

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: CAMO-17-132211

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05/17/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:42		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-45 S1		FIELD PREP:	F	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES <input checked="" type="radio"/> 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-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	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. Bonham & A. Stanfield

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 5/17/17 1550	RECEIVED BY (Printed Name) (Signature)	Date/Time 5/17/17 1558
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-17-132212

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05-17-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	14:36		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-45 S2		FIELD PREP:	F	
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	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP-CR52/53	1 LITER POLY	1	ICE		
	WSP- GENINORG+PerChlorate	1 LITER POLY	1	ICE		
	WSP-N15/O18- NO3	40 ML SEPTUM AMBER GLASS	2	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. Bonham, A. Stanfield

RELINQUISHED BY (Printed Name) <u>Tanner Bonham</u> (Signature) <u>[Signature]</u>	Date/Time <u>05/17/17</u> <u>1550</u>	RECEIVED BY (Printed Name) <u>Sherwood</u> (Signature) <u>[Signature]</u>	Date/Time <u>5/17/17</u> <u>1550</u>
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-17-132214

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05/17/2017	ok	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):	1212		MEDIA:	UA	
PRS ID:	ok		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-50 S1		FIELD PREP:	F	
LOCATION TYPE:	ok		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / <input checked="" type="radio"/> 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		

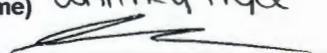
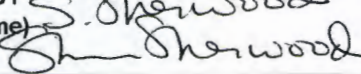
SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): W. Pryce

RELINQUISHED BY (Printed Name) Whitney Pryce (Signature) 	Date/Time 5/17/17 1330	RECEIVED BY (Printed Name) S. Sherwood (Signature) 	Date/Time 5/17/17 1330
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-17-133051

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05-17-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	14:36		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-45 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-LL-H-3	1 LITER POLY	1	NONE		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS:

Sampled ~25' from running diesel generator; gusty wind/dust during sampling; heavy traffic on well pad (being used as staging area)

LOCATION COMMENTS:

None

FIELD PARAMETERS:

Sample Time	14:36	HH:MM	Dissolved Oxygen (mg/L)	5.99	Flow (in gpm)	3.40
Oxidation-Reduction Potential (mV)	84.6	pH (SU)	8.22	Specific Conductance (uS/cm)	173.6	
Temperature (°C)	20.8	Turbidity (NTU)	0.36			

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

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 5/17/17 1550	RECEIVED BY (Printed Name) (Signature)	Date/Time 5/17/17 1550
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-17-133050

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05-17-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:42		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-45 S1		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-LL-H-3	1 LITER POLY	1	NONE		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time 12:42 HH:MM Dissolved Oxygen (mg/L) 7.14 Flow (in gpm) 3.44
 Oxidation-Reduction Potential (mV) 135.7 pH (SU) 7.68 Specific Conductance (uS/cm) 188.9
 Temperature (C) 20.5 Turbidity (NTU) 0.16

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

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 5/17/17 1550	RECEIVED BY (Printed Name) (Signature)	Date/Time 5/17/17 1550
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-17-132234

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05/17/2017	ok	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):	1212		MEDIA:	UA	
PRS ID:	ok		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-50 S1		FIELD PREP:	UF	
LOCATION TYPE:	ok		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
MS	MSGP-Hg	1 LITER POLY	1	HNO3	Y	NA
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time 1212 HH:MM Dissolved Oxygen 6.61 Flow (in gpm) 2.61
 Oxidation-Reduction Potential 193.6 pH 7.96 Specific Conductance 190.6
 Temperature 20.5 Turbidity 0.26

COLLECTED BY (PRINT):

W. Pryce

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 5/17/17 1330	RECEIVED BY (Printed Name) (Signature)	Date/Time 5/17/17 1330
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

DATA VALIDATION REPORT

Chain Of Custody No. 2017-1552

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
423575	EPA:120.1	3				
423575	EPA:150.1	3				
423575	EPA:160.1	3				
423575	EPA:170.0	6				
423575	EPA:245.2	6				
423575	EPA:300.0	3				
423575	EPA:310.1	3				
423575	EPA:335.4	3				
423575	EPA:350.1	3				
423575	EPA:351.2	3				
423575	EPA:353.2	3				
423575	EPA:365.4	3				
423575	SM:A2340B	3				
423575	SW-846:6010C	3				
423575	SW-846:6020	3				
423575	SW-846:6850	3				
423575	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
423575	EPA:120.1	1668501	1668501	3										1			1				
423575	EPA:150.1	1669863	1669863	3										1			1				
423575	EPA:160.1	1665589	1665589	3					1					1			1				
423575	EPA:170.0	NA	NA	6																	
423575	EPA:245.2	1668006	1668004	6					1	2				1			2				
423575	EPA:300.0	1668293	1668293	1					1					1			1				
423575	EPA:300.0	1669023	1669023	2					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
423575	EPA:310.1	1669161	1669161	3						1				1				1			
423575	EPA:335.4	1667161	1667160	3					1	1				1				1			
423575	EPA:350.1	1666189	1666188	3					1	1				1				1			
423575	EPA:351.2	1667286	1667285	3					1	1				1				1			
423575	EPA:353.2	1667152	1667152	3					1					1				2			
423575	EPA:365.4	1666194	1666193	3					1	1				1				1			
423575	SM:A2340B	1674389	1674389	3																	
423575	SW-846:6010C	1666876	1666875	3					1	1				1				1			
423575	SW-846:6020	1666864	1666862	3					1	1				1				1			
423575	SW-846:6850	1667580	1667579	3					1	1	1			1							
423575	SW-846:9060	1667273	1667273	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-17-132211	423575001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-132212	423575003	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-132214	423575005	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-17-132339	1203797708	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203797707	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-132211	423575001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-132212	423575003	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-132214	1203801186	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-132214	423575005	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203801184	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-132201	1203794808	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-132211	423575001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-132212	423575003	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-132214	423575005	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203790696	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203790695	MB	1	0	0	0
EPA:170.0	VOC	CAMO-17-132211	423575001	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	CAMO-17-132212	423575003	REG	1	0	0	0
EPA:170.0	VOC	CAMO-17-132214	423575005	REG	1	0	0	0
EPA:170.0	VOC	CAMO-17-132234	423575006	REG	1	0	0	0
EPA:170.0	VOC	CAMO-17-133050	423575002	REG	1	0	0	0
EPA:170.0	VOC	CAMO-17-133051	423575004	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132201	1203796487	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132201	1203796489	MS	0	0	1	0
EPA:245.2	INORGANIC	CAMO-17-132202	1203796488	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132202	1203796490	MS	0	0	1	0
EPA:245.2	INORGANIC	CAMO-17-132211	423575001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132212	423575003	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132214	423575005	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132234	423575006	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-133050	423575002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-133051	423575004	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203796486	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203796485	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132200	1203797179	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132211	423575001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132212	1203798955	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132212	423575003	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132214	423575005	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203797178	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203798954	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203797177	MB	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203798953	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-132211	423575001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-132212	423575003	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-132214	1203799304	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-132214	1203799307	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-132214	423575005	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203799302	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-132234	423575006	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-133050	1203794409	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-133050	1203794412	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-133050	423575002	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-133051	423575004	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203794407	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203794406	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-132211	423575001	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:350.1	GENERAL CHEMISTRY	CAMO-17-132212	423575003	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-132214	423575005	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203792074	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203792073	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	WST53-17-133059	1203792075	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	WST53-17-133059	1203792076	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-132222	1203794806	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-132222	1203794807	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-132234	423575006	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-133050	423575002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-133051	423575004	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203794805	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203794804	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-132211	1203794383	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-132211	423575001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-132212	423575003	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-132214	423575005	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203794380	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203794379	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	MSGP-17-131943	1203794381	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-132211	423575001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-132212	423575003	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-132214	423575005	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203792088	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203792087	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	WST53-17-133059	1203792089	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	WST53-17-133059	1203792090	MS	0	0	1	0
SM:A2340B	INORGANIC	CAMO-17-132211	423575001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-17-132212	423575003	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-17-132214	423575005	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-132211	1203793776	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-132211	1203793777	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAMO-17-132211	423575001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-132212	423575003	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-132214	423575005	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203793775	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203793774	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-17-132211	1203793744	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-17-132211	1203793745	MS	0	0	11	0
SW-846:6020	INORGANIC	CAMO-17-132211	423575001	REG	11	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6020	INORGANIC	CAMO-17-132212	423575003	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-17-132214	423575005	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203793743	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203793742	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-132201	1203795362	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-132201	1203795363	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-132211	423575001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-132212	423575003	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-132214	423575005	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203795361	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203795360	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-132234	423575006	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-133049	1203795680	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-133050	423575002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-133051	423575004	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203795679	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203795678	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	1203792073	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0307	J	mg/L	0.050
MB	1203793774	METHOD BLANK	SW-846:6010C	W	Sodium	-139	J	ug/L	300

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
CAMO-17-132211	1203792073	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0307	mg/L	0.0175	J	0.050	Y	5	100	Y
CAMO-17-132212	1203792073	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0307	mg/L	0.0858		0.050	Y	5	100	Y
CAMO-17-132214	1203792073	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0307	mg/L	0.0513		0.050	Y	5	100	Y
CAMO-17-132211	1203793774	METHOD BLANK	SW-846:6010C	Sodium	-139	ug/L	11900		300	Y			
CAMO-17-132212	1203793774	METHOD BLANK	SW-846:6010C	Sodium	-139	ug/L	11800		300	Y			
CAMO-17-132214	1203793774	METHOD BLANK	SW-846:6010C	Sodium	-139	ug/L	12800		300	Y			

6. Any surrogate recoveries outside the control limits?

No.

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
WST53-17-133059	1203792076		EPA:350.1	Ammonia as Nitrogen	1666188	05-22-2017	W	74.8		110	90	10		
CAMO-17-132222	1203794807		EPA:351.2	Total Kjeldahl Nitrogen	1667285	05-24-2017	W	156		110	90	10		
WST53-17-133059	1203792090		EPA:365.4	Total Phosphate as Phosphorus	1666193	05-23-2017	W	360		139	63	10		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

DATA VALIDATION REPORT

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	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-45 S1	2017-1552	CAMO-17-132211	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N	0.0175	mg/L	0.0175	mg/L			W	05/17/2017	1666189	VAL	Y	
R-45 S2	2017-1552	CAMO-17-132212	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N	0.0858	mg/L	0.0858	mg/L			W	05/17/2017	1666189	VAL	Y	
R-50 S1	2017-1552	CAMO-17-132214	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N	0.0513	mg/L	0.0513	mg/L			W	05/17/2017	1666189	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-17-132211	R-45 S1	REG	EPA:120.1	0	1
CAMO-17-132211	R-45 S1	REG	EPA:150.1	0	1
CAMO-17-132211	R-45 S1	REG	EPA:160.1	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-17-132211	R-45 S1	REG	EPA:170.0	0	1
CAMO-17-132211	R-45 S1	REG	EPA:245.2	0	1
CAMO-17-132211	R-45 S1	REG	EPA:300.0	0	4
CAMO-17-132211	R-45 S1	REG	EPA:310.1	0	2
CAMO-17-132211	R-45 S1	REG	EPA:350.1	0	1
CAMO-17-132211	R-45 S1	REG	EPA:353.2	0	1
CAMO-17-132211	R-45 S1	REG	EPA:365.4	0	1
CAMO-17-132211	R-45 S1	REG	SM:A2340B	0	1
CAMO-17-132211	R-45 S1	REG	SW-846:6010C	0	17
CAMO-17-132211	R-45 S1	REG	SW-846:6020	0	11
CAMO-17-132211	R-45 S1	REG	SW-846:6850	0	1
CAMO-17-132212	R-45 S2	REG	EPA:120.1	0	1
CAMO-17-132212	R-45 S2	REG	EPA:150.1	0	1
CAMO-17-132212	R-45 S2	REG	EPA:160.1	0	1
CAMO-17-132212	R-45 S2	REG	EPA:170.0	0	1
CAMO-17-132212	R-45 S2	REG	EPA:245.2	0	1
CAMO-17-132212	R-45 S2	REG	EPA:300.0	0	4
CAMO-17-132212	R-45 S2	REG	EPA:310.1	0	2
CAMO-17-132212	R-45 S2	REG	EPA:350.1	0	1
CAMO-17-132212	R-45 S2	REG	EPA:353.2	0	1
CAMO-17-132212	R-45 S2	REG	EPA:365.4	0	1
CAMO-17-132212	R-45 S2	REG	SM:A2340B	0	1
CAMO-17-132212	R-45 S2	REG	SW-846:6010C	0	17
CAMO-17-132212	R-45 S2	REG	SW-846:6020	0	11
CAMO-17-132212	R-45 S2	REG	SW-846:6850	0	1
CAMO-17-132214	R-50 S1	REG	EPA:120.1	0	1
CAMO-17-132214	R-50 S1	REG	EPA:150.1	0	1
CAMO-17-132214	R-50 S1	REG	EPA:160.1	0	1
CAMO-17-132214	R-50 S1	REG	EPA:170.0	0	1
CAMO-17-132214	R-50 S1	REG	EPA:245.2	0	1
CAMO-17-132214	R-50 S1	REG	EPA:300.0	0	4
CAMO-17-132214	R-50 S1	REG	EPA:310.1	0	2
CAMO-17-132214	R-50 S1	REG	EPA:350.1	0	1
CAMO-17-132214	R-50 S1	REG	EPA:353.2	0	1
CAMO-17-132214	R-50 S1	REG	EPA:365.4	0	1
CAMO-17-132214	R-50 S1	REG	SM:A2340B	0	1
CAMO-17-132214	R-50 S1	REG	SW-846:6010C	0	17

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-17-132214	R-50 S1	REG	SW-846:6020	0	11
CAMO-17-132214	R-50 S1	REG	SW-846:6850	0	1
CAMO-17-132234	R-50 S1	REG	EPA:170.0	0	1
CAMO-17-132234	R-50 S1	REG	EPA:245.2	0	1
CAMO-17-132234	R-50 S1	REG	EPA:335.4	0	1
CAMO-17-132234	R-50 S1	REG	EPA:351.2	0	1
CAMO-17-132234	R-50 S1	REG	SW-846:9060	0	1
CAMO-17-133050	R-45 S1	REG	EPA:170.0	0	1
CAMO-17-133050	R-45 S1	REG	EPA:245.2	0	1
CAMO-17-133050	R-45 S1	REG	EPA:335.4	0	1
CAMO-17-133050	R-45 S1	REG	EPA:351.2	0	1
CAMO-17-133050	R-45 S1	REG	SW-846:9060	0	1
CAMO-17-133051	R-45 S2	REG	EPA:170.0	0	1
CAMO-17-133051	R-45 S2	REG	EPA:245.2	0	1
CAMO-17-133051	R-45 S2	REG	EPA:335.4	0	1
CAMO-17-133051	R-45 S2	REG	EPA:351.2	0	1
CAMO-17-133051	R-45 S2	REG	SW-846:9060	0	1



June 14, 2017

gel.com

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

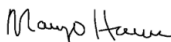
Re: LANL- WQH Water Samples
Work Order: 423575
SDG: 2017-1552

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on May 19, 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: 2017-1552
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 423575
SDG: 2017-1552

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 423575
SDG # : 2017-1552**

June 14, 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 19, 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:

<u>Laboratory ID</u>	<u>Client ID</u>
423575001	CAMO-17-132211
423575002	CAMO-17-133050
423575003	CAMO-17-132212
423575004	CAMO-17-133051
423575005	CAMO-17-132214
423575006	CAMO-17-132234

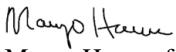
Case Narrative

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 for
Valerie Davis
Project Manager

List of current GEL Certifications as of 14 June 2017

State	Certification
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

SAMPLE RECEIPT & REVIEW FORM

Client: ESHL		SDG/AR/COC/Work Order: 423575		
Received By: ZKW		Date Received: 5/19/17		
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other 5908 1782 1113 5900 1782 1124		
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <u>62</u> CPM/mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?		<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"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Wet Ice <u>Ice Packs</u> Dry ice None Other: _____ *all temperatures are recorded in Celsius TEMP: 1°C
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" 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"/>			ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
11 Number of containers received match number indicated on COC?			<input checked="" type="checkbox"/>	Sample ID's affected: <u>We only rec'd 1 vial for -136837</u>
12 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials

Date _____

Page

of

of _____

GL-CHL-SR-001 Rev 5

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

SHIP DATE: 18MAY17
ACTWGT: 53.0 LB MAN
CAD: 0014176/CAFE2916

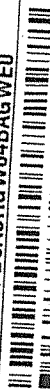
LOS ALAMOS, NM 87545
UNITED STATES US

BILL SENDER

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

CHARLESTON SC 29407
(843) 566-8171

REF: 21PD0ASRGW04BAGWEO



FedEx
Express

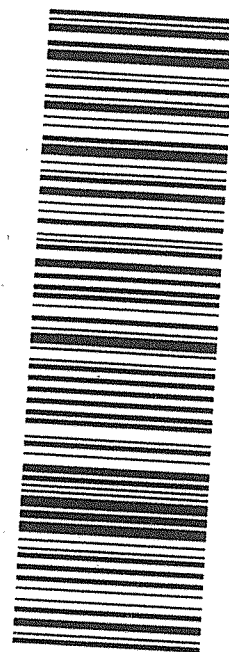


2 of 2
MPS# 5908 1782 1124
Mstr# 5908 1782 1113

0201

X7 RBWA

29407
SC-US CHS



Part # 156148V-434 R1T2 06/15

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

SHIP DATE: 19MAY17
ACTWGT: 49.0 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: 21PD0ASRGW04BAGWEO



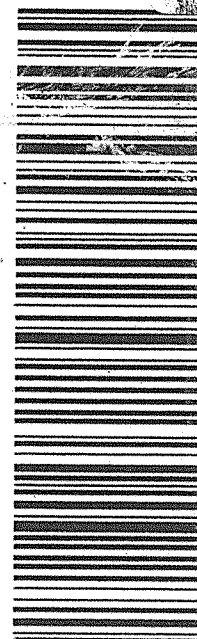
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Express



1 of 2
TRX# 5908 1782 1113
MASTER

X7 RBWA

29407
SC-US CHS



Part # 156148V-434 R1T2 06/15

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 #: 2017-1552
Work Order #: 423575**

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:	1667580
Prep Batch Number:	1667579

Sample Analysis

Sample ID	Client ID
423575001	423575001 (CAMO-17-132211)
423575003	423575003 (CAMO-17-132212)
423575005	423575005 (CAMO-17-132214)
1203795366	Interference Check Sample (ICS)
1203795360	Method Blank (MB)
1203795361	Laboratory Control Sample (LCS)
1203795362	423330001(CAMO-17-132201) Matrix Spike (MS)
1203795363	423330001(CAMO-17-132201) 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 423330001 (CAMO-17-132201) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPDs between the MS and MSD met the acceptance limits.

Internal Standard Area Acceptance

The internal standard areas were within the required acceptance criteria for all samples and QC.

Retention Time

During the analysis of Perchlorate by LC/MS/MS, retention time shifts are commonly observed. These retention time shifts, which are caused by fouling of the column by the sample matrices, are problematic when the retention time is used as one of the criterion for confirmation. To overcome this problem, a known amount of O(18) labeled Perchlorate was added to each sample as a retention time standard. The presence of Perchlorate was confirmed by the relative retention time (RRT) of the Perchlorate peak and the O(18) standard. A RRT window of 0.98 to 1.02, as required by DOD QSM 5.0, has been used. In addition to the isotopic ratio, the presence of Perchlorate in the samples associated with this data package have been confirmed using the relative retention criteria stated above, not the absolute retention time.

Technical Information

Holding Time Specifications

All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based

on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Manual Integrations

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

Method Comments

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

Additional Comments

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

Perchlorate Isotope Ratio

The Perchlorate isotope ratio met acceptance criteria for all samples and QC samples. Please see the isotope ratio criteria in the Miscellaneous Section.

System Configuration

The laboratory utilizes a Waters LC 2795 liquid chromatography instrument for Perchlorate analysis. It is coupled with a Micromass Quattro Ultima Mass Spectrometer/Mass Spectrometer. It is designated as LCMSMS #2. It is fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis. The laboratory may also utilize an Agilent 1100 liquid chromatography instrument for Perchlorate analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/Mass Spectrometer, designated as LCMSMS #3 or LCMSMS #4. It is also fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis.

Electronic Packaging Comment

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

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

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

Chromatographic Columns

The LC-MS/MS Perchlorate analysis was performed on a Quatro Ultima LC/MS/MS.

Chromatographic separation of Perchlorate is accomplished through analysis on the following anion column:

Dionex: IonPac AG-16 2 x 50 mm.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-1552 GEL Work Order: 423575

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: Michael Penny

Date: 13 JUN 2017

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1667579Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-132211Date Received: 19-MAY-17GEL Job No (SDG): 2017-1552GEL Sample ID: 423575001Date Filtered: 23-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	0.605	ug/L		1	23-MAY-17 23:16	per0523054a
	Perchlorate Isotope Ratio			3			1	23-MAY-17 23:16	per0523054a
14797-73-0	Perchlorate-101	.05	.2	0.580	ug/L		1	23-MAY-17 23:16	per0523054a
	Perchlorate-O(18)			0.381	ug/L		1	23-MAY-17 23:16	per0523054a

^ 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: 1667579Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-132212Date Received: 19-MAY-17GEL Job No (SDG): 2017-1552GEL Sample ID: 423575003Date Filtered: 23-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	0.411	ug/L		1	23-MAY-17 23:25	per0523055a
	Perchlorate Isotope Ratio			2.82			1	23-MAY-17 23:25	per0523055a
14797-73-0	Perchlorate-101	.05	.2	0.419	ug/L		1	23-MAY-17 23:25	per0523055a
	Perchlorate-O(18)			0.385	ug/L		1	23-MAY-17 23:25	per0523055a

^ 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: 1667579Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-132214Date Received: 19-MAY-17GEL Job No (SDG): 2017-1552GEL Sample ID: 423575005Date Filtered: 23-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	0.598	ug/L		1	23-MAY-17 23:34	per0523056a
	Perchlorate Isotope Ratio			2.87			1	23-MAY-17 23:34	per0523056a
14797-73-0	Perchlorate-101	.05	.2	0.599	ug/L		1	23-MAY-17 23:34	per0523056a
	Perchlorate-O(18)			0.401	ug/L		1	23-MAY-17 23:34	per0523056a

^ 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): 2017-1552

Extract Batch Code: 1667579

Date Filtered: 23-MAY-17

Matrix: WATER

Sample ID: 1203795361

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.205	ug/L	102		85 - 115
Perchlorate Isotope Ratio		2.74				-
Perchlorate-101	0.200	.215	ug/L	108		85 - 115
Perchlorate-O(18)		.382	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): 2017-1552

Extract Batch Code: 1667579

Date Extracted: 23-MAY-17

GEL MS/PS ID: 1203795362

Client ID: CAMO-17-132201

GEL MSD/PSD ID: 1203795363

QC Type: MS

Compound^	Spike Added	Sample Conc	Units	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Recovery Limit
Perchlorate	0.200	0.377	ug/L	0.555	89	.544	84	2	30	75 - 125
Perchlorate Isotope Ratio	0	2.92		2.96		2.78		6		-
Perchlorate-101	0.200	0.371	ug/L	0.539	84	.563	96	4	30	75 - 125
Perchlorate-O(18)	0	0.392	ug/L	0.394		.387		2		-

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

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1667579Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 23-MAY-17GEL Job No (SDG): 2017-1552GEL Sample ID: 1203795360Date Filtered: 23-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	23-MAY-17 20:16	per0523034a
	Perchlorate Isotope Ratio						1	23-MAY-17 20:16	per0523034a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	23-MAY-17 20:16	per0523034a
	Perchlorate-O(18)			0.411	ug/L		1	23-MAY-17 20:16	per0523034a

^ 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: 1667579Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 23-MAY-17GEL Job No (SDG): 2017-1552GEL Sample ID: 1203795361Date Filtered: 23-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	0.205	ug/L		1	23-MAY-17 20:25	per0523035a
	Perchlorate Isotope Ratio			2.74			1	23-MAY-17 20:25	per0523035a
14797-73-0	Perchlorate-101	.05	.2	0.215	ug/L		1	23-MAY-17 20:25	per0523035a
	Perchlorate-O(18)			0.382	ug/L		1	23-MAY-17 20:25	per0523035a

^ 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: 1667579Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1552GEL Sample ID: 1203795366Date Filtered: 23-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	23-MAY-17 21:01	per0523039a
	Perchlorate Isotope Ratio			3.04			1	23-MAY-17 21:01	per0523039a
14797-73-0	Perchlorate-101	.05	.2	0.190	ug/L	J	1	23-MAY-17 21:01	per0523039a
	Perchlorate-O(18)			0.403	ug/L		1	23-MAY-17 21:01	per0523039a

^ 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: 1667579Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-132201MSDate Received: 17-MAY-17GEL Job No (SDG): 2017-1552GEL Sample ID: 1203795362Date Filtered: 23-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	0.555	ug/L		1	23-MAY-17 21:19	per0523041a
	Perchlorate Isotope Ratio			2.96			1	23-MAY-17 21:19	per0523041a
14797-73-0	Perchlorate-101	.05	.2	0.539	ug/L		1	23-MAY-17 21:19	per0523041a
	Perchlorate-O(18)			0.394	ug/L		1	23-MAY-17 21:19	per0523041a

^ 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: 1667579Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-132201MSDDate Received: 17-MAY-17GEL Job No (SDG): 2017-1552GEL Sample ID: 1203795363Date Filtered: 23-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	0.544	ug/L		1	23-MAY-17 21:28	per0523042a
	Perchlorate Isotope Ratio			2.78			1	23-MAY-17 21:28	per0523042a
14797-73-0	Perchlorate-101	.05	.2	0.563	ug/L		1	23-MAY-17 21:28	per0523042a
	Perchlorate-O(18)			0.387	ug/L		1	23-MAY-17 21:28	per0523042a

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

*Concentration =

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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-1552
Work Order #: 423575

Sample ID	Client ID
423575001	CAMO-17-132211
423575002	CAMO-17-133050
423575003	CAMO-17-132212
423575004	CAMO-17-133051
423575005	CAMO-17-132214
423575006	CAMO-17-132234
1203793774	Method Blank (MB) ICP
1203793775	Laboratory Control Sample (LCS)
1203793778	423575001(CAMO-17-132211L) Serial Dilution (SD)
1203793776	423575001(CAMO-17-132211D) Sample Duplicate (DUP)
1203793777	423575001(CAMO-17-132211S) Matrix Spike (MS)
1203793742	Method Blank (MB) ICP-MS
1203793743	Laboratory Control Sample (LCS)
1203793746	423575001(CAMO-17-132211L) Serial Dilution (SD)
1203793744	423575001(CAMO-17-132211D) Sample Duplicate (DUP)
1203793745	423575001(CAMO-17-132211S) Matrix Spike (MS)
1203796485	Method Blank (MB) CVAA
1203796486	Laboratory Control Sample (LCS)
1203796492	423448001(CAMO-17-132202L) Serial Dilution (SD)
1203796488	423448001(CAMO-17-132202D) Sample Duplicate (DUP)
1203796490	423448001(CAMO-17-132202S) Matrix Spike (MS)

Sample Analysis

Samples 423575001,002,003,004,005 and 006 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1666876, 1666864, 1668006 and 1674389
Prep Batch :	1666875, 1666862 and 1668004
Standard Operating Procedures:	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
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

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

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

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

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium, sodium and zinc. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 423575001 (CAMO-17-132211), 423575003 (CAMO-17-132212) and 423575005 (CAMO-17-132214)-ICP.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria. For the ICP-MS analysis, the ICSA solution contains 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: 423575001

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

The samples in this SDG were not diluted and 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: 2017-1552 GEL Work Order: 423575

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: 15 JUN 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 423575001**BASIS:** As Received**DATE COLLECTED** 17-MAY-17**CLIENT ID:** CAMO-17-132211**LEVEL:** Low**DATE RECEIVED** 19-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	MTM1	05/25/17 11:45	052517W3-5	1668006

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 423575001

BASIS: As Received

DATE COLLECTED 17-MAY-17

CLIENT ID: CAMO-17-132211

LEVEL: Low

DATE RECEIVED 19-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	06/14/17 13:23	061417A-1	1666876
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	06/07/17 14:13	170607-2	1666864
7440-38-2	Arsenic	2.57	ug/L	J	2	5	5	1	MS	PRB	06/07/17 14:13	170607-2	1666864
7440-39-3	Barium	29.7	ug/L		1	5	5	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7440-42-8	Boron	15.6	ug/L	J	15	50	50	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	06/07/17 14:13	170607-2	1666864
7440-70-2	Calcium	18900	ug/L		50	200	200	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7440-47-3	Chromium	41.7	ug/L		3	10	10	1	MS	PRB	06/08/17 16:52	170608-4	1666864
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	06/08/17 13:24	170608-3	1666864
7439-95-4	Magnesium	5230	ug/L		110	300	300	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7439-98-7	Molybdenum	0.997	ug/L		0.2	0.5	0.5	1	MS	PRB	06/07/17 14:13	170607-2	1666864
7440-02-0	Nickel	0.807	ug/L	J	0.6	2	2	1	MS	PRB	06/08/17 16:52	170608-4	1666864
7440-09-7	Potassium	1300	ug/L		50	150	150	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	06/07/17 14:13	170607-2	1666864
7631-86-9	Silica	69100	ug/L		53	213	213	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	PRB	06/07/17 14:13	170607-2	1666864
7440-23-5	Sodium	11900	ug/L		100	300	300	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7440-24-6	Strontium	84.7	ug/L		1	5	5	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	06/08/17 13:24	170608-3	1666864
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7440-61-1	Uranium	0.708	ug/L		0.067	0.2	0.2	1	MS	PRB	06/08/17 13:24	170608-3	1666864
7440-62-2	Vanadium	4.7	ug/L	J	1	5	5	1	P	HSC	06/14/17 13:23	061417A-1	1666876
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	06/14/17 13:23	061417A-1	1666876

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 423575001**BASIS:** As Received**DATE COLLECTED** 17-MAY-17**CLIENT ID:** CAMO-17-132211**LEVEL:** Low**DATE RECEIVED** 19-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	68.8	mg/L		0.453	1.24	1.24	1		JJ2	06/15/17 11:55		1674389

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1666864	1666862	SW846 3005A	50	mL	50	mL	05/19/17	CXW4
1666876	1666875	SW846 3005A	50	mL	50	mL	05/19/17	CXW4
1668006	1668004	EPA 245.1/245.2 Prep	20	mL	20	mL	05/24/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 423575002**BASIS:** As Received**DATE COLLECTED** 17-MAY-17**CLIENT ID:** CAMO-17-133050**LEVEL:** Low**DATE RECEIVED** 19-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	MTM1	05/25/17 11:47	052517W3-5	1668006

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1668006	1668004	EPA 245.1/245.2 Prep	20	mL	20	mL	05/24/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 423575003**BASIS:** As Received**DATE COLLECTED** 17-MAY-17**CLIENT ID:** CAMO-17-132212**LEVEL:** Low**DATE RECEIVED** 19-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	MTM1	05/25/17 11:52	052517W3-5	1668006

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 423575003

BASIS: As Received

DATE COLLECTED 17-MAY-17

CLIENT ID: CAMO-17-132212

LEVEL: Low

DATE RECEIVED 19-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	06/14/17 13:16	061417A-1	1666876
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	06/07/17 14:29	170607-2	1666864
7440-38-2	Arsenic	2.81	ug/L	J	2	5	5	1	MS	PRB	06/07/17 14:29	170607-2	1666864
7440-39-3	Barium	30.3	ug/L		1	5	5	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7440-42-8	Boron	18.5	ug/L	J	15	50	50	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	06/07/17 14:29	170607-2	1666864
7440-70-2	Calcium	17500	ug/L		50	200	200	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7440-47-3	Chromium	20.6	ug/L		3	10	10	1	MS	PRB	06/08/17 17:03	170608-4	1666864
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	06/08/17 13:31	170608-3	1666864
7439-95-4	Magnesium	5070	ug/L		110	300	300	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7439-98-7	Molybdenum	1.02	ug/L		0.2	0.5	0.5	1	MS	PRB	06/07/17 14:29	170607-2	1666864
7440-02-0	Nickel	1.8	ug/L	J	0.6	2	2	1	MS	PRB	06/08/17 17:03	170608-4	1666864
7440-09-7	Potassium	1350	ug/L		50	150	150	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	06/07/17 14:29	170607-2	1666864
7631-86-9	Silica	72000	ug/L		53	213	213	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	PRB	06/07/17 14:29	170607-2	1666864
7440-23-5	Sodium	11800	ug/L		100	300	300	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7440-24-6	Strontium	77	ug/L		1	5	5	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	06/08/17 13:31	170608-3	1666864
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7440-61-1	Uranium	0.703	ug/L		0.067	0.2	0.2	1	MS	PRB	06/08/17 13:31	170608-3	1666864
7440-62-2	Vanadium	6.67	ug/L		1	5	5	1	P	HSC	06/14/17 13:16	061417A-1	1666876
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	06/14/17 13:16	061417A-1	1666876

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 423575003**BASIS:** As Received**DATE COLLECTED** 17-MAY-17**CLIENT ID:** CAMO-17-132212**LEVEL:** Low**DATE RECEIVED** 19-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	64.5	mg/L		0.453	1.24	1.24	1		JJ2	06/15/17 11:55		1674389

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1666864	1666862	SW846 3005A	50	mL	50	mL	05/19/17	CXW4
1666876	1666875	SW846 3005A	50	mL	50	mL	05/19/17	CXW4
1668006	1668004	EPA 245.1/245.2 Prep	20	mL	20	mL	05/24/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 423575004**BASIS:** As Received**DATE COLLECTED** 17-MAY-17**CLIENT ID:** CAMO-17-133051**LEVEL:** Low**DATE RECEIVED** 19-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	MTM1	05/25/17 11:54	052517W3-5	1668006

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1668006	1668004	EPA 245.1/245.2 Prep	20	mL	20	mL	05/24/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 423575005**BASIS:** As Received**DATE COLLECTED** 17-MAY-17**CLIENT ID:** CAMO-17-132214**LEVEL:** Low**DATE RECEIVED** 19-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	MTM1	05/25/17 11:55	052517W3-5	1668006

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 423575005

BASIS: As Received

DATE COLLECTED 17-MAY-17

CLIENT ID: CAMO-17-132214

LEVEL: Low

DATE RECEIVED 19-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	06/14/17 13:20	061417A-1	1666876
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	06/07/17 14:32	170607-2	1666864
7440-38-2	Arsenic	2.68	ug/L	J	2	5	5	1	MS	PRB	06/07/17 14:32	170607-2	1666864
7440-39-3	Barium	23.4	ug/L		1	5	5	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	06/07/17 14:32	170607-2	1666864
7440-70-2	Calcium	17300	ug/L		50	200	200	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7440-47-3	Chromium	128	ug/L		3	10	10	1	MS	PRB	06/08/17 17:05	170608-4	1666864
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	06/08/17 13:33	170608-3	1666864
7439-95-4	Magnesium	5000	ug/L		110	300	300	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7439-98-7	Molybdenum	0.780	ug/L		0.2	0.5	0.5	1	MS	PRB	06/07/17 14:32	170607-2	1666864
7440-02-0	Nickel	3.18	ug/L		0.6	2	2	1	MS	PRB	06/08/17 17:05	170608-4	1666864
7440-09-7	Potassium	1320	ug/L		50	150	150	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	06/07/17 14:32	170607-2	1666864
7631-86-9	Silica	68100	ug/L		53	213	213	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	PRB	06/07/17 14:32	170607-2	1666864
7440-23-5	Sodium	12800	ug/L		100	300	300	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7440-24-6	Strontium	73.8	ug/L		1	5	5	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	06/08/17 13:33	170608-3	1666864
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7440-61-1	Uranium	0.504	ug/L		0.067	0.2	0.2	1	MS	PRB	06/08/17 13:33	170608-3	1666864
7440-62-2	Vanadium	4.3	ug/L	J	1	5	5	1	P	HSC	06/14/17 13:20	061417A-1	1666876
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	06/14/17 13:20	061417A-1	1666876

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 423575005**BASIS:** As Received**DATE COLLECTED** 17-MAY-17**CLIENT ID:** CAMO-17-132214**LEVEL:** Low**DATE RECEIVED** 19-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	63.7	mg/L		0.453	1.24	1.24	1		JJ2	06/15/17 11:55		1674389

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1666864	1666862	SW846 3005A	50	mL	50	mL	05/19/17	CXW4
1666876	1666875	SW846 3005A	50	mL	50	mL	05/19/17	CXW4
1668006	1668004	EPA 245.1/245.2 Prep	20	mL	20	mL	05/24/17	AXS5

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

METALS
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INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1552**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 423575006**BASIS:** As Received**DATE COLLECTED** 17-MAY-17**CLIENT ID:** CAMO-17-132234**LEVEL:** Low**DATE RECEIVED** 19-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	MTM1	05/25/17 11:57	052517W3-5	1668006

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1668006	1668004	EPA 245.1/245.2 Prep	20	mL	20	mL	05/24/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
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PREPARATION BLANK SUMMARY

SDG NO. 2017-1552

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>
1203793742	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
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Antimony	1	ug/L	+/-3	U	MS	1	3
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203793774	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	-139	ug/L	+/-300	J	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203796485	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

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Matrix Spike Summary

SDG NO. 2017-1552 Client ID CAMO-17-132211S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 423575001 Spike ID: 1203793745

<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	50.6		1	U	50	101		MS
Arsenic	ug/L	75-125	53		2.57	J	50	101		MS
Cadmium	ug/L	75-125	49.5		0.3	U	50	99		MS
Chromium	ug/L	75-125	95		41.7		50	107		MS
Lead	ug/L	75-125	50.9		0.5	U	50	102		MS
Molybdenum	ug/L	75-125	53.9		0.997		50	106		MS
Nickel	ug/L	75-125	51.1		0.807	J	50	101		MS
Selenium	ug/L	75-125	52		2	U	50	102		MS
Silver	ug/L	75-125	51.9		0.3	U	50	104		MS
Thallium	ug/L	75-125	46.9		0.6	U	50	93.7		MS
Uranium	ug/L	75-125	53.3		0.708		50	105		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1552 Client ID: CAMO-17-132211S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 423575001 Spike ID: 1203793777

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	4960		68	U	5000	99.2		P
Barium	ug/L	75-125	525		29.7		500	99.1		P
Beryllium	ug/L	75-125	502		1	U	500	100		P
Boron	ug/L	75-125	535		15.6	J	500	104		P
Calcium	ug/L	75-125	23900		18900		5000	99.8		P
Cobalt	ug/L	75-125	497		1	U	500	99.5		P
Copper	ug/L	75-125	525		3	U	500	105		P
Iron	ug/L	75-125	5140		30	U	5000	102		P
Magnesium	ug/L	75-125	10200		5230		5000	98.7		P
Manganese	ug/L	75-125	498		2	U	500	99.6		P
Potassium	ug/L	75-125	6400		1300		5000	102		P
Silica	ug/L		79800		69100		10700	100	N/A	P
Sodium	ug/L	75-125	16800		11900		5000	96.7		P
Strontium	ug/L	75-125	589		84.7		500	101		P
Tin	ug/L	75-125	501		2.5	U	500	99.7		P
Vanadium	ug/L	75-125	515		4.7	J	500	102		P
Zinc	ug/L	75-125	476		3.3	U	500	95.2		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Matrix Spike Summary

SDG NO. 2017-1552 **Client ID:** CAMO-17-132202S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 423448001 **Spike ID:** 1203796490

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	1.99		0.067	U	2	99.1		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1552

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-17-132211D

Matrix: WATER

Level: Low

Sample ID: 423575001

Duplicate ID: 1203793744

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	2.57 J		2.55 J		.586		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-10	41.7		45.1		7.83		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.997		0.861		14.6		MS
Nickel	ug/L	+/-2	0.807 J		0.966 J		17.9		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	0.708		0.725		2.37		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
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Duplicate Sample Summary

SDG No.: 2017–1552

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO–17–132211D

Matrix: WATER

Level: Low

Sample ID: 423575001

Duplicate ID: 1203793776

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-20%	29.7		29.7		.135		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	15.6 J		16 J		2.75		P
Calcium	ug/L	+/-20%	18900		18900		.037		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%	5230		5240		.22		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1300		1280		1.88		P
Silica	ug/L	+/-20%	69100		69500		.533		P
Sodium	ug/L	+/-20%	11900		11900		.0419		P
Strontium	ug/L	+/-20%	84.7		84.2		.553		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	4.7 J		4.57 J		2.94		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
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Duplicate Sample Summary

SDG No.: 2017-1552**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAMO-17-132202D**Matrix:** WATER**Level:** Low**Sample ID:** 423448001**Duplicate ID:** 1203796488**Percent Solids for Dup:** N/A

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

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1552

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>
1203793743								
	Molybdenum	ug/L	50	50.8		102	80-120	MS
	Nickel	ug/L	50	53.1		106	80-120	MS
	Selenium	ug/L	50	53.2		106	80-120	MS
	Silver	ug/L	50	50.4		101	80-120	MS
	Thallium	ug/L	50	46.8		93.7	80-120	MS
	Uranium	ug/L	50	52.2		104	80-120	MS
	Antimony	ug/L	50	49.6		99.1	80-120	MS
	Arsenic	ug/L	50	53.3		107	80-120	MS
	Cadmium	ug/L	50	49.2		98.3	80-120	MS
	Chromium	ug/L	50	51.5		103	80-120	MS
	Lead	ug/L	50	51.8		104	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1552

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>
1203793775								
	Barium	ug/L	500	498		99.5	80-120	P
	Beryllium	ug/L	500	495		99	80-120	P
	Boron	ug/L	500	507		101	80-120	P
	Calcium	ug/L	5000	5010		100	80-120	P
	Cobalt	ug/L	500	503		101	80-120	P
	Copper	ug/L	500	511		102	80-120	P
	Iron	ug/L	5000	5160		103	80-120	P
	Magnesium	ug/L	5000	5090		102	80-120	P
	Manganese	ug/L	500	502		100	80-120	P
	Potassium	ug/L	5000	5040		101	80-120	P
	Aluminum	ug/L	5000	5030		101	80-120	P
	Silica	ug/L	10700	10400		97.4	80-120	P
	Sodium	ug/L	5000	5420		108	80-120	P
	Strontium	ug/L	500	512		102	80-120	P
	Tin	ug/L	500	495		98.9	80-120	P
	Vanadium	ug/L	500	503		101	80-120	P
	Zinc	ug/L	500	472		94.4	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1552

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>
1203796486	Mercury	ug/L	2	2.01		101	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1552 **Client ID:** CAMO-17-132211L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 423575001 **Serial Dilution ID:** 1203793746

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2.57	J	10	U	33.281			MS
Cadmium	.3	U	1.5	U				MS
Chromium	41.7		44.6	J	7.092			MS
Lead	.5	U	2.5	U				MS
Molybdenum	.997		1.1	J	9.829			MS
Nickel	.807	J	3	U	46.84			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.708		.715	J	.989			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1552 Client ID CAMO-17-132211L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 423575001 Serial Dilution ID: 1203793778

<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	29.7		29.9		.852			P
Beryllium	1	U	5	U				P
Boron	15.6	J	75	U	19.565			P
Calcium	18900		19500		3.134		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	158	J				P
Magnesium	5230		5280		1.058			P
Manganese	2	U	10	U				P
Potassium	1300		1380		5.69			P
Silica	69100		69100		.039		10	P
Sodium	11900		11900		.486		10	P
Strontium	84.7		84.9		.294		10	P
Tin	2.5	U	12.5	U				P
Vanadium	4.7	J	5	U	4.823			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1552 **Client ID:** CAMO-17-132202L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 423448001 **Serial Dilution ID:** 1203796492

<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 #: 2017-1552
Work Order #: 423575**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1667273

Method: SW 9060 Total Organic Carbon

Sample Analysis

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

Sample ID	Client ID
423575002	CAMO-17-133050
423575004	CAMO-17-133051
423575006	CAMO-17-132234
1203795678	Method Blank (MB)
1203795679	Laboratory Control Sample (LCS)
1203795680	423833004(CAMO-17-133049) Sample Duplicate (DUP)
1203795682	423833004(CAMO-17-133049) 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 423833004 (CAMO-17-133049) 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:	Cyanide and Total		
Analytical Batch:	1667161	Method:	WSP-CN(T)
Prep Batch :	1667160	Method:	EPA 335.4

Sample Analysis

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

Sample ID	Client ID
423575002	CAMO-17-133050
423575004	CAMO-17-133051
423575006	CAMO-17-132234
1203794406	Method Blank (MB)
1203794407	Laboratory Control Sample (LCS)
1203794409	423575002(CAMO-17-133050) Sample Duplicate (DUP)
1203794412	423575002(CAMO-17-133050) 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.

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 423575002 (CAMO-17-133050) 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

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product: Ion Chromatography
Analytical Batch: 1668293 and 1669023 **Method:** WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
423575001	CAMO-17-132211
423575003	CAMO-17-132212
423575005	CAMO-17-132214
1203797177	Method Blank (MB)
1203798953	Method Blank (MB)
1203797178	Laboratory Control Sample (LCS)
1203798954	Laboratory Control Sample (LCS)
1203797179	423194001(CAMO-17-132200) Sample Duplicate (DUP)
1203798955	423575003(CAMO-17-132212) Sample Duplicate (DUP)
1203797180	423194001(CAMO-17-132200) Post Spike (PS)
1203798956	423575003(CAMO-17-132212) 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-5000 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

Samples 423194001 (CAMO-17-132200) and 423575003 (CAMO-17-132212) were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following samples 1203797179 (CAMO-17-132200DUP), 1203797180 (CAMO-17-132200PS) and 423575005 (CAMO-17-132214) were 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	423575
	005
Chloride	2X

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Manual Integrations

Samples 1203797179 (CAMO-17-132200DUP), 1203797180 (CAMO-17-132200PS), 423575001 (CAMO-17-132211), 1203798955 (CAMO-17-132212DUP), 1203798956 (CAMO-17-132212PS), 423575003 (CAMO-17-132212) and 423575005 (CAMO-17-132214) 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: 1666189 **Method:** NH3
Prep Batch : 1666188 **Method:** EPA 350.1 Prep

Sample Analysis

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

Sample ID	Client ID
423575001	CAMO-17-132211
423575003	CAMO-17-132212
423575005	CAMO-17-132214
1203792073	Method Blank (MB)
1203792074	Laboratory Control Sample (LCS)
1203792075	423224002(WST53-17-133059) Sample Duplicate (DUP)
1203792076	423224002(WST53-17-133059) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample 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 423224002 (WST53-17-133059) was selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Ammonia	1203792076 (WST53-17-133059MS)	74.8* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Analyte	Sample	Value
Nitrogen, Ammonia	1203792075 (WST53-17-133059DUP)	35.1* (0%-20%)

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 1203792073 (MB), 1203792074 (LCS), 1203792075 (WST53-17-133059DUP) and 1203792076 (WST53-17-133059MS) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

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

A data exception report (DER) 1634279 was generated for samples 1203792075 (WST53-17-133059DUP) and 1203792076 (WST53-17-133059MS) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1667286	Method:	TKN
Prep Batch :	1667285	Method:	EPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
423575002	CAMO-17-133050
423575004	CAMO-17-133051
423575006	CAMO-17-132234
1203794804	Method Blank (MB)
1203794805	Laboratory Control Sample (LCS)
1203794806	423448002(CAMO-17-132222) Sample Duplicate (DUP)
1203794807	423448002(CAMO-17-132222) 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 423448002 (CAMO-17-132222) was selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203794807 (CAMO-17-132222MS)	156* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

Samples 1203794804 (MB), 1203794805 (LCS), 1203794806 (CAMO-17-132222DUP) and 1203794807 (CAMO-17-132222MS) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was

reported.

Miscellaneous Information

Data Exception (DER) Documentation

A data exception report (DER) 1635179 was generated for sample 1203794807 (CAMO-17-132222MS) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1667152

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
423575001	CAMO-17-132211
423575003	CAMO-17-132212
423575005	CAMO-17-132214
1203794379	Method Blank (MB)
1203794380	Laboratory Control Sample (LCS)
1203794381	423584003(NonSDG) Sample Duplicate (DUP)
1203794383	423575001(CAMO-17-132211) Sample Duplicate (DUP)
1203794387	423584003(NonSDG) Post Spike (PS)
1203794389	423575001(CAMO-17-132211) 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

Samples 423575001 (CAMO-17-132211) and 423584003 (NonSDG) were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The following samples 1203794383 (CAMO-17-132211DUP), 1203794389 (CAMO-17-132211PS), 423575001 (CAMO-17-132211) and 423575005 (CAMO-17-132214) were 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	423575	
	001	005
Nitrogen, Nitrate/Nitrite	10X	5X

Sample Re-analysis

Samples 1203794379 (MB) and 1203794380 (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:

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Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1666194	Method:	PO4
Prep Batch :	1666193	Method:	EPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
423575001	CAMO-17-132211
423575003	CAMO-17-132212
423575005	CAMO-17-132214
1203792087	Method Blank (MB)
1203792088	Laboratory Control Sample (LCS)
1203792089	423224002(WST53-17-133059) Sample Duplicate (DUP)
1203792090	423224002(WST53-17-133059) 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 423224002 (WST53-17-133059) 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 1203792089 (WST53-17-133059DUP) and 1203792090 (WST53-17-133059MS) were diluted because target analyte concentrations exceeded the calibration range. Samples 1203792089 (WST53-17-133059DUP) and 1203792090 (WST53-17-133059MS) were diluted at the prep step due to high concentration. 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.

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: 1665589

Method: TDS

Sample Analysis

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

Sample ID	Client ID
423575001	CAMO-17-132211
423575003	CAMO-17-132212
423575005	CAMO-17-132214
1203790695	Method Blank (MB)
1203790696	Laboratory Control Sample (LCS)
1203794808	423330001(CAMO-17-132201) 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 423330001 (CAMO-17-132201) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Analyte	Sample	Value
Total Dissolved Solids	1203794808 (CAMO-17-132201DUP)	10.5* (0%-5%)

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**

A data exception report (DER) 1634782 was generated for sample 1203794808 (CAMO-17-132201DUP) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1668501

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
423575001	CAMO-17-132211
423575003	CAMO-17-132212
423575005	CAMO-17-132214
1203797707	Laboratory Control Sample (LCS)
1203797708	423220001(CASA-17-132339) 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 423220001 (CASA-17-132339) 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: 1669863 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
423575001	CAMO-17-132211
423575003	CAMO-17-132212
423575005	CAMO-17-132214
1203801184	Laboratory Control Sample (LCS)
1203801186	423575005(CAMO-17-132214) 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 423575005 (CAMO-17-132214) 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
1203801186 (CAMO-17-132214DUP)	pH	Received 19-MAY-17, out of holding 17-MAY-17
423575001 (CAMO-17-132211)	pH	Received 19-MAY-17, out of holding 17-MAY-17
423575003 (CAMO-17-132212)	pH	Received 19-MAY-17, out of holding 17-MAY-17
423575005 (CAMO-17-132214)	pH	Received 19-MAY-17, out of holding 17-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) 1639932 was generated for samples 423575001 (CAMO-17-132211), 423575003 (CAMO-17-132212), 423575005 (CAMO-17-132214) and 1203801186 (CAMO-17-132214DUP) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1669161 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
423575001	CAMO-17-132211
423575003	CAMO-17-132212
423575005	CAMO-17-132214
1203799302	Laboratory Control Sample (LCS)
1203799304	423575005(CAMO-17-132214) Sample Duplicate (DUP)
1203799307	423575005(CAMO-17-132214) 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 423575005 (CAMO-17-132214) 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:

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

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2017-1552 GEL Work Order: 423575

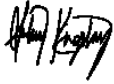
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 13 JUN 2017

Title: Analyst I

Sample Data Summary

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Certificate of Analysis

Report Date: June 13, 2017

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

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

Client SDG: 2017-1552

Client Sample ID: CAMO-17-132211
Sample ID: 423575001
Matrix: W
Collect Date: 17-MAY-17 12:42
Receive Date: 19-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"												
Bromide	J	0.0674	0.067	0.200	mg/L		1	MXL2	05/26/17	0436	1668293	1
Chloride		6.07	0.067	0.200	mg/L		1					
Fluoride		0.326	0.033	0.100	mg/L		1					
Sulfate		9.34	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0175	0.017	0.050	mg/L	1.00	1	KLP1	05/22/17	1302	1666189	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		3.13	0.170	0.500	mg/L		10	AXH3	05/25/17	1127	1667152	3
PO4 "As Received"												
Phosphorus, Total as P	U	ND	0.020	0.050	mg/L	1.00	1	KLP1	05/23/17	1516	1666194	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		160	3.40	14.3	mg/L			KLP1	05/22/17	1435	1665589	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		68.2	1.45	4.00	mg/L			RXB5	05/31/17	1933	1669161	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		175	1.00	1.00	umhos/cm		1	VH1	05/30/17	1504	1668501	7
PH "As Received"												
pH at Temp 17.2C	H	7.99	0.010	0.100	SU		1	RXB5	05/31/17	1931	1669863	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	05/22/17	1105	1666188
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	05/23/17	1200	1666193

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Certificate of Analysis

Report Date: June 13, 2017

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

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

Client SDG: 2017-1552

Client Sample ID: CAMO-17-132211
Sample ID: 423575001

Project: ESHL00114
Client ID: ARSL004

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

Notes:

Column headers are defined as follows:

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

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Certificate of Analysis

Report Date: June 13, 2017

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

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

Client SDG: 2017-1552

Client Sample ID: CAMO-17-133050
Sample ID: 423575002
Matrix: W
Collect Date: 17-MAY-17 12:42
Receive Date: 19-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	0.666	0.330	1.00	mg/L		1	TSM	05/24/17	1838	1667273	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	05/23/17	1408	1667161	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	05/24/17	1202	1667286	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	05/23/17	1348	1667160
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	05/23/17	1700	1667285

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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Report Date: June 13, 2017

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

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

Client SDG: 2017-1552

Client Sample ID: CAMO-17-132212
Sample ID: 423575003
Matrix: W
Collect Date: 17-MAY-17 14:36
Receive Date: 19-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"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	05/26/17	1556	1669023	1
Chloride		4.44	0.067	0.200	mg/L		1					
Fluoride		0.393	0.033	0.100	mg/L		1					
Sulfate		5.21	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0858	0.017	0.050	mg/L	1.00	1	KLP1	05/22/17	1303	1666189	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.906	0.017	0.050	mg/L		1	AXH3	05/25/17	1130	1667152	3
PO4 "As Received"												
Phosphorus, Total as P	U	ND	0.020	0.050	mg/L	1.00	1	KLP1	05/23/17	1517	1666194	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		153	3.40	14.3	mg/L			KLP1	05/22/17	1435	1665589	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		79.0	1.45	4.00	mg/L			RXB5	05/31/17	1936	1669161	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		160	1.00	1.00	umhos/cm		1	VH1	05/30/17	1505	1668501	7
PH "As Received"												
pH at Temp 15.8C	H	8.31	0.010	0.100	SU		1	RXB5	05/31/17	1934	1669863	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	05/22/17	1105	1666188
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	05/23/17	1200	1666193

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Certificate of Analysis

Report Date: June 13, 2017

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

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

Client SDG: 2017-1552

Client Sample ID: CAMO-17-132212
Sample ID: 423575003

Project: ESHL00114
Client ID: ARSL004

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

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

Client SDG: 2017-1552

Client Sample ID: CAMO-17-133051
Sample ID: 423575004
Matrix: W
Collect Date: 17-MAY-17 14:36
Receive Date: 19-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	0.577	0.330	1.00	mg/L		1	TSM	05/24/17	1925	1667273	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	05/23/17	1411	1667161	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	05/24/17	1202	1667286	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	05/23/17	1348	1667160
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	05/23/17	1700	1667285

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 13, 2017

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

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

Client SDG: 2017-1552

Client Sample ID: CAMO-17-132214
Sample ID: 423575005
Matrix: W
Collect Date: 17-MAY-17 12:12
Receive Date: 19-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"												
Bromide	J	0.0768	0.067	0.200	mg/L		1	MXL2	05/26/17	1722	1669023	1
Fluoride		0.291	0.033	0.100	mg/L		1					
Sulfate		14.3	0.133	0.400	mg/L		1					
Chloride		8.48	0.134	0.400	mg/L		2	MXL2	05/31/17	1923	1669023	2
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0513	0.017	0.050	mg/L	1.00	1	KLP1	05/22/17	1304	1666189	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		2.07	0.085	0.250	mg/L		5	AXH3	05/25/17	1132	1667152	4
PO4 "As Received"												
Phosphorus, Total as P	J	0.0211	0.020	0.050	mg/L	1.00	1	KLP1	05/23/17	1518	1666194	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		161	3.40	14.3	mg/L			KLP1	05/22/17	1435	1665589	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		60.0	1.45	4.00	mg/L			RXB5	05/31/17	1938	1669161	7
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		176	1.00	1.00	umhos/cm		1	VH1	05/30/17	1505	1668501	8
PH "As Received"												
pH at Temp 15.5C	H	7.97	0.010	0.100	SU		1	RXB5	05/31/17	1937	1669863	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	05/22/17	1105	1666188
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	05/23/17	1200	1666193

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Certificate of Analysis

Report Date: June 13, 2017

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

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

Client SDG: 2017-1552

Client Sample ID: CAMO-17-132214
Sample ID: 423575005

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 13, 2017

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

Los Alamos, New Mexico 87545

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

Client SDG: 2017-1552

Client Sample ID: CAMO-17-132234
Sample ID: 423575006
Matrix: W
Collect Date: 17-MAY-17 12:12
Receive Date: 19-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	U	ND	0.330	1.00	mg/L		1	TSM	05/24/17	2012	1667273	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	05/23/17	1412	1667161	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	05/24/17	1203	1667286	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	05/23/17	1348	1667160
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	05/23/17	1700	1667285

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

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

QC Summary

Report Date: June 13, 2017

Page 1 of 7

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

Contact: Mr. Keith Greene

Workorder: 423575

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1667273										
QC1203795680	423833004	DUP									
Total Organic Carbon Average		U	ND	U	ND	mg/L	N/A		TSM	05/25/17	04:19
QC1203795679	LCS										
Total Organic Carbon Average	10.0				9.74	mg/L	97.4	(80%-120%)		05/24/17	18:03
QC1203795678	MB										
Total Organic Carbon Average			U	ND	mg/L					05/24/17	17:51
QC1203795682	423833004	PS									
Total Organic Carbon Average	10.0	U	ND		10.6	mg/L	103	(75%-125%)		05/25/17	05:06
Flow Injection Analysis											
Batch	1667161										
QC1203794409	423575002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	05/23/17	14:09
QC1203794407	LCS										
Cyanide, Total	50.0				49.4	ug/L	98.8	(90%-110%)		05/23/17	14:07
QC1203794406	MB										
Cyanide, Total			U	ND	ug/L					05/23/17	14:05
QC1203794412	423575002	MS									
Cyanide, Total	100	U	ND		106	ug/L	106	(90%-110%)		05/23/17	14:10
Ion Chromatography											
Batch	1668293										
QC1203797179	423194001	DUP									
Bromide			0.570		0.590	mg/L	3.34 ^	(+/-0.200)	MXL2	05/25/17	22:49

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1668293										
Chloride		60.1		60.2	mg/L	0.0283		(0%-20%)	MXL2	05/26/17	05:34
Fluoride		0.569		0.567	mg/L	0.388		(0%-20%)		05/25/17	22:49
Sulfate		60.0		60.1	mg/L	0.0749		(0%-20%)		05/26/17	05:34
QC1203797178 LCS											
Bromide	1.25			1.36	mg/L		109	(80%-120%)		05/25/17	21:51
Chloride	5.00			5.20	mg/L		104	(80%-120%)			
Fluoride	2.50			2.67	mg/L		107	(80%-120%)			
Sulfate	10.0			10.5	mg/L		105	(80%-120%)			
QC1203797177 MB											
Bromide			U	ND	mg/L					05/25/17	21:22
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203797180 423194001 PS											
Bromide	1.25	0.570		1.93	mg/L		109	(75%-125%)		05/25/17	23:18
Chloride	5.00	6.01		11.9	mg/L		117	(75%-125%)		05/26/17	06:03
Fluoride	2.50	0.569		3.20	mg/L		105	(75%-125%)		05/25/17	23:18
Sulfate	10.0	6.00		16.8	mg/L		108	(75%-125%)		05/26/17	06:03

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1669023										
QC1203798955	423575003	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	05/26/17	16:25
Chloride			4.44		4.43	mg/L	0.124	(0%-20%)			
Fluoride			0.393		0.396	mg/L	0.583 ^	(+/-0.100)			
Sulfate			5.21		5.16	mg/L	1.01	(0%-20%)			
QC1203798954	LCS										
Bromide	1.25				1.36	mg/L	109	(80%-120%)		05/26/17	15:27
Chloride	5.00				5.05	mg/L	101	(80%-120%)			
Fluoride	2.50				2.60	mg/L	104	(80%-120%)			
Sulfate	10.0				10.3	mg/L	103	(80%-120%)			
QC1203798953	MB										
Bromide			U		ND	mg/L				05/26/17	14:58
Chloride			U		ND	mg/L					
Fluoride			U		ND	mg/L					
Sulfate			U		ND	mg/L					
QC1203798956	423575003	PS									
Bromide	1.25	U	ND		1.38	mg/L	107	(75%-125%)		05/26/17	16:54
Chloride	5.00		4.44		10.1	mg/L	114	(75%-125%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1669023										
Fluoride	2.50	0.393		3.01	mg/L		105	(75%-125%)	MXL2	05/26/17	16:54
Sulfate	10.0	5.21		16.0	mg/L		108	(75%-125%)			
Nutrient Analysis											
Batch	1666189										
QC1203792075	423224002	DUP									
Nitrogen, Ammonia		0.912		0.640	mg/L	35.1 *		(0%-20%)	KLP1	05/22/17	12:51
QC1203792074	LCS										
Nitrogen, Ammonia	1.00			1.02	mg/L		102	(90%-110%)		05/22/17	12:15
QC1203792073	MB										
Nitrogen, Ammonia			J	0.0307	mg/L					05/22/17	12:14
QC1203792076	423224002	MS									
Nitrogen, Ammonia	1.00	0.912		1.66	mg/L		74.8 *	(90%-110%)		05/22/17	12:51
Batch	1666194										
QC1203792089	423224002	DUP									
Phosphorus, Total as P		78.6		101	mg/L	24.7		(0%-27%)	KLP1	05/23/17	15:23
QC1203792088	LCS										
Phosphorus, Total as P	1.00			1.05	mg/L		105	(80%-124%)		05/23/17	15:03
QC1203792087	MB										
Phosphorus, Total as P			U	ND	mg/L					05/23/17	15:02
QC1203792090	423224002	MS									
Phosphorus, Total as P	4.00	78.6		93.0	mg/L		N/A	(63%-139%)		05/23/17	15:28
Batch	1667152										
QC1203794381	423584003	DUP									
Nitrogen, Nitrate/Nitrite		0.295		0.296	mg/L	0.338		(0%-20%)	AXH3	05/25/17	11:22

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1667152										
QC1203794383	423575001	DUP									
Nitrogen, Nitrate/Nitrite		3.13		3.07	mg/L	1.94		(0%-20%)	AXH3	05/25/17	11:28
QC1203794380	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.05	mg/L		105	(90%-110%)		05/25/17	11:07
QC1203794379	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					05/25/17	11:06
QC1203794387	423584003	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.295		1.32	mg/L		103	(90%-110%)		05/25/17	11:23
QC1203794389	423575001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.313		1.38	mg/L		107	(90%-110%)		05/25/17	11:29
Batch	1667286										
QC1203794806	423448002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	05/24/17	11:54
QC1203794805	LCS										
Nitrogen, Total Kjeldahl	1.00			1.03	mg/L		103	(90%-110%)		05/24/17	11:52
QC1203794804	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					05/24/17	11:51
QC1203794807	423448002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.56	mg/L		156*	(90%-110%)		05/24/17	11:55
Solids Analysis											
Batch	1665589										
QC1203794808	423330001	DUP									
Total Dissolved Solids		124		143	mg/L	10.5*		(0%-5%)	KLP1	05/22/17	14:35

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1665589										
QC1203790696	LCS										
Total Dissolved Solids	300			291	mg/L		97.1	(95%-105%)	KLP1	05/22/17	14:35
QC1203790695	MB										
Total Dissolved Solids			U	ND	mg/L					05/22/17	14:35
Titration and Ion Analysis											
Batch	1668501										
QC1203797708	423220001	DUP									
Conductivity			213	214	umhos/cm	0.468		(0%-10%)	VH1	05/30/17	15:02
QC1203797707	LCS										
Conductivity	1410			1400	umhos/cm		98.9	(95%-105%)		05/30/17	15:00
Batch	1669161										
QC1203799304	423575005	DUP									
Alkalinity, Total as CaCO3			60.0	60.6	mg/L	0.995		(0%-20%)	RXB5	05/31/17	19:39
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1203799302	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		05/31/17	19:13
QC1203799307	423575005	MS									
Alkalinity, Total as CaCO3	100		60.0	163	mg/L		103	(80%-120%)		05/31/17	19:41
Batch	1669863										
QC1203801186	423575005	DUP									
pH		H	7.97	H	7.97	SU	0	(0%-5%)	RXB5	05/31/17	19:40
QC1203801184	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		05/31/17	19:26

Notes:

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

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

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

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

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

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

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 22-MAY-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 350.1	Matrix Type: Liquid	Client Code: ESHL, WASP
Batch ID: 1666189	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 423185,423194(2017-1529),423213(2017-1526),423215(2017-1525),423220(2017-1522),423224(2017-1524),423313,423330(2017-1533),423339(2017-1534),423575(2017-1552)</p> <p>Application Issues:</p> <p>Failed Recovery for MS/MSD, or PS/PSD</p> <p>Failed RPD for DUP</p>			
Specification and Requirements		DER Disposition:	
Exception Description:			
<p>1. Failed RPD for DUP:</p> <p>QC 1203792075DUP,1203792079DUP</p> <p>2. Failed Recovery for MS/MSD, or PS/PSD:</p> <p>QC 1203792076MS,</p> <p>1203792078MS</p>		<p>1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: Nitrogen, Ammonia 1203792075 (WST53-17-133059DUP) [35.1* (0%-20%)] and 1203792079 (17-WS-05-151DUP) [abs(.139 - .076)* (+/- .05 mg/L)].</p> <p>2. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity. Nitrogen, Ammonia 1203792076 (WST53-17-133059MS) [74.8* (90%-110%)] and 1203792078 (17-WS-05-150MS) [75.7* (90%-110%)].</p>	

Originator's Name:

Kristen Mizzell 22-MAY-17

Data Validator/Group Leader:

Aubrey Kingsbury 22-MAY-17

DATA EXCEPTION REPORT			
Mo.Day Yr. 23-MAY-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: BALANCE ANALYTICAL	Test / Method: EPA 160.1, SM 2540C	Matrix Type: Liquid	Client Code: BRKL, ESHL
Batch ID: 1665589	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 423221(38768),423330(2017-1533),423339(2017-1534),423448(2017-1541),423575(2017-1552) Application Issues: Failed RPD for DUP			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed RPD for DUP: QC 1203790697DUP,1203794808DUP		1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: Total Dissolved Solids 1203790697 (38768-001DUP) [5.13* (0%-5%)] and 1203794808 (CAMO-17-132201DUP) [10.5* (0%-5%)].	

Originator's Name:
Kristen Mizzell 23-MAY-17

Data Validator/Group Leader:
Aubrey Kingsbury 23-MAY-17

DATA EXCEPTION REPORT			
Mo.Day Yr. 24-MAY-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 351.2, EPA 351.2 SC	Matrix Type: Liquid	Client Code: ESHL, GWSD
Batch ID: 1667286	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 423448(2017-1541),423545,423575(2017-1552) Application Issues: Failed Recovery for MS/MSD, or PS/PSD			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203794807MS		1. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity. Nitrogen, Total Kjeldahl 1203794807 (CAMO-17-132222MS) [156* (90%-110%)].	

Originator's Name:

Kristen Mizzell 24-MAY-17

Data Validator/Group Leader:

Aubrey Kingsbury 24-MAY-17

DATA EXCEPTION REPORT			
Mo.Day Yr. 07-JUN-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: EPA 150.1, SW846 9040C	Matrix Type: Liquid	Client Code: ESHL, SCPO
Batch ID: 1669863	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 423439,423575(2017-1552),423605,423831(2017-1566),423833(2017-1565) Application Issues: Sample received out of holding			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Sample received out of holding: 423439 001,002 423575 001,003,005 423605 001 423831 001 423833 001,003 QC 1203801185DUP,1203801186DUP		1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified. 1203801185 (DEPO-0517-SW-01-17DDUP) [Received 18-MAY-17, out of holding 17-MAY-17]. 1203801186 (CAMO-17-132214DUP) [Received 19-MAY-17, out of holding 17-MAY-17]. 423439001 (DEPO-0517-GW-001-17) [Received 18-MAY-17, out of holding 17-MAY-17]. 423439002 (DEPO-0517-SW-01-17D) [Received 18-MAY-17, out of holding 17-MAY-17]. 423575001 (CAMO-17-132211) [Received 19-MAY-17, out of holding 17-MAY-17]. 423575003 (CAMO-17-132212) [Received 19-MAY-17, out of holding 17-MAY-17]. 423575005 (CAMO-17-132214) [Received 19-MAY-17, out of holding 17-MAY-17]. 423605001 (DEPO-0518-GW-002-17) [Received 19-MAY-17, out of holding 18-MAY-17]. 423831001 (CAMO-17-132215) [Received 23-MAY-17, out of holding 18-MAY-17]. 423833001 (CAMO-17-132523) [Received 23-MAY-17, out of holding 18-MAY-17]. 423833003 (CAMO-17-132210) [Received 23-MAY-17, out of holding 18-MAY-17].	

Originator's Name:

Rachael Bell 07-JUN-17

Data Validator/Group Leader:

Elzbieta Szulc 09-JUN-17