		P
Boron	ug/L	75-125	514		16	J	500	99.6		P
Calcium	ug/L	75-125	23800		18400		5000	107		P
Cobalt	ug/L	75-125	477		1	U	500	95.4		P
Copper	ug/L	75-125	504		3	U	500	101		P
Iron	ug/L	75-125	5020		30	U	5000	100		P
Magnesium	ug/L	75-125	8810		3970		5000	96.8		P
Manganese	ug/L	75-125	482		2	U	500	96.2		P
Potassium	ug/L	75-125	6350		1420		5000	98.5		P
Silica	ug/L		82300		70400		10700	111	N/A	P

\*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-1496 Client ID: CASA-17-132323S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 422730001 Spike ID: 1203786386

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	50.2		1	U	50	100		MS
Arsenic	ug/L	75-125	53.9		2.23	J	50	103		MS
Cadmium	ug/L	75-125	51.3		0.3	U	50	103		MS
Chromium	ug/L	75-125	220		172		50	96.9		MS
Lead	ug/L	75-125	46.8		0.5	U	50	93.6		MS
Molybdenum	ug/L	75-125	54.1		1.18		50	106		MS
Nickel	ug/L	75-125	54.9		5.95		50	97.9		MS
Selenium	ug/L	75-125	52.5		2	U	50	102		MS
Silver	ug/L	75-125	51.5		0.3	U	50	103		MS
Thallium	ug/L	75-125	44.2		0.6	U	50	88.4		MS
Uranium	ug/L	75-125	48.3		0.104	J	50	96.5		MS

## \*Analytical Methods:

MS SW846 3005A/6020A



## METALS

-5a-

## Matrix Spike Summary

**SDG NO.** 2017-1496 **Client ID:** CASA-17-132323S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 422730001 **Spike ID:** 1203787069

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	2.28		0.067	U	2	113		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

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

SDG No.: 2017-1496

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-17-132323D

Matrix: WATER

Level: Low

Sample ID: 422730001

Duplicate ID: 1203786190

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	23.3		23.7		1.49		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	16 J		16.7 J		4.47		P
Calcium	ug/L	+/-20%	18400		18600		1.01		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%	3970		4030		1.46		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1420		1420		.282		P
Silica	ug/L	+/-20%	70400		70800		.579		P
Sodium	ug/L	+/-20%	10900		10900		.0732		P
Strontium	ug/L	+/-20%	77.6		78.1		.664		P
Tin	ug/L		2.5 U		2.79 J		200		P
Vanadium	ug/L	+/-5	5.74		5.8		1.09		P
Zinc	ug/L	+/-10	4.39 J		4.11 J		6.6		P

\*Analytical Methods:

P SW846 3005A/6010C

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

SDG No.: 2017-1496

Lab Code: GEL

Contract: ESHL00114

Client ID: CASA-17-132323D

Matrix: WATER

Level: Low

Sample ID: 422730001

Duplicate ID: 1203786385

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	2.23 J		2.25 J		1.07		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-50	172		170		1.34		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.18		1.14		4.23		MS
Nickel	ug/L	+/-2	5.95		5.5		7.74		MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.104 J		0.096 J		8		MS

\*Analytical Methods:

MS SW846 3005A/6020A

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

**SDG No.:** 2017–1496**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CASA–17–132323D**Matrix:** WATER**Level:** Low**Sample ID:** 422730001**Duplicate ID:** 1203787068**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		0.146 J		200		AV

\*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2017-1496

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>
1203786189								
	Aluminum	ug/L	5000	4890		97.8	80-120	P
	Barium	ug/L	500	483		96.6	80-120	P
	Beryllium	ug/L	500	479		95.8	80-120	P
	Boron	ug/L	500	491		98.3	80-120	P
	Calcium	ug/L	5000	4720		94.5	80-120	P
	Cobalt	ug/L	500	486		97.2	80-120	P
	Copper	ug/L	500	496		99.1	80-120	P
	Iron	ug/L	5000	4980		99.5	80-120	P
	Magnesium	ug/L	5000	4710		94.3	80-120	P
	Manganese	ug/L	500	486		97.3	80-120	P
	Potassium	ug/L	5000	4740		94.8	80-120	P
	Silica	ug/L	10700	10400		97.1	80-120	P
	Sodium	ug/L	5000	5350		107	80-120	P
	Strontium	ug/L	500	520		104	80-120	P
	Tin	ug/L	500	473		94.5	80-120	P
	Vanadium	ug/L	500	493		98.5	80-120	P
	Zinc	ug/L	500	462		92.3	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2017-1496

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>
1203786384								
	Antimony	ug/L	50	49.4		98.9	80-120	MS
	Arsenic	ug/L	50	51.9		104	80-120	MS
	Cadmium	ug/L	50	52.2		104	80-120	MS
	Lead	ug/L	50	49.2		98.3	80-120	MS
	Molybdenum	ug/L	50	53		106	80-120	MS
	Nickel	ug/L	50	48.9		97.9	80-120	MS
	Selenium	ug/L	50	52.1		104	80-120	MS
	Silver	ug/L	50	52.4		105	80-120	MS
	Thallium	ug/L	50	46.3		92.5	80-120	MS
	Uranium	ug/L	50	48.5		96.9	80-120	MS
	Chromium	ug/L	50	49.2		98.3	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2017-1496

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>
1203787067	Mercury	ug/L	2	2.22		111	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-9-

## Serial Dilution Sample Summary

SDG NO. 2017-1496

Client ID: CASA-17-132323L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 422730001

Serial Dilution ID: 1203786192

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	23.3		24.3	J	4.049			P
Beryllium	1	U	5	U				P
Boron	16	J	75	U	2.516			P
Calcium	18400		19000		2.949		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3970		4100		3.394			P
Manganese	2	U	10	U				P
Potassium	1420		1200		15.893			P
Silica	70400		72700		3.142		10	P
Sodium	10900		11400		4.445		10	P
Strontium	77.6		83.2		7.127		10	P
Tin	2.5	U	12.5	U				P
Vanadium	5.74		5	U	16.179			P
Zinc	4.39	J	16.5	U	125.425			P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

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## Serial Dilution Sample Summary

SDG NO. 2017-1496

Client ID: CASA-17-132323L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 422730001

Serial Dilution ID: 1203786387

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2.23	J	10	U	165.366			MS
Cadmium	.3	U	1.5	U				MS
Chromium	34.4		32.5	J	5.602			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.18		1.23	J	3.885			MS
Nickel	5.95		7.23	J	21.531			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.104	J	.335	U	106.731			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2017-1496 **Client ID:** CASA-17-132323L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 422730001 **Serial Dilution ID:** 1203787070

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

## \*Analytical Methods:

AV EPA 245.1/245.2

# **General Chem Analysis**

# Case Narrative

**General Chemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2017-1496  
Work Order #: 422730**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1665822

**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>
422730002	CASA-17-132332
422730004	CASA-17-132333
422730006	CAMO-17-132526
1203791230	Method Blank (MB)
1203791231	Laboratory Control Sample (LCS)
1203791710	422637002(CASA-17-132331) Sample Duplicate (DUP)
1203791711	422637002(CASA-17-132331) 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# 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 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 Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 422637002 (CASA-17-132331) 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>	1663020	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1663019	<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>
422730002	CASA-17-132332
422730004	CASA-17-132333
422730006	CAMO-17-132526
1203784603	Method Blank (MB)
1203784604	Laboratory Control Sample (LCS)
1203785527	422637002(CASA-17-132331) Sample Duplicate (DUP)
1203785529	422637002(CASA-17-132331) 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# 19.

### **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 Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 422637002 (CASA-17-132331) 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:** 1664539

**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>
422730001	CASA-17-132323
422730003	CASA-17-132324
422730005	CAMO-17-132524
1203788153	Method Blank (MB)
1203788154	Laboratory Control Sample (LCS)
1203788155	422570003(CAMO-17-132213) Sample Duplicate (DUP)
1203788157	422570003(CAMO-17-132213) 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-1600 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 MBs analyzed with this SDG met the acceptance criteria.

##### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

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

The LCS spike recoveries met the acceptance limits.

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

Sample 422570003 (CAMO-17-132213) was selected for QC analysis.

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

The MS/PS recoveries for this sample set were within the required acceptance limits 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 following sample 422730005 (CAMO-17-132524) was diluted because target analyte concentrations exceeded the calibration range. 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	<b>422730</b>
	<b>005</b>
Chloride	2X
Sulfate	2X

##### **Sample Re-analysis**

Samples 1203788153 (MB), 1203788154 (LCS), 1203788155 (CAMO-17-132213DUP), 1203788157 (CAMO-17-132213PS), 422730001 (CASA-17-132323), 422730003 (CASA-17-132324) and 422730005 (CAMO-17-132524) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

#### **Miscellaneous Information**

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

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

**Manual Integrations**

Samples 1203788155 (CAMO-17-132213DUP), 1203788157 (CAMO-17-132213PS), 422730001 (CASA-17-132323), 422730003 (CASA-17-132324) and 422730005 (CAMO-17-132524) 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:** 1664592 **Method:** NH3  
**Prep Batch :** 1664591 **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>
422730001	CASA-17-132323
422730003	CASA-17-132324
422730005	CAMO-17-132524
1203788274	Method Blank (MB)
1203788275	Laboratory Control Sample (LCS)
1203788278	422730001(CASA-17-132323) Sample Duplicate (DUP)
1203788279	422730001(CASA-17-132323) Matrix Spike (MS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 422730001 (CASA-17-132323) 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**

Samples 1203788274 (MB) and 1203788275 (LCS) were re-analyzed due to instrument failure. The results from the reanalysis are reported.

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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



### **Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1665040	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1665039	<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>
422730002	CASA-17-132332
422730004	CASA-17-132333
422730006	CAMO-17-132526
1203789377	Method Blank (MB)
1203789378	Laboratory Control Sample (LCS)
1203789381	422730002(CASA-17-132332) Sample Duplicate (DUP)
1203789383	422730002(CASA-17-132332) 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 Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 422730002 (CASA-17-132332) was selected for QC analysis.

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

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

Sample1203789378 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported. Samples1203789377 (MB) and 1203789378 (LCS) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

**Product:** Nitrate Nitrite by Cadmium Reduction

**Analytical Batch:** 1664158

**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>
422730001	CASA-17-132323
422730003	CASA-17-132324
422730005	CAMO-17-132524
1203787255	Method Blank (MB)
1203787256	Laboratory Control Sample (LCS)
1203787269	422637001(CASA-17-132322) Sample Duplicate (DUP)
1203787271	422637001(CASA-17-132322) 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 Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 422637001 (CASA-17-132322) was selected for QC analysis.

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

The MS/PS recoveries for this sample set were within the required acceptance limits 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 1203787269 (CASA-17-132322DUP), 1203787271 (CASA-17-132322PS), 422730001 (CASA-17-132323) and 422730003 (CASA-17-132324) were diluted because target analyte concentrations exceeded the calibration range. The following sample 422730005 (CAMO-17-132524) 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	422730		
	001	003	005
Nitrogen, Nitrate/Nitrite	25X	25X	10X

**Sample Re-analysis**

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

### **Miscellaneous Information**

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

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

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1663545	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1663543	<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>
422730001	CASA-17-132323
422730003	CASA-17-132324
422730005	CAMO-17-132524
1203785845	Method Blank (MB)
1203785846	Laboratory Control Sample (LCS)
1203785851	422637001(CASA-17-132322) Sample Duplicate (DUP)
1203785852	422637001(CASA-17-132322) 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 Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 422637001 (CASA-17-132322) 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:** Solids and Total Dissolved

**Analytical Batch:** 1664155

**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>
422730001	CASA-17-132323
422730003	CASA-17-132324
422730005	CAMO-17-132524
1203787277	Method Blank (MB)
1203787278	Laboratory Control Sample (LCS)
1203787280	422570003(CAMO-17-132213) 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 Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

#### **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**

Sample 422570003 (CAMO-17-132213) 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:** Specific Conductivity

**Analytical Batch:** 1663951

**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>
422730001	CASA-17-132323
422730003	CASA-17-132324
422730005	CAMO-17-132524
1203786728	Laboratory Control Sample (LCS)
1203786729	422730001(CASA-17-132323) 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# 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 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 Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 422730001 (CASA-17-132323) 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:** 1666469 **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>
422730001	CASA-17-132323
422730003	CASA-17-132324
422730005	CAMO-17-132524
1203792736	Laboratory Control Sample (LCS)
1203792737	422730001(CASA-17-132323) 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 Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 422730001 (CASA-17-132323) 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**

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

Sample	Analyte	Value
1203792737 (CASA-17-132323DUP)	pH	Received 10-MAY-17, out of holding 08-MAY-17
422730001 (CASA-17-132323)	pH	Received 10-MAY-17, out of holding 08-MAY-17
422730003 (CASA-17-132324)	pH	Received 10-MAY-17, out of holding 08-MAY-17
422730005 (CAMO-17-132524)	pH	Received 10-MAY-17, out of holding 08-MAY-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) 1633517 was generated for samples 422730001 (CASA-17-132323), 422730003 (CASA-17-132324), 422730005 (CAMO-17-132524) and 1203792737 (CASA-17-132323DUP) in this SDG/batch.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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### **Method/Analysis Information**

**Product:** Alkalinity

**Analytical Batch:** 1666465      **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>
422730001	CASA-17-132323
422730003	CASA-17-132324
422730005	CAMO-17-132524
1203792713	Laboratory Control Sample (LCS)
1203792717	422730001(CASA-17-132323) Sample Duplicate (DUP)
1203792720	422730001(CASA-17-132323) 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 Electronic bottle-top 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 Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.



**Quality Control (QC) Designation**

Sample 422730001 (CASA-17-132323) 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.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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**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: 2017-1496 GEL Work Order: 422730

#### 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: Kristen Mizzell

Date: 31 MAY 2017

Title: Analyst I

# **Sample Data Summary**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: June 1, 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: 2017-1496

Client Sample ID: CASA-17-132323  
Sample ID: 422730001  
Matrix: W  
Collect Date: 08-MAY-17 12:15  
Receive Date: 10-MAY-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"												
Chloride		9.39	0.067	0.200	mg/L		1	MXL2	05/11/17	2313	1664539	1
Fluoride		0.362	0.033	0.100	mg/L		1					
Sulfate		19.0	0.133	0.400	mg/L		1					
Bromide	J	0.0876	0.067	0.200	mg/L		1	MXL2	05/13/17	0140	1664539	2
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0457	0.017	0.050	mg/L	1.00	1	KLP1	05/15/17	1314	1664592	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		4.98	0.425	1.25	mg/L		25	AXH3	05/17/17	0739	1664158	4
PO4 "As Received"												
Phosphorus, Total as P	J	0.0379	0.020	0.050	mg/L	1.00	1	KLP1	05/16/17	1416	1663545	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		190	3.40	14.3	mg/L			KLP1	05/11/17	1624	1664155	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		42.4	1.45	4.00	mg/L			RXB5	05/18/17	1850	1666465	7
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		205	1.00	1.00	umhos/cm		1	VH1	05/12/17	1444	1663951	8
PH "As Received"												
pH at Temp 15.3C	H	7.98	0.010	0.100	SU		1	RXB5	05/18/17	1850	1666469	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	05/15/17	1134	1664591
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	05/15/17	1700	1663543

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: June 1, 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: 2017-1496

Client Sample ID: CASA-17-132323  
Sample ID: 422730001

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:300.0											
3	EPA:350.1											
4	EPA:353.2											
5	EPA 365.4 1974											
6	EPA:160.1											
7	EPA:310.1											
8	EPA:120.1											
9	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

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: June 1, 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: 2017-1496

Client Sample ID: CASA-17-132332  
Sample ID: 422730002  
Matrix: W  
Collect Date: 08-MAY-17 12:15  
Receive Date: 10-MAY-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	J	0.702	0.330	1.00	mg/L		1	TSM	05/20/17	0447	1665822	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	05/11/17	0924	1663020	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.130	0.033	0.100	mg/L	1.00	1	KLP1	05/24/17	1021	1665040	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	05/11/17	0752	1663019
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	05/23/17	1700	1665039

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

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: June 1, 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: 2017-1496

Client Sample ID: CASA-17-132324  
Sample ID: 422730003  
Matrix: W  
Collect Date: 08-MAY-17 14:09  
Receive Date: 10-MAY-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"												
Chloride		6.30	0.067	0.200	mg/L		1	MXL2	05/11/17	2342	1664539	1
Fluoride		0.310	0.033	0.100	mg/L		1					
Sulfate		9.19	0.133	0.400	mg/L		1					
Bromide	J	0.0764	0.067	0.200	mg/L		1	MXL2	05/13/17	0209	1664539	2
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.101	0.017	0.050	mg/L	1.00	1	KLP1	05/15/17	1323	1664592	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		3.38	0.425	1.25	mg/L		25	AXH3	05/17/17	0740	1664158	4
PO4 "As Received"												
Phosphorus, Total as P	J	0.0344	0.020	0.050	mg/L	1.00	1	KLP1	05/16/17	1416	1663545	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		173	3.40	14.3	mg/L			KLP1	05/11/17	1624	1664155	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		70.0	1.45	4.00	mg/L			RXB5	05/18/17	1856	1666465	7
Carbonate alkalinity (CaCO3)		14.0	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		200	1.00	1.00	umhos/cm		1	VH1	05/12/17	1445	1663951	8
PH "As Received"												
pH at Temp 14.4C	H	8.73	0.010	0.100	SU		1	RXB5	05/18/17	1854	1666469	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	05/15/17	1134	1664591
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	05/15/17	1700	1663543

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: June 1, 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: 2017-1496

Client Sample ID: CASA-17-132324  
Sample ID: 422730003

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:300.0											
3	EPA:350.1											
4	EPA:353.2											
5	EPA 365.4 1974											
6	EPA:160.1											
7	EPA:310.1											
8	EPA:120.1											
9	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: June 1, 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: 2017-1496

Client Sample ID: CASA-17-132333  
Sample ID: 422730004  
Matrix: W  
Collect Date: 08-MAY-17 14:09  
Receive Date: 10-MAY-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	J	0.583	0.330	1.00	mg/L		1	TSM	05/20/17	0534	1665822	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	05/11/17	0925	1663020	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	05/24/17	1023	1665040	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	05/11/17	0752	1663019
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	05/23/17	1700	1665039

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: June 1, 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: 2017-1496

Client Sample ID: CAMO-17-132524  
Sample ID: 422730005  
Matrix: W  
Collect Date: 08-MAY-17 13:15  
Receive Date: 10-MAY-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"												
Fluoride		0.180	0.033	0.100	mg/L		1	MXL2	05/12/17	0109	1664539	1
Bromide	J	0.124	0.067	0.200	mg/L		1	MXL2	05/13/17	0336	1664539	2
Chloride		11.8	0.134	0.400	mg/L		2	MXL2	05/13/17	0601	1664539	3
Sulfate		21.4	0.266	0.800	mg/L		2					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0497	0.017	0.050	mg/L	1.00	1	KLP1	05/15/17	1324	1664592	4
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		1.49	0.170	0.500	mg/L		10	AXH3	05/17/17	0741	1664158	5
PO4 "As Received"												
Phosphorus, Total as P	J	0.0474	0.020	0.050	mg/L	1.00	1	KLP1	05/16/17	1417	1663545	6
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		161	3.40	14.3	mg/L			KLP1	05/11/17	1624	1664155	7
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		64.6	1.45	4.00	mg/L			RXB5	05/18/17	1859	1666465	8
Carbonate alkalinity (CaCO3)	J	3.20	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		235	1.00	1.00	umhos/cm		1	VH1	05/12/17	1445	1663951	9
PH "As Received"												
pH at Temp 15.2C	H	8.60	0.010	0.100	SU		1	RXB5	05/18/17	1858	1666469	10

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	05/15/17	1134	1664591
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	05/15/17	1700	1663543

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## Certificate of Analysis

Report Date: June 1, 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: 2017-1496

Client Sample ID: CAMO-17-132524  
Sample ID: 422730005

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:300.0											
3	EPA:300.0											
4	EPA:350.1											
5	EPA:353.2											
6	EPA 365.4 1974											
7	EPA:160.1											
8	EPA:310.1											
9	EPA:120.1											
10	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: June 1, 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: 2017-1496

Client Sample ID: CAMO-17-132526

Project: ESHL00114

Sample ID: 422730006

Client ID: ARSL004

Matrix: W

Collect Date: 08-MAY-17 13:15

Receive Date: 10-MAY-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	J	0.360	0.330	1.00	mg/L		1	TSM	05/20/17	0644	1665822	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	J	2.01	1.67	5.00	ug/L	1.00	1	AXH3	05/11/17	0926	1663020	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.193	0.033	0.100	mg/L	1.00	1	KLP1	05/24/17	1024	1665040	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	05/11/17	0752	1663019
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	05/23/17	1700	1665039

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: June 1, 2017

Page 1 of 6

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

Contact: Mr. Keith Greene

Workorder: 422730

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1665822										
QC1203791710	422637002	DUP									
Total Organic Carbon Average		J	0.332	U	ND	mg/L	200	^	TSM	05/20/17	02:26
QC1203791231	LCS										
Total Organic Carbon Average	10.0				9.84	mg/L		98.4	(80%-120%)	05/20/17	01:27
QC1203791230	MB										
Total Organic Carbon Average			U	ND	mg/L					05/20/17	01:16
QC1203791711	422637002	PS									
Total Organic Carbon Average	10.0	J	0.332		9.82	mg/L		94.9	(75%-125%)	05/20/17	03:13
<b>Flow Injection Analysis</b>											
Batch	1663020										
QC1203785527	422637002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	05/11/17	08:56
QC1203784604	LCS										
Cyanide, Total	50.0				50.5	ug/L		101	(90%-110%)	05/11/17	08:53
QC1203784603	MB										
Cyanide, Total			U	ND	ug/L					05/11/17	08:52
QC1203785529	422637002	MS									
Cyanide, Total	100	U	ND		101	ug/L		101	(90%-110%)	05/11/17	08:57
<b>Ion Chromatography</b>											
Batch	1664539										
QC1203788155	422570003	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	05/12/17	23:16

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## QC Summary

Workorder: 422730

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1664539										
Chloride		1.85		1.85	mg/L	0.211		(0%-20%)	MXL2	05/11/17	20:49
Fluoride		0.129		0.125	mg/L	3.15	^	(+/-0.100)			
Sulfate		2.06		2.01	mg/L	2.43		(0%-20%)			
QC1203788154 LCS											
Bromide	1.25			1.26	mg/L		101	(80%-120%)		05/12/17	22:18
Chloride	5.00			5.10	mg/L		102	(80%-120%)		05/11/17	19:51
Fluoride	2.50			2.68	mg/L		107	(80%-120%)			
Sulfate	10.0			10.5	mg/L		105	(80%-120%)			
QC1203788153 MB											
Bromide			U	ND	mg/L					05/12/17	21:49
Chloride			U	ND	mg/L					05/11/17	19:22
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203788157 422570003 PS											
Bromide	1.25	U	ND	1.26	mg/L		97.7	(75%-125%)		05/12/17	23:45
Chloride	5.00		1.85	7.20	mg/L		107	(75%-125%)		05/11/17	21:18
Fluoride	2.50		0.129	2.74	mg/L		104	(75%-125%)			
Sulfate	10.0		2.06	12.8	mg/L		107	(75%-125%)			

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## QC Summary

Workorder: 422730

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1663545										
QC1203785851	422637001	DUP									
Phosphorus, Total as P	J	0.0276	J	0.0257	mg/L	7.13	^	(+/-0.050)	KLP1	05/16/17	13:53
QC1203785846	LCS										
Phosphorus, Total as P	1.00			0.914	mg/L			91.4	(80%-124%)	05/16/17	13:51
QC1203785845	MB										
Phosphorus, Total as P			U	ND	mg/L					05/16/17	13:50
QC1203785852	422637001	MS									
Phosphorus, Total as P	1.00	J	0.0276	1.02	mg/L			99.2	(63%-139%)	05/16/17	13:53
Batch	1664158										
QC1203787269	422637001	DUP									
Nitrogen, Nitrate/Nitrite		2.30		2.28	mg/L	0.873	^	(+/-0.500)	AXH3	05/17/17	07:22
QC1203787256	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.01	mg/L			101	(90%-110%)	05/17/17	07:05
QC1203787255	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					05/17/17	07:04
QC1203787271	422637001	PS									
Nitrogen, Nitrate/Nitrite	1.00		0.230	1.26	mg/L			103	(90%-110%)	05/17/17	07:23
Batch	1664592										
QC1203788278	422730001	DUP									
Nitrogen, Ammonia	J	0.0457	U	ND	mg/L	200	^		KLP1	05/15/17	13:21
QC1203788275	LCS										
Nitrogen, Ammonia	1.00			0.932	mg/L			93.2	(90%-110%)	05/15/17	13:20
QC1203788274	MB										
Nitrogen, Ammonia			J	0.0497	mg/L					05/15/17	13:19



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## QC Summary

Workorder: 422730

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1664592										
QC1203788279	422730001	MS									
Nitrogen, Ammonia	1.00	J	0.0457	0.971	mg/L		92.5	(90%-110%)	KLP1	05/15/17	13:22
Batch	1665040										
QC1203789381	422730002	DUP									
Nitrogen, Total Kjeldahl			0.130	J	0.050	mg/L	88.9 ^	(+/-0.100)	KLP1	05/24/17	10:22
QC1203789378	LCS										
Nitrogen, Total Kjeldahl	1.00			1.05	mg/L		105	(90%-110%)		05/24/17	10:18
QC1203789377	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					05/24/17	10:06
QC1203789383	422730002	MS									
Nitrogen, Total Kjeldahl	1.00		0.130	1.20	mg/L		107	(90%-110%)		05/24/17	10:22
<b>Solids Analysis</b>											
Batch	1664155										
QC1203787280	422570003	DUP									
Total Dissolved Solids			114	114	mg/L	0		(0%-5%)	KLP1	05/11/17	16:24
QC1203787278	LCS										
Total Dissolved Solids	300			289	mg/L		96.2	(95%-105%)		05/11/17	16:24
QC1203787277	MB										
Total Dissolved Solids			U	ND	mg/L					05/11/17	16:24
<b>Titration and Ion Analysis</b>											
Batch	1663951										
QC1203786729	422730001	DUP									
Conductivity			205	206	umhos/cm	0.487		(0%-10%)	VH1	05/12/17	14:45
QC1203786728	LCS										
Conductivity	1410			1400	umhos/cm		99	(95%-105%)		05/12/17	14:39

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## QC Summary

Workorder: 422730

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1666465										
QC1203792717	422730001	DUP									
Alkalinity, Total as CaCO3		42.4		41.8	mg/L	1.43		(0%-20%)	RXB5	05/18/17	18:51
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203792713	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		05/18/17	18:33
QC1203792720	422730001	MS									
Alkalinity, Total as CaCO3	100	42.4		149	mg/L		106	(80%-120%)		05/18/17	18:54
Batch	1666469										
QC1203792737	422730001	DUP									
pH	H	7.98	H	7.98	SU	0		(0%-5%)	RXB5	05/18/17	18:52
QC1203792736	LCS										
pH	7.00			6.99	SU		99.9	(99%-101%)		05/18/17	18:33

### Notes:

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

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## QC Summary

Workorder: 422730

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
d	5-day BOD--The 2:1 depletion requirement was not met for this sample										
e	5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes										
h	Preparation or preservation holding time was exceeded										

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

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

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

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

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

# Miscellaneous

### DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 18-MAY-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, SM 4500-H B, SW846 9040C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> CARE, ESHL, FLET, NFSR
<b>Batch ID:</b> 1666469	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 422623,422722,422730(2017-1496),422778(CAH-17-041a),422853(2017-1506),422859(2017-1505),422869(2017-1504),423409(EUI-10506) <b>Application Issues:</b> Sample received out of holding			
<b>Specification and Requirements</b> <b>Exception Description:</b>		<b>DER Disposition:</b>	
1. Sample received out of holding:  422623 001  422722 001  422730 001,003,005  422778 001  422853 001  422859 001  422869 001,005  423409 001  QC 1203792737DUP,1203792989DUP		1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified. 1203792737 (CASA-17-132323DUP) [Received 10-MAY-17, out of holding 08-MAY-17]. 1203792989 (Bi-Annual SewerDUP) [Received 10-MAY-17, out of holding 09-MAY-17]. 422623001 (Inflow 12) [Received 08-MAY-17, out of holding 08-MAY-17]. 422722001 (Outflow 11) [Received 09-MAY-17, out of holding 09-MAY-17]. 422730001 (CASA-17-132323) [Received 10-MAY-17, out of holding 08-MAY-17]. 422730003 (CASA-17-132324) [Received 10-MAY-17, out of holding 08-MAY-17]. 422730005 (CAMO-17-132524) [Received 10-MAY-17, out of holding 08-MAY-17]. 422778001 (Bi-Annual Sewer) [Received 10-MAY-17, out of holding 09-MAY-17]. 422853001 (CAMO-17-132206) [Received 11-MAY-17, out of holding 09-MAY-17]. 422859001 (CAMO-17-132199) [Received 11-MAY-17, out of holding 09-MAY-17]. 422869001 (WST15-17-135038) [Received 11-MAY-17, out of holding 09-MAY-17]. 422869005 (WST15-17-135039) [Received 11-MAY-17, out of holding 09-MAY-17]. 423409001 (1001-02-0001 L126115) [Received 17-MAY-17, out of holding 15-MAY-17].	

**Originator's Name:**

Rachael Bell 18-MAY-17

**Data Validator/Group Leader:**

Elzbieta Szulc 19-MAY-17