



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4302

EVENT NAME:

Mortandad/Sandia (Chromium  
Investigation) MY2013 Q4  
Watershed  
Sampling\_MORTANDAD

SAMPLE ID: CAMO-13-36970

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		7/19/2013	FIELD MATRIX:	WG	gk
TIME COLLECTED (HH:MM):		1147	MEDIA:	UA	
PRS ID:		gk	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: R-62			FIELD PREP:	UF	gk
LOCATION TYPE:			FIELD QC TYPE:	FD	
PORT: SINGLE COMPLETION			SAMPLE USAGE:	QC	

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	X	NA

SAMPLE COMMENTS: NA

LOCATION COMMENTS: NA

## FIELD PARAMETERS:

Dissolved Oxygen NA mg/L      Oxidation-Reduction Potential NA MV      pH NA SU  
Specific Conductance NA uS/cm      Temperature NA deg C      Turbidity NA NTU

COLLECTED BY (PRINT) J. Peller

RELINQUISHED BY (Printed Name) William Shaw (Signature) <u>[Signature]</u>	Date/Time 7/19/2013 12:40	RECEIVED BY (Printed Name) L. G. J. J. (Signature) <u>[Signature]</u>	Date/Time 7/19/13 12:40
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/01/2013



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4302

EVENT NAME:

Mortandad/Sandia (Chromium  
Investigation) MY2013 Q4  
Watershed  
Sampling\_MORTANDAD

SAMPLE ID: CAMO-13-36971

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		2/19/2013	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):		1147	MEDIA:	UA	
PRS ID:		ok	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: R-62			FIELD PREP:	F	ok
LOCATION TYPE:			FIELD QC TYPE:	FD	
PORT: SINGLE COMPLETION			SAMPLE USAGE:	QC	

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-GENINORG+PerChlorate	1 LITER POLY	1	ICE		NA
	WSP-Met+B+SN+SR+U	1 LITER POLY	1	HNO3		
	WSP-NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: N/A

LOCATION COMMENTS: NA

## FIELD PARAMETERS:

Dissolved Oxygen NA mg/L  
Specific Conductance NA uS/cmOxidation-Reduction Potential NA MV  
Temperature NA deg CpH NA SU  
Turbidity NA NTU

COLLECTED BY (PRINT) P. Felley

RELINQUISHED BY (Printed Name) William J. Felley (Signature) [Signature]	Date/Time 2/19/13 11:47	RECEIVED BY (Printed Name) [Signature] (Signature) [Signature]	Date/Time 2/19/13 12:40
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/01/2013

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4302 EVENT NAME: Mortandad/Sandia (Chromium Investigation) MY2013 Q4 Watershed Sampling\_MORTANDAD

SAMPLE ID: CAMO-13-36979 WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		7/19/2013	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1147	MEDIA:	UA	
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: R-62			FIELD PREP:	UF	OK
LOCATION TYPE: MON			FIELD QC TYPE: REG		
PORT: SINGLE COMPLETION			SAMPLE USAGE: INV		

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	X	N/A

SAMPLE COMMENTS: Perzel generator running while sampling

LOCATION COMMENTS: NA

## FIELD PARAMETERS:

Dissolved Oxygen 5.31 mg/L Oxidation-Reduction Potential 126.4 MV pH 6.59 SU

Specific Conductance 187 uS/cm Temperature 20.50 deg C Turbidity 3.0 NTU

COLLECTED BY (PRINT) R. Feltner

RELINQUISHED BY (Printed Name) <u>William Shaw</u> (Signature) <u>[Signature]</u>	Date/Time <u>7/19/13</u> <u>1240</u>	RECEIVED BY (Printed Name) <u>K. G. [Signature]</u> (Signature) <u>[Signature]</u>	Date/Time <u>7/19/13</u> <u>12:40</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/01/2013



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4302 EVENT NAME: Mortandad/Sandia (Chromium Investigation) MY2013 Q4 Watershed Sampling\_MORTANDAD

SAMPLE ID: CAMO-13-36987 WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		7/19/2013	FIELD MATRIX:	WG	qec
TIME COLLECTED (HH:MM):		1147	MEDIA:	UA	
PRS ID:		qk	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: R-62			FIELD PREP:	F	OK
LOCATION TYPE: MON			FIELD QC TYPE:	REG	
PORT: SINGLE COMPLETION			SAMPLE USAGE:	INV	

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-GENINORG+PerChlorate	1 LITER POLY	1	ICE	Y	NA
I	WSP-Met+B+SN+SR+U	1 LITER POLY	1	HNO3	I	I
I	WSP-NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4	I	I

SAMPLE COMMENTS: NA

LOCATION COMMENTS: NA

## FIELD PARAMETERS:

Dissolved Oxygen NA mg/L Oxidation-Reduction Potential NA MV pH NA SU

Specific Conductance NA uS/cm Temperature NA deg C Turbidity NA NTU

COLLECTED BY (PRINT) R. Pellen Z

RELINQUISHED BY (Printed Name) William Shan (Signature) <u>[Signature]</u>	Date/Time 7/19/13 1240	RECEIVED BY (Printed Name) K. Greene (Signature) <u>[Signature]</u>	Date/Time 7/19/13 12:40
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/01/2013

## Data Validation Report

Chain Of Custody No. 2013-1260

## 1. Distribution Of Samples In EDD.

	Analytical	Regular	Field	Trip	Field	Equipment
SDG	Method	Samples	Duplicates	Blanks	Blanks	Blanks
330006	EPA:120.1	1	1			
330006	EPA:150.1	1	1			
330006	EPA:160.1	1	1			
330006	EPA:245.2	1	1			
330006	EPA:300.0	1	1			
330006	EPA:310.1	1	1			
330006	EPA:350.1	1	1			
330006	EPA:351.2	1	1			
330006	EPA:353.2	1	1			
330006	EPA:365.4	1	1			
330006	SM:A2340B	1	1			
330006	SW-846:6010B	1	1			
330006	SW-846:6020	1	1			
330006	SW-846:6850	1	1			
330006	SW-846:9060	1	1			

	Analytical	Analysis	Prep	Regular	Field	Trip	Field	Equipment	Method	Matrix	Matrix
SDG	Method	Lot ID	Lot ID	Samples	Duplicates	Blanks	Blanks	Blanks	Blanks	Spikes	Spike Dups
330006	EPA:120.1	1320710	1320710	1	1						
330006	EPA:150.1	1318847	1318847	1	1						
330006	EPA:160.1	1317422	1317422	1	1					1	
330006	EPA:245.2	1319318	1319317	1	1					1	2
330006	EPA:300.0	1316930	1316930	1	1					1	
330006	EPA:310.1	1319311	1319311	1	1					2	1
330006	EPA:350.1	1319983	1319982	1	1					1	2
330006	EPA:351.2	1315708	1315707	1	1					1	2
330006	EPA:353.2	1317208	1317208	1	1					1	
330006	EPA:365.4	1317225	1317224	1	1					1	2
330006	SM:A2340B	1323437	1323437	1	1						
330006	SW-846:6010B	1320241	1320234	1	1					1	1
330006	SW-846:6020	1320243	1320242	1	1					1	1
330006	SW-846:6850	1318125	1318124	1	1					1	2
330006	SW-846:9060	1317001	1317001	1	1					1	

## 2. Distribution Of Analytes In EDD.

Analytical Method	Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spikes	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-13-36971	330006004	FD		1	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-13-36987	330006002	REG		1	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-13-37015	1202923058	DUP		1	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1202923061	LCS		0	0	1
EPA:120.1	GENERAL CHEMISTRY	WST16-13-36930	1202923453	DUP		1	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-13-36971	1202918636	DUP		1	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-13-36971	330006004	FD		1	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-13-36987	330006002	REG		1	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-13-36993	1202918635	DUP		1	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1202918637	LCS		0	0	1

Analytical	Post-Digestion	Lab Control	Lab Control	Blank	Blank	Lab	Storage	Preparation	Reagent
Spikes	Spikes	Samples	Sample Dups	Spikes	Spike Dups	Duplicates	Blanks	Blanks	Blanks
		1				2			
		1				2			
		1				1			
		1				2			
		1				2			
		2				1			
		1				2			
		1				2			
		1				1			
		1				2			
		1				1			
		1				1			
		1							
		1				1			



EPA:160.1	GENERAL CHEMISTRY	CAMO-13-36971	330006004	FD	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-13-36987	330006002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-13-37021	1202915197	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1202915198	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1202915196	MB	1	0	0	0
EPA:245.2	INORGANIC	CAMO-13-36971	330006004	FD	1	0	0	0
EPA:245.2	INORGANIC	CAMO-13-36987	1202919736	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-13-36987	1202919737	MS	0	0	1	0
EPA:245.2	INORGANIC	CAMO-13-36987	330006002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1202919735	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1202919734	MB	1	0	0	0
EPA:245.2	INORGANIC	WTESR-13-33891	1202919739	DUP	1	0	0	0
EPA:245.2	INORGANIC	WTESR-13-33891	1202919740	MS	0	0	1	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-13-36971	330006004	FD	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-13-36987	1202913938	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-13-36987	330006002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1202913942	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1202913937	MB	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	WTLAP-13-32597	1202913939	DUP	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-13-36971	330006004	FD	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-13-36987	330006002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-13-36995	1202919730	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-13-36995	1202919731	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202919729	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202920423	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202919728	MB	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202920422	MB	2	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-13-36971	330006004	FD	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-13-36987	330006002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-13-36992	1202921248	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-13-36992	1202921250	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1202921252	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1202921247	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	WTMSGP-13-39433	1202921249	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	WTMSGP-13-39433	1202921251	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36970	330006003	FD	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36976	1202911679	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36976	1202911680	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36977	1202910856	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36977	1202910857	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36979	330006001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1202910855	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1202910854	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-13-36971	330006004	FD	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-13-36987	1202914697	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-13-36987	330006002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1202914701	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1202914694	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-13-36971	330006004	FD	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-13-36987	330006002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-13-36994	1202914750	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-13-36994	1202914752	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-13-37021	1202916979	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-13-37021	1202916980	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1202914754	LCS	0	0	1	0



Data Validation Report for:

Chain Of Custody No. 2013-1260

EPA:365.4	GENERAL CHEMISTRY	MB	1202914749	MB	1	0	0	0
SM:A2340B	INORGANIC	CAMO-13-36971	330006004	FD	1	0	0	0
SM:A2340B	INORGANIC	CAMO-13-36987	330006002	REG	1	0	0	0
SW-846:6010B	INORGANIC	CAMO-13-36971	330006004	FD	17	0	0	0
SW-846:6010B	INORGANIC	CAMO-13-36987	330006002	REG	17	0	0	0
SW-846:6010B	INORGANIC	CASA-13-37019	1202921921	DUP	17	0	0	0
SW-846:6010B	INORGANIC	CASA-13-37019	1202921922	MS	0	0	17	0
SW-846:6010B	INORGANIC	LCS	1202921920	LCS	0	0	17	0
SW-846:6010B	INORGANIC	MB	1202921919	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-13-36971	330006004	FD	11	0	0	0
SW-846:6020	INORGANIC	CAMO-13-36987	330006002	REG	11	0	0	0
SW-846:6020	INORGANIC	CASA-13-37019	1202921926	DUP	11	0	0	0
SW-846:6020	INORGANIC	CASA-13-37019	1202921927	MS	0	0	11	0
SW-846:6020	INORGANIC	LCS	1202921925	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1202921924	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-13-36971	330006004	FD	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-13-36987	330006002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-13-37019	1202916786	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-13-37019	1202916787	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1202916785	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1202916784	MB	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	WST16-13-36930	1202921071	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	WST16-13-36930	1202921072	MSD	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-13-36970	330006003	FD	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-13-36976	1202914125	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-13-36979	330006001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1202914127	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1202914124	MB	1	0	0	0

## 3. Are any analytes missing?

No.

## 4. Were any holding times exceeded?

No.

## 5. Any contaminants in blanks?

Field	Lab	Type Of	Analytical	Sample	Parameter	Lab	Lab	Units	Lab
Sample ID	Sample ID	Blank	Method	Matrix	Name	Result	Qualifier		Detection Limit
MB	1202919734	METHOD BLANK	EPA:245.2	W	Mercury	-0.081	J	ug/L	0.2
MB	1202921247	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0441	J	mg/L	0.05
MB	1202921919	METHOD BLANK	SW-846:6010B	W	Potassium	-82.1	J	ug/L	150
MB	1202921924	METHOD BLANK	SW-846:6020	W	Antimony	-1.7	J	ug/L	3

Any samples affected by the presence of contaminants in blanks?



Data Validation Report for:

Chain Of Custody No. 2013-1260

Field	Blank Field	Blank Lab	Blank	Analytical	Parameter		Blank	Sample	Lab	Detect	
Sample ID	Sample ID	Sample ID	Type	Method	Name	Units	Result	Result	Qualifier	Limit	Detected
CAMO-13-36987	MB	1202919734	METHOD BLANK	EPA:245.2	Mercury	ug/L	-0.081	0.2	U	0.2	N
CAMO-13-36971	MB	1202919734	METHOD BLANK	EPA:245.2	Mercury	ug/L	-0.081	0.2	U	0.2	N
CAMO-13-36987	MB	1202921247	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	mg/L	0.0441	0.084		0.05	Y
CAMO-13-36987	MB	1202921919	METHOD BLANK	SW-846:6010B	Potassium	ug/L	-82.1	1500		150	Y
CAMO-13-36971	MB	1202921919	METHOD BLANK	SW-846:6010B	Potassium	ug/L	-82.1	1380		150	Y
CAMO-13-36987	MB	1202921924	METHOD BLANK	SW-846:6020	Antimony	ug/L	-1.7	3	U	3	N
CAMO-13-36971	MB	1202921924	METHOD BLANK	SW-846:6020	Antimony	ug/L	-1.7	3	U	3	N

## 6. Any surrogate recoveries outside the control limits?

No.

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

Field	Matrix	Matrix	Analytical	Parameter	Analysis	Analysis	Sample	MS %	MSD %	Upper	Lower
Sample ID	Spike ID	Spike Dup ID	Method	Name	Lot ID	Date	Matrix	Recvry	Recvry	Limit	Limit
CAMO-13-36977	1202910857		EPA:351.2	Total Kjeldahl Nitrogen	1315707	8/6/2013	W	132		110	90

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

No.

## 9. Any Field Duplicate RPDs outside the desired limits?

No.

## 10. Any Lab Duplicate RPDs outside the desired limits?

No.

## 11. Any required reporting limits exceeded?

No.

## 12. Additional Validator's Comments.

None.

## 13. Display Flagged Data.

Location ID	Chain Of Custody No	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detected
R-62	2013-1260	CAMO-13-36987	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N

## Reason Code

I4

## Description

the sample result is  $\leq 5 \times$  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 qualifire. The analyte is detected in the sample.

U\_LAB

The analytical laboratory qualified the analyte as not detected.



Data Validation Report for:

Chain Of Custody No. 2013-1260

Correction Factor (ND)	Correction Factor (J)	Use Factors
5		Y
5		Y
5		Y
5		Y
5		Y
5		Y
5		Y

Rejection Limit	RPD Limit
10	

Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent Moisture	Analysis Lot ID	Validation Status Code	Use Flag
0.084	mg/L	0.084	mg/L			W	7/19/2013		1319983	VAL	Y

## 14. Useable Result Count.

Field	Location	Sample	Analytical	No. Unuseable	Total No. Of
Sample ID	ID	Purpose	Method	Records	Records
CAMO-13-36970	R-62	FD	EPA:351.2	0	1
CAMO-13-36970	R-62	FD	SW-846:9060	0	1
CAMO-13-36971	R-62	FD	EPA:120.1	0	1
CAMO-13-36971	R-62	FD	EPA:150.1	0	1
CAMO-13-36971	R-62	FD	EPA:160.1	0	1
CAMO-13-36971	R-62	FD	EPA:245.2	0	1
CAMO-13-36971	R-62	FD	EPA:300.0	0	4
CAMO-13-36971	R-62	FD	EPA:310.1	0	2
CAMO-13-36971	R-62	FD	EPA:350.1	0	1
CAMO-13-36971	R-62	FD	EPA:353.2	0	1
CAMO-13-36971	R-62	FD	EPA:365.4	0	1
CAMO-13-36971	R-62	FD	SM:A2340B	0	1
CAMO-13-36971	R-62	FD	SW-846:6010B	0	17
CAMO-13-36971	R-62	FD	SW-846:6020	0	11
CAMO-13-36971	R-62	FD	SW-846:6850	0	1
CAMO-13-36979	R-62	REG	EPA:351.2	0	1
CAMO-13-36979	R-62	REG	SW-846:9060	0	1
CAMO-13-36987	R-62	REG	EPA:120.1	0	1
CAMO-13-36987	R-62	REG	EPA:150.1	0	1
CAMO-13-36987	R-62	REG	EPA:160.1	0	1
CAMO-13-36987	R-62	REG	EPA:245.2	0	1
CAMO-13-36987	R-62	REG	EPA:300.0	0	4
CAMO-13-36987	R-62	REG	EPA:310.1	0	2
CAMO-13-36987	R-62	REG	EPA:350.1	0	1
CAMO-13-36987	R-62	REG	EPA:353.2	0	1
CAMO-13-36987	R-62	REG	EPA:365.4	0	1
CAMO-13-36987	R-62	REG	SM:A2340B	0	1
CAMO-13-36987	R-62	REG	SW-846:6010B	0	17
CAMO-13-36987	R-62	REG	SW-846:6020	0	11
CAMO-13-36987	R-62	REG	SW-846:6850	0	1





August 19, 2013

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

Mr. Keith Greene  
Los Alamos National Laboratory  
PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545

Re: LANL-WQH Water Samples  
Work Order: 330006  
SDG: 2013-1260

Dear Mr. Greene:

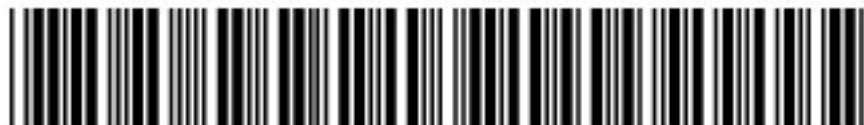
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on July 23, 2013, and analyzed for General Chemistry, Metals and Perchlorates by LCMSMS. This original data report has been prepared and reviewed in accordance with GEL's 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,

Valerie Davis  
Project Manager

Purchase Order: 63641-10  
Chain of Custody: 2013-1260  
Enclosures



**ARS International (63641-10)**  
**LANL-WQH Water Samples**  
**Work Order #: 330006**  
**SDG: 2013-1260**



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# Case Narrative

**Case Narrative for  
ARS International (63641-10)  
LANL-WQH Water Samples  
Workorder #: 330006  
SDG # : 2013-1260**

**August 19, 2013**

**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 July 23, 2013 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
330006001	CAMO-13-36979
330006002	CAMO-13-36987
330006003	CAMO-13-36970
330006004	CAMO-13-36971

**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.

  
for  
Valerie Davis  
Project Manager



**List of current GEL Certifications as of 19 August 2013**

<b>State</b>	<b>Certification</b>
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP A2LA ISO 17025	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Nevada	SC000122011-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-13-8
Utah NELAP	SC000122013-8
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

# **Chain of Custody and Supporting Documentation**

## Chain of Custody/Analysis Request

COC/Lab Request #:

2013-1260

Page 1 of 1

[illegible]



## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <u>LANC</u>		SDG/AR/COC/Work Order: <u>2013-1260</u>	
Received By: <u>H. Taylor</u>		Date Received: <u>072313</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0cpm</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Temperature Device Serial #: <u>51050004</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
7 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: <u>See continuation</u>
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other
14 Carrier and tracking number.			<u>5462 9833 2070 -4</u> <u>5462 9833 2081 -5</u> <u>5462 9833 2092 -5</u> <u>5462 9833 2060 -16</u> <u>5462 9833 2107 -4</u>

Comments (Use Continuation Form if needed):

Client: LANL Received By: H. Taylor Date Received: 072313 SDG/AR/COC/Work Order: 2013-1260

RN 2013-1261

\* WTLAP-13-31132 received 1 container for SR90

RN 2013-1263

\* WT-IPC-13-32200 received 2 containers for Ra226/Ra228

RN 2013-1264

\* WT-IPC-13-32245 received 2 containers for Ra226/Ra228

RN 2013-1266

\* WT-IPC-13-32260 received 2 containers for Ra226/Ra228

RN 2013-1267

\* WT-IPC-13-32261 received 2 containers for Ra226/Ra228

RN 2013-1269

\* CAWA-13-36214 and <sup>HH</sup>36215 received  
2 containers each for HEP

Received ID WSTGH-13-39083 for DRO, BTEX and GRO  
without a chain, matrix is oil.

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

SHIP DATE: 22 JUL 13  
ACTWGT: 51.0 LB MAN  
CAD: 0014176/CAFE2511

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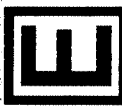
TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171  
REF: MR0A002068B0



FedEx  
Express

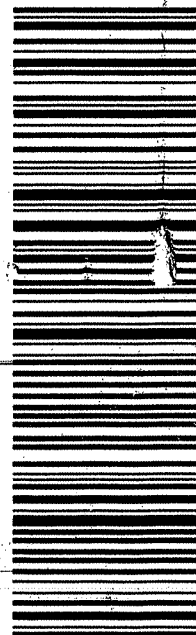


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0201  
MASTER #

XX CHSA

29407  
SC-US CHS



Part # 156148-434 RIT2 08/10

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

SHIP DATE: 22 JUL 13  
ACTWGT: 54.0 LB MAN  
CAD: 0014176/CAFE2511

BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171  
REF: MR0A002068B0



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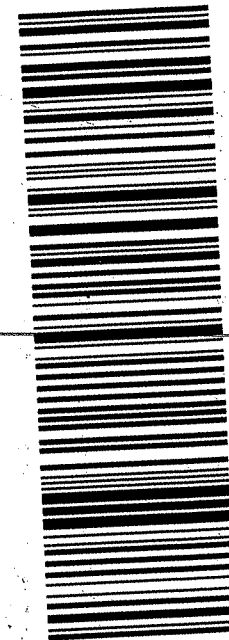


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0263  
Mstr# 5462 9833 2070

XX CHSA

29407  
SC-US CHS



Part # 156148-434 RIT2 08/10



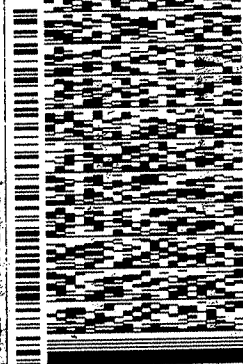
ORIGIN ID: SAFA (505) 665-9966  
KEITH GREENE  
LOS ALAMOS NATL LAB  
TR00 BLDG 1237 DPU 03  
LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 22 JUL 13  
ACTWOT: 54.0 LB MAN  
CAD: 0014176/CAFE2511

BILL SENDER  
07.23  
2000

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407  
(843) 556-8171  
REF: MR10015AGNKO



FedEx  
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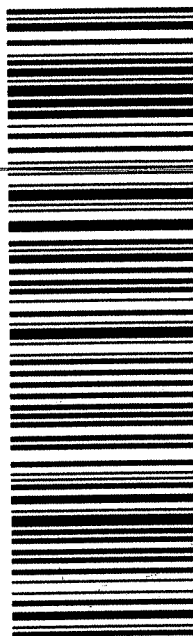


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0201

XX CHSA

29407  
SC-US CHS



Part # 156148-434 RIT2 08/10

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KEITH GREENE  
LOS ALAMOS NATL LAB  
TR00 BLDG 1237 DPU 03  
LOS ALAMOS, NM 87545  
UNITED STATES US

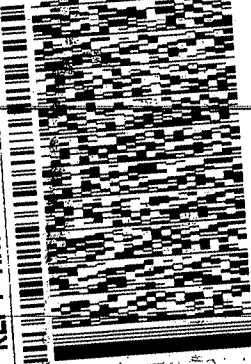
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TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171  
REF: MR0A00EC5Y00



FedEx  
Express



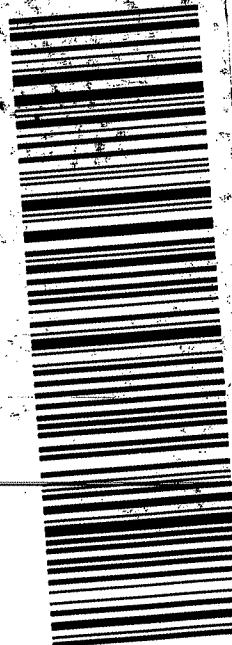
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0201

MASTER #

XX CHSA

29407  
SC-US CHS



Part # 156148-434 RIT2 08/10

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

SHIP DATE: 22JUL13  
ACTWGT: 30.0 LB MIN  
CAD: 0014176/CAFE2511

BILL SENDER

TO: VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

4

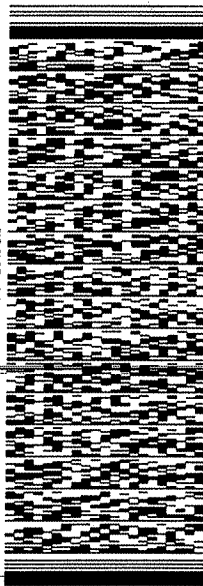
CHARLESTON SC 29407

(843) 556-8171  
REF: NR0A00EC5Y00



FedEx  
Express

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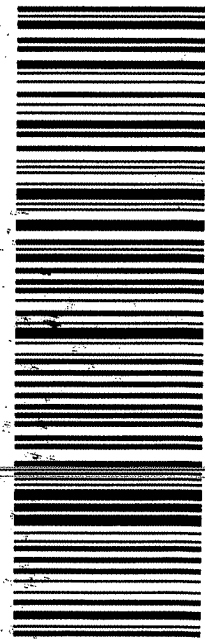
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PRIORITY OVERNIGHT

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Mstr# 5462 9833 2092

0201

XX CHSA

29407  
SC-US CHS



Part # 156148 434 R112 08/10

50DC1/RM84/108C

# **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

**Perchlorate by LC-MS/MS  
ARS International (ARSL)  
SDG 2013-1260**

**Method/Analysis Information**

**Procedure:** **Definitive Low Level Perchlorate Analysis Utilizing Liquid Chromatography-Mass Spectrometry/Mass Spectrometry (LC-MS/MS) by EPA Method 6850 Modified (6850M)**

Analytical Method: SW846 6850 Modified

Prep Method: SW846 6850 Modified

Analytical Batch Number: 1318125

Prep Batch Number: 1318124

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
330006002	CAMO-13-36987
330006004	CAMO-13-36971
1202916788	Interference Check Sample (ICS)
1202916784	Method Blank (MB)
1202916785	Laboratory Control Sample (LCS)
1202916786	330090002(CASA-13-37019) Matrix Spike (MS)
1202916787	330090002(CASA-13-37019) 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# 10.

**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**

The initial calibration verification standard (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 met all recovery acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**QC Sample Designation**

Client sample 330090002 (CASA-13-37019) from SDG 2013-1294 was chosen for matrix spike and matrix spike duplicate analysis.

**Matrix Spike (MS) Recovery Statement**

The MS recoveries were within the established acceptance limits.

**Matrix Spike Duplicate (MSD) Recovery Statement**

The MSD recoveries were within the established acceptance limits.

**MS/MSD Relative Percent Difference (RPD) Statement**

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

**Retention Time Standard Area Acceptance**

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

**Retention Time**

During the analysis of Perchlorate by LC/MS/MS, retention time shifts are commonly observed. These retention time shifts, which are caused by fouling of the column by the sample matrices, are problematic when the retention time is used as one of the criterion for confirmation. To overcome this problem, a known amount of O(18) labeled Perchlorate was added to each sample as a retention time standard.

The presence of Perchlorate was confirmed by the relative retention time (RRT) of the Perchlorate peak and the O(18) standard. A RRT window of 0.98 to 1.02, as required by Method 332.0, has been used.

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

## **Technical Information**

### **Holding Time Specifications**

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

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

All procedures were performed as stated in the SOP.

### **Sample Dilutions**

The samples in this SDG did not require dilutions.

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

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**

Some initial calibration standards, continuing calibration standards, and/or samples may require manual integrations due to software limitations.

### **Method Comments**

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

### **Additional Comments**

The concentration observed in 1202916786 (CASA-13-37019MS) and 1202916787 (CASA-13-37019MSD) were just above the calibration range for both Perchlorate and Perchlorate-101. This was due to the background concentration present in the parent sample, 330090002 (CASA-13-37019). There was no need to re-analyze the matrix spikes at a dilution.

The Perchlorate Isotope Ratio on the Form I may differ slightly from the ratio on the corresponding raw data due to rounding rules and/or significant figures or due to software limitations when there are manual integrations, dilutions or other factors. The ratio value of the Form I is the correct value.

The retention time marker, Perchlorate-O (18), is added to all samples, instrument blanks, and standards prior to injection. It is used to verify the retention time of Perchlorate and Perchlorate-101 and to insure an accurate injection occurred.

Due to various anions affecting the recovery of Perchlorate-O (18) and not Perchlorate and Perchlorate-101, the calibration curves of Perchlorate and Perchlorate-101 are not internally corrected for using Perchlorate-O (18). They are external calibrations.

### **Perchlorate Isotope Ratio**

The Perchlorate isotope ratio met acceptance criteria for all samples and QC samples.

Please see the isotope ratio criteria in the Miscellaneous Section.

### **System Configuration**

The laboratory utilizes a Waters LC 2795 liquid chromatography instrument for Perchlorate analysis. It is coupled with either a Micromass Quattro Micro Mass Spectrometer/ Mass Spectrometer, or a Micromass Quattro Ultima Mass Spectrometer/ Mass Spectrometer. Each being designated as LCMSMS #1 and LCMSMS #2, respectively. 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**

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

ARSL001 ARS International (63641-10)

Client SDG: 2013-1260 GEL Work Order: 330006

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

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, 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 AUG 2013

Title: Group Leader



# **Sample Data Summary**

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1318124Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-13-36987Date Received: 23-JUL-13GEL Job No (SDG): 2013-1260GEL Sample ID: 330006002Date Filtered: 03-AUG-13Injection 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	0.773	ug/L		1	05-AUG-13 19:01	per0805024a
	Perchlorate Isotope Ratio			3.05			1	05-AUG-13 19:01	per0805024a
14797-73-0	Perchlorate-101	.05	.2	0.771	ug/L		1	05-AUG-13 19:01	per0805024a
	Perchlorate-O(18)			0.527	ug/L		1	05-AUG-13 19:01	per0805024a

^ 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: 1318124Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-13-36971Date Received: 23-JUL-13GEL Job No (SDG): 2013-1260GEL Sample ID: 330006004Date Filtered: 03-AUG-13Injection 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	0.770	ug/L		1	05-AUG-13 19:10	per0805025a
	Perchlorate Isotope Ratio			3.06			1	05-AUG-13 19:10	per0805025a
14797-73-0	Perchlorate-101	.05	.2	0.765	ug/L		1	05-AUG-13 19:10	per0805025a
	Perchlorate-O(18)			0.538	ug/L		1	05-AUG-13 19:10	per0805025a

^ 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):** 2013-1260

**Extract Batch Code:** 1318124

**Date Filtered:** 03-AUG-13

**Matrix:** WATER

**Sample ID:** 1202916785

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.204	ug/L	102		85 - 115
Perchlorate Isotope Ratio		3.07				-
Perchlorate-101	0.200	.202	ug/L	101		85 - 115
Perchlorate-O(18)		.522	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):** 2013-1260

**Extract Batch Code:** 1318124

**Date Extracted:** 03-AUG-13

**GEL MS/PS ID:** 1202916786

**Client ID:** CASA-13-37019

**GEL MSD/PSD ID:** 1202916787

**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	0.838	ug/L	1.01	88.3	1.02	93.2	.975	30	75 - 125
Perchlorate Isotope Ratio	0	3.12		3.02		3.07		1.52		-
Perchlorate-101	0.200	0.818	ug/L	1.02	102	1.02	98.9	.544	30	75 - 125
Perchlorate-O(18)	0	0.530	ug/L	0.551		.541		1.85		-

^ 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: 1318124Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 03-AUG-13GEL Job No (SDG): 2013-1260GEL Sample ID: 1202916784Date Filtered: 03-AUG-13Injection 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	05-AUG-13 18:36	per0805021a
	Perchlorate Isotope Ratio						1	05-AUG-13 18:36	per0805021a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	05-AUG-13 18:36	per0805021a
	Perchlorate-O(18)			0.504	ug/L		1	05-AUG-13 18:36	per0805021a

^ 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: 1318124Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 03-AUG-13GEL Job No (SDG): 2013-1260GEL Sample ID: 1202916785Date Filtered: 03-AUG-13Injection 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	0.204	ug/L		1	05-AUG-13 18:44	per0805022a
	Perchlorate Isotope Ratio			3.07			1	05-AUG-13 18:44	per0805022a
14797-73-0	Perchlorate-101	.05	.2	0.202	ug/L		1	05-AUG-13 18:44	per0805022a
	Perchlorate-O(18)			0.522	ug/L		1	05-AUG-13 18:44	per0805022a

^ 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: 1318124Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2013-1260GEL Sample ID: 1202916788Date Filtered: 03-AUG-13Injection 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	05-AUG-13 18:53	per0805023a
	Perchlorate Isotope Ratio			3.05			1	05-AUG-13 18:53	per0805023a
14797-73-0	Perchlorate-101	.05	.2	0.201	ug/L		1	05-AUG-13 18:53	per0805023a
	Perchlorate-O(18)			0.534	ug/L		1	05-AUG-13 18:53	per0805023a

^ 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: 1318124Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-13-37019MSDate Received: 24-JUL-13GEL Job No (SDG): 2013-1260GEL Sample ID: 1202916786Date Filtered: 03-AUG-13Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	1.01	ug/L		1	05-AUG-13 19:43	per0805029a
	Perchlorate Isotope Ratio			3.02			1	05-AUG-13 19:43	per0805029a
14797-73-0	Perchlorate-101	.05	.2	1.02	ug/L		1	05-AUG-13 19:43	per0805029a
	Perchlorate-O(18)			0.551	ug/L		1	05-AUG-13 19:43	per0805029a

^ 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: 1318124Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-13-37019MSDDate Received: 24-JUL-13GEL Job No (SDG): 2013-1260GEL Sample ID: 1202916787Date Filtered: 03-AUG-13Injection Volume (uL): 20%Solids:           

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	1.02	ug/L		1	05-AUG-13 19:52	per0805030a
	Perchlorate Isotope Ratio			3.07			1	05-AUG-13 19:52	per0805030a
14797-73-0	Perchlorate-101	.05	.2	1.02	ug/L		1	05-AUG-13 19:52	per0805030a
	Perchlorate-O(18)			0.541	ug/L		1	05-AUG-13 19:52	per0805030a

^ 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 Fractional Narrative  
ARS International (ARSL)  
SDG 2013-1260**

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
330006002	CAMO-13-36987
330006004	CAMO-13-36971
1202921919	Method Blank (MB) <b>ICP</b>
1202921920	Laboratory Control Sample (LCS)
1202921923	330090002(CASA-13-37019L) Serial Dilution (SD)
1202921921	330090002(CASA-13-37019D) Sample Duplicate (DUP)
1202921922	330090002(CASA-13-37019S) Matrix Spike (MS)
1202921924	Method Blank (MB) <b>ICP-MS</b>
1202921925	Laboratory Control Sample (LCS)
1202921928	330090002(CASA-13-37019L) Serial Dilution (SD)
1202921926	330090002(CASA-13-37019D) Sample Duplicate (DUP)
1202921927	330090002(CASA-13-37019S) Matrix Spike (MS)
1202919734	Method Blank (MB) <b>CVAA</b>
1202919735	Laboratory Control Sample (LCS)
1202919738	330006002(CAMO-13-36987L) Serial Dilution (SD)
1202919736	330006002(CAMO-13-36987D) Sample Duplicate (DUP)
1202919737	330006002(CAMO-13-36987S) Matrix Spike (MS)

**Method/Analysis Information**

<b>Analytical Batch:</b>	1320241, 1320243, 1319318 and 1323437
<b>Prep Batch :</b>	1320234, 1320242 and 1319317
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 22, GL-MA-E-006 REV# 9, GL-MA-E-014 REV# 25, GL-MA-E-010 REV# 26 and GL-GC-E-107 REV# 8
<b>Analytical Method:</b>	SW846 3005/6010B, SW846 3005/6020 DOE-AL, EPA 245.1/245.2 and SM 2340 B

**Prep Method :** SW846 3005A and EPA 245.1/245.2 Prep

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

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

### **System Configuration**

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

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 6100E inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

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. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

### **Calibration Information**

#### **Instrument Calibration**

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

**CRDL Requirements**

All CRDL standard(s) met the referenced advisory control limits.

**ICSA/ICSAB Statement**

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

**Continuing Calibration Blank (CCB) Requirements**

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

**Continuing Calibration Verification (CCV) Requirements**

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

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

The MBs analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Quality Control (QC) Sample Statement**

The following samples were selected as the quality control (QC) samples for this SDG: 330090002 (CASA-13-37019)-ICP and ICP-MS and 330006002 (CAMO-13-36987)-CVAA.

**Matrix Spike (MS) Recovery Statement**

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All applicable elements met the acceptance criteria.

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

The relative percent difference (RPD) obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the contract required detection limit (RL), a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements with the exception of nickel.

**Serial Dilution % Difference Statement**

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations that are 25X the IDL/MDL for CVAA, 50X the IDL/MDL for ICP, and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria of less than 10% difference (%D).

## **Technical Information**

### **Holding Time Specifications**

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. All samples in this SDG met the specified holding time.

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

All procedures were performed as stated in the SOP.

### **Sample Dilutions**

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instruments. Samples 330006002 and 330006004 required dilution for tin in order to minimize suppression due to matrix interferences.

### **Preparation Information**

The samples in this SDG were prepared exactly 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**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: 1210109. A copy is included in the Miscellaneous Data section of this package.

### **Additional Comments**

Additional comments were not required for this SDG.



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

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

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

### **Certification Statement**

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

### **Review Validation:**

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

**The following data validator verified the information presented in this case narrative:**

Reviewer:  Date: 08/19/13

# **Sample Data Summary**

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

ARSL001 ARS International (63641-10)

Client SDG: 2013-1260 GEL Work Order: 330006

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

\* A quality control analyte recovery is outside of specified acceptance criteria

J Value is estimated

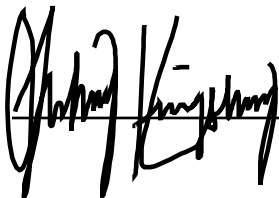
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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 Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis.

Reviewed by



08/19/13

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

**SDG No:** 2013-1260**CONTRACT:** ESHL00210**METHOD TYPE:** EPA**SAMPLE ID:** 330006002**BASIS:** As Received**DATE COLLECTED** 19-JUL-13**CLIENT ID:** CAMO-13-36987**LEVEL:** Low**DATE RECEIVED** 23-JUL-13**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	NOR1	08/02/13 11:20	080213W1-7	1319318

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

SDG No: 2013-1260

CONTRACT: ESHL00210

METHOD TYPE: SW846

SAMPLE ID: 330006002

BASIS: As Received

DATE COLLECTED 19-JUL-13

CLIENT ID: CAMO-13-36987

LEVEL: Low

DATE RECEIVED 23-JUL-13

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	08/09/13 14:01	130809-5	1320243
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	BAJ	08/08/13 18:16	130808-2	1320243
7440-39-3	Barium	30.6	ug/L		1	5	5	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7440-42-8	Boron	18.4	ug/L	J	15	50	50	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	BAJ	08/08/13 18:16	130808-2	1320243
7440-70-2	Calcium	19300	ug/L		50	200	200	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7440-47-3	Chromium	136	ug/L		2	10	10	1	MS	BAJ	08/09/13 08:09	130808-4	1320243
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	08/08/13 18:16	130808-2	1320243
7439-95-4	Magnesium	5380	ug/L		110	300	300	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7439-98-7	Molybdenum	1.34	ug/L		0.165	0.5	0.5	1	MS	SKJ	08/09/13 12:25	130809-6	1320243
7440-02-0	Nickel	1.81	ug/L	J	0.5	2	2	1	MS	BAJ	08/08/13 18:16	130808-2	1320243
7440-09-7	Potassium	1500	ug/L		50	150	150	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	BAJ	08/08/13 18:16	130808-2	1320243
7631-86-9	Silica	65700	ug/L		53	213	213	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	BAJ	08/08/13 18:16	130808-2	1320243
7440-23-5	Sodium	12300	ug/L		100	300	300	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7440-24-6	Strontium	103	ug/L		1	5	5	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	BAJ	08/08/13 18:16	130808-2	1320243
7440-31-5	Tin	100	ug/L	U	25	100	100	10	P	HSC	08/09/13 09:27	080913A-1	1320241
7440-61-1	Uranium	0.840	ug/L		0.067	0.2	0.2	1	MS	SKJ	08/09/13 12:25	130809-6	1320243
7440-62-2	Vanadium	3.31	ug/L	J	1	5	5	1	P	HSC	08/09/13 08:12	080913A-1	1320241
7440-66-6	Zinc	7.79	ug/L	J	3.3	10	10	1	P	HSC	08/09/13 08:12	080913A-1	1320241

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

**SDG No:** 2013-1260**CONTRACT:** ESHL00210**METHOD TYPE:****SAMPLE ID:** 330006002      **BASIS:** As Received      **DATE COLLECTED** 19-JUL-13**CLIENT ID:** CAMO-13-36987      **LEVEL:** Low      **DATE RECEIVED** 23-JUL-13**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	70.4	mg/L		0.453	1.24	1.24	1		AXH3	08/19/13 08:11		1323437

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1319318	1319317	EPA 245.1/245.2 Prep	20	mL	20	mL	08/01/13	AXS5
1320241	1320234	SW846 3005A	50	mL	50	mL	08/08/13	AXG2
1320243	1320242	SW846 3005A	50	mL	50	mL	08/07/13	AXG2

**\*Analytical Methods:**

**MS**      **SW846 3005/6020 DOE-AL**  
**P**      **SW846 3005/6010B**  
**AV**      **EPA 245.1/245.2**



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

**SDG No:** 2013-1260**CONTRACT:** ESHL00210**METHOD TYPE:** EPA**SAMPLE ID:** 330006004**BASIS:** As Received**DATE COLLECTED** 19-JUL-13**CLIENT ID:** CAMO-13-36971**LEVEL:** Low**DATE RECEIVED** 23-JUL-13**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	NOR1	08/02/13 11:27	080213W1-7	1319318

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

SDG No: 2013-1260

CONTRACT: ESHL00210

METHOD TYPE: SW846

SAMPLE ID: 330006004

BASIS: As Received

DATE COLLECTED 19-JUL-13

CLIENT ID: CAMO-13-36971

LEVEL: Low

DATE RECEIVED 23-JUL-13

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	08/09/13 14:04	130809-5	1320243
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	BAJ	08/08/13 18:23	130808-2	1320243
7440-39-3	Barium	29	ug/L		1	5	5	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7440-42-8	Boron	38.4	ug/L	J	15	50	50	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	BAJ	08/08/13 18:23	130808-2	1320243
7440-70-2	Calcium	18500	ug/L		50	200	200	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7440-47-3	Chromium	133	ug/L		2	10	10	1	MS	BAJ	08/09/13 08:15	130808-4	1320243
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	08/08/13 18:23	130808-2	1320243
7439-95-4	Magnesium	5090	ug/L		110	300	300	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7439-98-7	Molybdenum	1.3	ug/L		0.165	0.5	0.5	1	MS	SKJ	08/09/13 12:28	130809-6	1320243
7440-02-0	Nickel	1.82	ug/L	J	0.5	2	2	1	MS	BAJ	08/08/13 18:23	130808-2	1320243
7440-09-7	Potassium	1380	ug/L		50	150	150	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	BAJ	08/08/13 18:23	130808-2	1320243
7631-86-9	Silica	63700	ug/L		53	213	213	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	BAJ	08/08/13 18:23	130808-2	1320243
7440-23-5	Sodium	11800	ug/L		100	300	300	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7440-24-6	Strontium	98.2	ug/L		1	5	5	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	BAJ	08/08/13 18:23	130808-2	1320243
7440-31-5	Tin	100	ug/L	U	25	100	100	10	P	HSC	08/09/13 09:30	080913A-1	1320241
7440-61-1	Uranium	0.853	ug/L		0.067	0.2	0.2	1	MS	SKJ	08/09/13 12:28	130809-6	1320243
7440-62-2	Vanadium	3.1	ug/L	J	1	5	5	1	P	HSC	08/09/13 08:15	080913A-1	1320241
7440-66-6	Zinc	6.85	ug/L	J	3.3	10	10	1	P	HSC	08/09/13 08:15	080913A-1	1320241

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

**SDG No:** 2013-1260**CONTRACT:** ESHL00210**METHOD TYPE:****SAMPLE ID:** 330006004**BASIS:** As Received**DATE COLLECTED** 19-JUL-13**CLIENT ID:** CAMO-13-36971**LEVEL:** Low**DATE RECEIVED** 23-JUL-13**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	67.3	mg/L		0.453	1.24	1.24	1		AXH3	08/19/13 08:11		1323437

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1319318	1319317	EPA 245.1/245.2 Prep	20	mL	20	mL	08/01/13	AXS5
1320241	1320234	SW846 3005A	50	mL	50	mL	08/08/13	AXG2
1320243	1320242	SW846 3005A	50	mL	50	mL	08/07/13	AXG2

**\*Analytical Methods:**

**MS** SW846 3005/6020 DOE-AL  
**P** SW846 3005/6010B  
**AV** EPA 245.1/245.2

# **Quality Control Summary**

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

SDG NO. 2013-1260

Contract: ESHL00210

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>
1202919734	Mercury	-0.081	ug/L	+/-0.2	J	AV	0.067	0.2
1202921919	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	-82.1	ug/L	+/-150	J	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Calcium	50	ug/L	+/-200	U	P	50	200
	Boron	15	ug/L	+/-50	U	P	15	50
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Barium	1	ug/L	+/-5	U	P	1	5
	Aluminum	68	ug/L	+/-200	U	P	68	200
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1202921924	Antimony	-1.7	ug/L	+/-3	J	MS	1	3
	Arsenic	1.7	ug/L	+/-5	U	MS	1.7	5
	Cadmium	0.11	ug/L	+/-1	U	MS	0.11	1
	Chromium	2	ug/L	+/-10	U	MS	2	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.165	ug/L	+/-0.5	U	MS	0.165	0.5
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Selenium	1.5	ug/L	+/-5	U	MS	1.5	5
	Silver	0.2	ug/L	+/-1	U	MS	0.2	1
	Thallium	0.45	ug/L	+/-2	U	MS	0.45	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL  
P SW846 3005/6010B  
AV EPA 245.1/245.2

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2013-1260

Client ID: CAMO-13-36987S

Contract: ESHL00210

Level: Low

Matrix: WATER

% Solids:

Sample ID: 330006002

Spike ID: 1202919737

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	2.03		0.067	U	2	102		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2013-1260 Client ID: CASA-13-37019S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 330090002 Spike ID: 1202921922

<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>
Boron	ug/L	75-125	567		53.3		500	103		P
Calcium	ug/L	75-125	23900		18600		5000	106		P
Cobalt	ug/L	75-125	534		1	U	500	107		P
Copper	ug/L	75-125	551		3	U	500	110		P
Iron	ug/L	75-125	5430		30	U	5000	109		P
Magnesium	ug/L	75-125	9300		3860		5000	109		P
Manganese	ug/L	75-125	548		31.2		500	103		P
Potassium	ug/L	75-125	7650		2340		5000	106		P
Silica	ug/L		59300		50400		10700	83.6	N/A	P
Sodium	ug/L	75-125	15000		10300		5000	93.9		P
Strontium	ug/L	75-125	605		74.5		500	106		P
Tin	ug/L	75-125	632		25	U	500	125		P
Vanadium	ug/L	75-125	543		3.94	J	500	108		P
Zinc	ug/L	75-125	527		3.3	U	500	105		P
Aluminum	ug/L	75-125	5320		68	U	5000	106		P
Barium	ug/L	75-125	541		13.8		500	105		P
Beryllium	ug/L	75-125	547		1	U	500	109		P

## \*Analytical Methods:

P SW846 3005/6010B

## METALS

-5a-

## Matrix Spike Summary

**SDG NO.** 2013-1260 **Client ID:** CASA-13-37019S

**Contract:** ESHL00210 **Level:** Low

**Matrix:** WATER **% Solids:**

**Sample ID:** 330090002 **Spike ID:** 1202921927

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	50.2		1	U	50	100		MS
Arsenic	ug/L	75-125	49.5		1.7	U	50	96.8		MS
Cadmium	ug/L	75-125	49.1		0.11	U	50	98.2		MS
Chromium	ug/L	75-125	47.6		2	U	50	93.6		MS
Lead	ug/L	75-125	48.2		0.5	U	50	96.4		MS
Molybdenum	ug/L	75-125	51.9		1.5		50	101		MS
Nickel	ug/L	75-125	47.7		3.8		50	87.7		MS
Selenium	ug/L	75-125	52.1		1.5	U	50	102		MS
Silver	ug/L	75-125	49.3		0.2	U	50	98.6		MS
Thallium	ug/L	75-125	43.2		0.45	U	50	86.2		MS
Uranium	ug/L	75-125	53.4		0.453		50	106		MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL



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

**SDG No.:** 2013-1260**Lab Code:** GEL**Contract:** ESHL00210**Client ID:** CAMO-13-36987D**Matrix:** LIQUID**Level:** Low**Sample ID:** 330006002**Duplicate ID:** 1202919736**Percent Solids for Dup:** N/A

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

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**\*Analytical Methods:**

AV EPA 245.1/245.2

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

SDG No.: 2013-1260

Lab Code: GEL

Contract: ESHL00210

Client ID: CASA-13-37019D

Matrix: LIQUID

Level: Low

Sample ID: 330090002

Duplicate ID: 1202921921

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-5	13.8		13.7		.502		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	53.3		43.5 J		20.3		P
Calcium	ug/L	+/-20%	18600		18600		.113		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%	3860		3860		.0622		P
Manganese	ug/L	+/-10	31.2		31		.708		P
Potassium	ug/L	+/-20%	2340		2390		1.98		P
Silica	ug/L	+/-20%	50400		50400		.0278		P
Sodium	ug/L	+/-20%	10300		10200		.4		P
Strontium	ug/L	+/-20%	74.5		73.9		.876		P
Tin	ug/L		25 U		25 U				P
Vanadium	ug/L	+/-5	3.94 J		4 J		1.53		P
Zinc	ug/L		3.3 U		3.3 U				P

\*Analytical Methods:

P SW846 3005/6010B

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

SDG No.: 2013-1260

Lab Code: GEL

Contract: ESHL00210

Client ID: CASA-13-37019D

Matrix: LIQUID

Level: Low

Sample ID: 330090002

Duplicate ID: 1202921926

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		1.7 U		1.7 U				MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L		2 U		2 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.5		1.52		.861		MS
Nickel	ug/L	+/- 2	3.8		0.5 U		165	*	MS
Selenium	ug/L		1.5 U		1.5 U				MS
Silver	ug/L		0.2 U		0.2 U				MS
Thallium	ug/L		0.45 U		0.45 U				MS
Uranium	ug/L	+/- .2	0.453		0.46		1.53		MS

\*Analytical Methods:

MS SW846 3005/6020 DOE-AL

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2013-1260

Contract: ESHL00210

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>
1202919735	Mercury	ug/L	2	2.08		104	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2013-1260

Contract: ESHL00210

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>
1202921920								
	Barium	ug/L	500	546		109	80-120	P
	Beryllium	ug/L	500	549		110	80-120	P
	Aluminum	ug/L	5000	5470		109	80-120	P
	Boron	ug/L	500	540		108	80-120	P
	Calcium	ug/L	5000	5500		110	80-120	P
	Cobalt	ug/L	500	552		110	80-120	P
	Copper	ug/L	500	551		110	80-120	P
	Iron	ug/L	5000	5500		110	80-120	P
	Magnesium	ug/L	5000	5580		112	80-120	P
	Manganese	ug/L	500	542		108	80-120	P
	Potassium	ug/L	5000	5420		108	80-120	P
	Silica	ug/L	10700	11400		106	80-120	P
	Sodium	ug/L	5000	5360		107	80-120	P
	Strontium	ug/L	500	545		109	80-120	P
	Tin	ug/L	500	553		111	80-120	P
	Vanadium	ug/L	500	550		110	80-120	P
	Zinc	ug/L	500	541		108	80-120	P

## \*Analytical Methods:

P SW846 3005/6010B

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2013-1260

Contract: ESHL00210

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>
1202921925								
	Antimony	ug/L	50	49.1		98.3	80-120	MS
	Arsenic	ug/L	50	51.2		102	80-120	MS
	Cadmium	ug/L	50	51		102	80-120	MS
	Chromium	ug/L	50	49.3		98.7	80-120	MS
	Lead	ug/L	50	50.7		101	80-120	MS
	Molybdenum	ug/L	50	50.1		100	80-120	MS
	Nickel	ug/L	50	52.4		105	80-120	MS
	Selenium	ug/L	50	53.8		108	80-120	MS
	Silver	ug/L	50	51.1		102	80-120	MS
	Thallium	ug/L	50	48.1		96.3	80-120	MS
	Uranium	ug/L	50	52.4		105	80-120	MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2013-1260 **Client ID:** CAMO-13-36987L**Contract:** ESHL00210**Matrix:** LIQUID **Level:** Low**Sample ID:** 330006002 **Serial Dilution ID:** 1202919738

<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

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2013-1260 **Client ID:** CASA-13-37019L

**Contract:** ESHL00210

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

**Sample ID:** 330090002 **Serial Dilution ID:** 1202921923

<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	13.8		13.8	J	.102			P
Beryllium	1	U	5	U				P
Boron	53.3		106	J	99.2			P
Calcium	18600		18400		.874		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3860		3720		3.68			P
Manganese	31.2		30	J	3.75			P
Potassium	2340		2620		11.9			P
Silica	50400		49200		2.38		10	P
Sodium	10300		9710		5.42		10	P
Strontium	74.5		73		2		10	P
Tin	2.5	U	12.5	U				P
Vanadium	3.94	J	5	U	100			P
Zinc	3.3	U	16.5	U				P

## \*Analytical Methods:

P SW846 3005/6010B



## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2013-1260 **Client ID:** CASA-13-37019L

**Contract:** ESHL00210

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

**Sample ID:** 330090002 **Serial Dilution ID:** 1202921928

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	1.7	U	8.5	U				MS
Cadmium	.11	U	.55	U				MS
Chromium	2	U	10	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.5		1.84	J	22.1			MS
Nickel	3.8		3.98	J	4.61			MS
Selenium	1.5	U	7.5	U				MS
Silver	.2	U	1	U				MS
Thallium	.45	U	3.79	J				MS
Uranium	.453		.5	J	10.4			MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

# Miscellaneous

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 09-AUG-13	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ICP/MS	<b>Test / Method:</b> SW846 3005/6020 DOE-AL	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1320243	<b>Sample Numbers:</b> See Below		
<p><b>Potentially affected work order(s)(SDG):</b> 329718(2013-1172),329767(2013-1181),329854(2013-1217),329859(2013-1221),329862(2013-1223),329865(2013-1224),329960(2013-1238),330006(2013-1260),330076(2013-1241),330089(2013-1293),330090(2013-1294)</p> <p><b>Application Issues:</b></p> <p>Failed RPD for DUP</p>			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Failed RPD for DUP:</p> <p>QC 1202921926DUP</p>		<p>The sample and sample duplicate % RPD failed outside the control limits for Ni due to possible sample non-homogeneity and/or matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p>	

**Originator's Name:**  
Elizabeth Janssen 09-AUG-13

**Data Validator/Group Leader:**  
Samantha Jacobs 09-AUG-13

# **General Chem Analysis**

# Case Narrative

**General Chemistry Narrative  
ARS International (ARSL)  
SDG 2013-1260**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1317001

**Method:** SW 9060 Total Organic Carbon

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 9060:

<b>Sample ID</b>	<b>Client ID</b>
330006001	CAMO-13-36979
330006003	CAMO-13-36970
1202914124	Method Blank (MB)
1202914125	329377001(CAMO-13-36976) Sample Duplicate (DUP)
1202914126	329377001(CAMO-13-36976) Post Spike (PS)
1202914127	Laboratory Control Sample (LCS)

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# 12.

**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 Model 1010 Total Organic Carbon Analyzer.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 329377001 (CAMO-13-36976).

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

A 15 mg/L Total Inorganic Carbon check standard is analyzed with each analytical run to prove that the instrument is effectively sparging away the inorganic carbon.

**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:** 1320710

**Method:** EPA120.1 Specific Conductivity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
330006002	CAMO-13-36987
330006004	CAMO-13-36971
1202923058	329854002(CASA-13-37015) Sample Duplicate (DUP)
1202923061	Laboratory Control Sample (LCS)
1202923453	330751001(WST16-13-36930) Sample Duplicate (DUP)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

The Conductivity analysis was performed on a Orion 160 Conductivity Meter.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Quality Control (QC) Information**

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

The LCS spike recovery met the acceptance limits.

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

The following samples were selected for QC analysis: 329854002 (CASA-13-37015) and 330751001 (WST16-13-36930).

**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:** 1318847 **Method:** EPA 150.1 pH

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
330006002	CAMO-13-36987
330006004	CAMO-13-36971
1202918635	329718002(CASA-13-36993) Sample Duplicate (DUP)
1202918636	330006004(CAMO-13-36971) Sample Duplicate (DUP)
1202918637	Laboratory Control Sample (LCS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

The Electrode analysis was performed on a PerpHect pH Meter Orion 370.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **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**

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

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following samples were selected for QC analysis: 329718002 (CASA-13-36993) and 330006004 (CAMO-13-36971).

**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**

The following samples from this sample group were received by the lab outside of the method specified holding time: 1202918635 (CASA-13-36993), 1202918636 (CAMO-13-36971), 330006002 (CAMO-13-36987) and 330006004 (CAMO-13-36971).

**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**

The following DER was generated for this SDG: 1206839 1202918635 (CASA-13-36993), 1202918636 (CAMO-13-36971), 330006002 (CAMO-13-36987) and 330006004 (CAMO-13-36971).

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

**Product:** Ion Chromatography

**Analytical Batch:** 1316930

**Method:** EPA 300.0 Anions Liquid 28 day

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
330006002	CAMO-13-36987
330006004	CAMO-13-36971
1202913937	Method Blank (MB)
1202913938	330006002(CAMO-13-36987) Sample Duplicate (DUP)
1202913940	330006002(CAMO-13-36987) Post Spike (PS)
1202913942	Laboratory Control Sample (LCS)

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# 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 Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

### **Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MBs analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 330006002 (CAMO-13-36987).

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The following samples were re-analyzed due to CCV failure: 1202913937 (MB), 1202913938 (CAMO-13-36987), 1202913940 (CAMO-13-36987), 1202913942 (LCS), 330006002 (CAMO-13-36987) and 330006004 (CAMO-13-36971).

**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**

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202913938 (CAMO-13-36987), 1202913940 (CAMO-13-36987), 330006002 (CAMO-13-36987) and 330006004 (CAMO-13-36971).

**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:** 1319983      **Method:** EPA 350.1 Nitrogen and Ammonia L

**Prep Batch :** 1319982      **Method:** EEPA 350.2 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
330006002	CAMO-13-36987
330006004	CAMO-13-36971
1202921247	Method Blank (MB)
1202921248	329546002(CASA-13-36992) Sample Duplicate (DUP)
1202921249	330736001(WTMSGP-13-39433) Sample Duplicate (DUP)
1202921250	329546002(CASA-13-36992) Matrix Spike (MS)
1202921251	330736001(WTMSGP-13-39433) Matrix Spike (MS)
1202921252	Laboratory Control Sample (LCS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**



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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following samples were selected for QC analysis: 329546002 (CASA-13-36992) and 330736001 (WTMSGP-13-39433).

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The following samples were re-analyzed due to CCV failure: 1202921249 (WTMSGP-13-39433), 1202921251 (WTMSGP-13-39433), 330006002 (CAMO-13-36987) and 330006004 (CAMO-13-36971).

**Miscellaneous Information**

**Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1315708	<b>Method:</b>	Nitrogen and Total Kjeldahl (TKN)
<b>Prep Batch :</b>	1315707	<b>Method:</b>	EEPA 351.2 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
330006001	CAMO-13-36979
330006003	CAMO-13-36970
1202910854	Method Blank (MB)
1202910855	Laboratory Control Sample (LCS)
1202910856	329653001(CAMO-13-36977) Sample Duplicate (DUP)
1202910857	329653001(CAMO-13-36977) Matrix Spike (MS)
1202911679	329377001(CAMO-13-36976) Sample Duplicate (DUP)
1202911680	329377001(CAMO-13-36976) 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+ 8500 Series.

### **Continuing Calibration Blanks**

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

### **Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following samples were selected for QC analysis: 329377001 (CAMO-13-36976) and 329653001 (CAMO-13-36977).

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

The spike recovery falls outside of the established acceptance limits due to matrix interference: 1202910857 (CAMO-13-36977).

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

The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1202910856 (CAMO-13-36977) and 1202911679 (CAMO-13-36976).

**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**

The following DER was generated for this SDG: 1208720 1202910857 (CAMO-13-36977).

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Nitrate Nitrite by Cadmium Reduction</b>		
<b>Analytical Batch:</b>	1317208	<b>Method:</b>	EPA 353.2 Nitrogen and Nitrate/Nitrite

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
330006002	CAMO-13-36987
330006004	CAMO-13-36971
1202914694	Method Blank (MB)
1202914697	330006002(CAMO-13-36987) Sample Duplicate (DUP)
1202914700	330006002(CAMO-13-36987) Post Spike (PS)
1202914701	Laboratory Control Sample (LCS)

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+ 8000 Series.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**

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

### **Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 330006002 (CAMO-13-36987).

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The following sample in this sample group was diluted due to matrix interference: 330006004 (CAMO-13-36971).

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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



### **Method/Analysis Information**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1317225	<b>Method:</b>	EPA 365.4 Phosphorus and Total in
<b>Prep Batch :</b>	1317224	<b>Method:</b>	EEPA 365.4 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
330006002	CAMO-13-36987
330006004	CAMO-13-36971
1202914749	Method Blank (MB)
1202914750	329960002(CASA-13-36994) Sample Duplicate (DUP)
1202914752	329960002(CASA-13-36994) Matrix Spike (MS)
1202914754	Laboratory Control Sample (LCS)
1202916979	330089003(CASA-13-37021) Sample Duplicate (DUP)
1202916980	330089003(CASA-13-37021) 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.

### **Continuing Calibration Blanks**

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

### **Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following samples were selected for QC analysis: 329960002 (CASA-13-36994) and 330089003 (CASA-13-37021).

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The following samples were re-analyzed due to instrument failure: 1202914749 (MB) and 1202914754 (LCS).

**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:** 1317422

**Method:** EPA 160.1 Solids and Dissolved-F

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
330006002	CAMO-13-36987
330006004	CAMO-13-36971
1202915196	Method Blank (MB)
1202915197	330089003(CASA-13-37021) Sample Duplicate (DUP)
1202915198	Laboratory Control Sample (LCS)

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# 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 Solids analysis was performed on a Sartorius Balance BAL216. Solids lab

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Quality Control (QC) Information**

#### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

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

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 330089003 (CASA-13-37021).

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Sample Aliquot**

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

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

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents.

**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:** 1319311      **Method:** EPA 310.1 Total Alkalinity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
330006002	CAMO-13-36987
330006004	CAMO-13-36971
1202919729	Laboratory Control Sample (LCS)
1202919730	330187002(CASA-13-36995) Sample Duplicate (DUP)
1202919731	330187002(CASA-13-36995) 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# 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 Titration analysis was performed on a manually operated buret.

### **Initial Standardization**

The titrant was properly standardized

### **Quality Control (QC) Information**

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

The LCS spike recovery met the acceptance limits.

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

The following sample was selected for QC analysis: 330187002 (CASA-13-36995).

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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**Certification Statement**

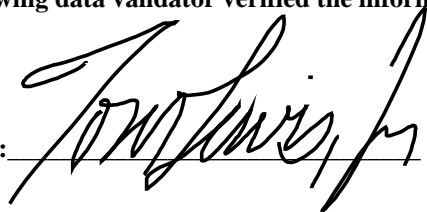
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

**Review Validation:**

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

**The following data validator verified the information presented in this case narrative:**

**Reviewer:**



**Date:**

19Aug13



# **Sample Data Summary**

## GEL LABORATORIES LLC

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

### Certificate of Analysis Report for

ARSL001 ARS International (63641-10)

Client SDG: 2013-1260 GEL Work Order: 330006

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

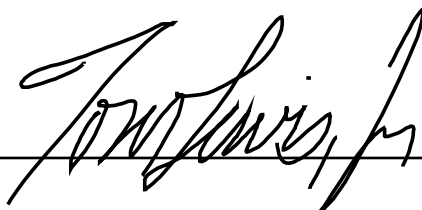
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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 Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis.

Reviewed by

A handwritten signature in black ink, appearing to read 'Valerie Davis', is written over a horizontal line.

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: August 19, 2013

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545

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

Client SDG: 2013-1260

Client Sample ID: CAMO-13-36979  
Sample ID: 330006001  
Matrix: W  
Collect Date: 19-JUL-13 11:47  
Receive Date: 23-JUL-13  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average	J	0.394	0.330	1.00	mg/L	1	TSM	07/25/13	1344	1317001	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1	KLP1	08/06/13	1504	1315708	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	08/05/13	1700	1315707

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 351.2	

Notes:

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: August 19, 2013

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545

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

Client SDG: 2013-1260

Client Sample ID: CAMO-13-36987  
Sample ID: 330006002  
Matrix: W  
Collect Date: 19-JUL-13 11:47  
Receive Date: 23-JUL-13  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Conductivity Analysis											
EPA120.1 Specific Conductivity "As Received"											
Conductivity		191	1.00	1.00	umhos/cm	1	TXT1	08/07/13	1421	1320710	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 16.5C	H	8.30	0.010	0.100	SU	1	LYG1	07/31/13	0910	1318847	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	U	ND	0.067	0.200	mg/L	1	VH1	07/31/13	1844	1316930	3
Chloride		8.07	0.067	0.200	mg/L	1					
Fluoride		0.184	0.033	0.100	mg/L	1					
Sulfate		13.9	0.133	0.400	mg/L	1					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia		0.084	0.017	0.050	mg/L	1	KLP1	08/06/13	1415	1319983	4
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		1.06	0.017	0.050	mg/L	1	KLP1	08/01/13	1112	1317208	5
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P	U	ND	0.017	0.050	mg/L	1	KLP1	07/30/13	1605	1317225	6
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		154	3.40	14.3	mg/L		LYG1	07/25/13	1353	1317422	7
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		61.4	0.725	1.00	mg/L		LXA1	08/01/13	1549	1319311	8
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	08/06/13	1230	1319982
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	07/30/13	1400	1317224

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: August 19, 2013

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545  
Contact: Mr. Keith Greene  
Project: LANL-WQH Water Samples

Client SDG: 2013-1260

Client Sample ID: CAMO-13-36987  
Sample ID: 330006002

Project: ESHL00210  
Client ID: ARSL001

The following Analytical Methods were performed:

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

**Notes:**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: August 19, 2013

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545

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

Client SDG: 2013-1260

Client Sample ID: CAMO-13-36970  
Sample ID: 330006003  
Matrix: W  
Collect Date: 19-JUL-13 11:47  
Receive Date: 23-JUL-13  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average	J	0.400	0.330	1.00	mg/L	1	TSM	07/25/13	1417	1317001	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1	KLP1	08/06/13	1509	1315708	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	08/05/13	1700	1315707

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 351.2	

Notes:

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: August 19, 2013

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545  
Contact: Mr. Keith Greene  
Project: LANL-WQH Water Samples

Client SDG: 2013-1260

Client Sample ID: CAMO-13-36971  
Sample ID: 330006004  
Matrix: W  
Collect Date: 19-JUL-13 11:47  
Receive Date: 23-JUL-13  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Conductivity Analysis											
EPA120.1 Specific Conductivity "As Received"											
Conductivity		190	1.00	1.00	umhos/cm	1	TXT1	08/07/13	1422	1320710	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 16.4C	H	8.37	0.010	0.100	SU	1	LYG1	07/31/13	0911	1318847	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	U	ND	0.067	0.200	mg/L	1	VH1	07/31/13	2017	1316930	3
Chloride		8.07	0.067	0.200	mg/L	1					
Fluoride		0.187	0.033	0.100	mg/L	1					
Sulfate		14.0	0.133	0.400	mg/L	1					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia	U	ND	0.017	0.050	mg/L	1	KLP1	08/06/13	1416	1319983	4
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		1.03	0.085	0.250	mg/L	5	KLP1	08/01/13	1116	1317208	5
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P	U	ND	0.017	0.050	mg/L	1	KLP1	07/30/13	1605	1317225	6
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		139	3.40	14.3	mg/L		LYG1	07/25/13	1353	1317422	7
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		67.1	0.725	1.00	mg/L		LXA1	08/01/13	1606	1319311	8
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	08/06/13	1230	1319982
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	07/30/13	1400	1317224

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: August 19, 2013

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545  
Contact: Mr. Keith Greene  
Project: LANL-WQH Water Samples

Client SDG: 2013-1260

Client Sample ID: CAMO-13-36971  
Sample ID: 330006004

Project: ESHL00210  
Client ID: ARSL001

The following Analytical Methods were performed:

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

**Notes:**



# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: August 19, 2013

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Los Alamos National Laboratory  
PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico  
Mr. Keith Greene

Contact:

Workorder: 330006

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1317001										
QC1202914125	329377001	DUP									
Total Organic Carbon Average	J	0.431	J	0.368	mg/L	15.8	^	(+/-1.00)	TSM	07/25/13	13:16
QC1202914127	LCS										
Total Organic Carbon Average	10.0			9.63	mg/L			(85%-115%)		07/25/13	12:33
QC1202914124	MB										
Total Organic Carbon Average			U	ND	mg/L					07/25/13	12:24
QC1202914126	329377001	PS									
Total Organic Carbon Average	10.0	J	0.431	10.5	mg/L			(65%-120%)		07/25/13	13:35
<b>Conductivity Analysis</b>											
Batch	1320710										
QC1202923058	329854002	DUP									
Conductivity			179	182	umhos/cm	1.39		(0%-10%)	TXT1	08/07/13	14:12
QC1202923453	330751001	DUP									
Conductivity			262	264	umhos/cm	0.760		(0%-10%)		08/07/13	14:26
QC1202923061	LCS										
Conductivity	1410			1420	umhos/cm			(95%-105%)		08/07/13	14:09
<b>Electrode Analysis</b>											
Batch	1318847										
QC1202918635	329718002	DUP									
pH	H	7.69	H	7.69	SU	0.00		(0%-10%)	LYG1	07/31/13	08:33
QC1202918636	330006004	DUP									
pH	H	8.37	H	8.37	SU	0.00		(0%-10%)		07/31/13	09:11
QC1202918637	LCS										
pH	7.00			6.95	SU			(99%-101%)		07/31/13	08:30
<b>Ion Chromatography</b>											
Batch	1316930										
QC1202913938	330006002	DUP									
Bromide	U	ND	U	ND	mg/L	N/A			VH1	07/31/13	19:15
Chloride		8.07		8.08	mg/L	0.186		(0%-20%)			
Fluoride		0.184		0.181	mg/L	2.08	^	(+/-0.100)			

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1316930										
Sulfate		13.9		13.9	mg/L	0.211		(0%-20%)	VH1	07/31/13	19:15
QC1202913942 LCS											
Bromide	1.25			1.29	mg/L		103	(90%-110%)		07/31/13	18:14
Chloride	5.00			4.71	mg/L		94.3	(90%-110%)			
Fluoride	2.50			2.42	mg/L		96.8	(90%-110%)			
Sulfate	10.0			9.73	mg/L		97.3	(90%-110%)			
QC1202913937 MB											
Bromide			U	ND	mg/L					07/31/13	17:43
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1202913940 330006002 PS											
Bromide	1.25	U	ND	1.30	mg/L		104	(90%-110%)		07/31/13	19:46
Chloride	5.00		8.07	13.5	mg/L		109	(90%-110%)			
Fluoride	2.50		0.184	2.44	mg/L		90.4	(90%-110%)			
Sulfate	10.0		13.9	24.3	mg/L		103	(90%-110%)			
<b>Nutrient Analysis</b>											
Batch	1315708										
QC1202910856 329653001 DUP											
Nitrogen, Total Kjeldahl		U	ND	J	0.0756	mg/L	N/A		KLP1	08/06/13	14:50
QC1202911679 329377001 DUP											
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A			08/06/13	14:45
QC1202910855 LCS											
Nitrogen, Total Kjeldahl	1.00			0.990	mg/L		99	(90%-110%)		08/06/13	14:44
QC1202910854 MB											
Nitrogen, Total Kjeldahl			J	0.0554	mg/L					08/06/13	14:43
QC1202910857 329653001 MS											

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1315708										
Nitrogen, Total Kjeldahl	1.00	U	ND	1.32	mg/L		132 *	(90%-110%)		08/06/13	14:51
QC1202911680 329377001 MS											
Nitrogen, Total Kjeldahl	1.00	U	ND	0.919	mg/L		91.9	(90%-110%)	KLP1	08/06/13	14:46
Batch	1317208										
QC1202914697 330006002 DUP											
Nitrogen, Nitrate/Nitrite			1.06	1.05	mg/L	0.948		(0%-20%)	KLP1	08/01/13	11:14
QC1202914701 LCS											
Nitrogen, Nitrate/Nitrite	1.00			0.956	mg/L		95.6	(90%-110%)		08/01/13	10:54
QC1202914694 MB											
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					08/01/13	10:52
QC1202914700 330006002 PS											
Nitrogen, Nitrate/Nitrite	1.00		1.06	2.08	mg/L		102	(90%-110%)		08/01/13	11:15
Batch	1317225										
QC1202914750 329960002 DUP											
Phosphorus, Total as P		U	ND	U	ND	mg/L	N/A		KLP1	07/30/13	16:00
QC1202916979 330089003 DUP											
Phosphorus, Total as P			2.35	2.24	mg/L	4.79		(0%-20%)		07/30/13	16:11
QC1202914754 LCS											
Phosphorus, Total as P	1.00			1.03	mg/L		103	(79%-126%)		07/30/13	16:03
QC1202914749 MB											
Phosphorus, Total as P			U	ND	mg/L					07/30/13	16:02
QC1202914752 329960002 MS											
Phosphorus, Total as P	1.00	U	ND	1.07	mg/L		107	(64%-134%)		07/30/13	16:01
QC1202916980 330089003 MS											
Phosphorus, Total as P	1.00		2.35	3.34	mg/L		99	(64%-134%)		07/30/13	16:12
Batch	1319983										
QC1202921248 329546002 DUP											
Nitrogen, Ammonia			0.0986	0.113	mg/L	13.6 ^		(+/-0.050)	KLP1	08/06/13	13:35
QC1202921249 330736001 DUP											
Nitrogen, Ammonia			0.663	0.642	mg/L	3.22		(0%-20%)		08/06/13	14:43
QC1202921252 LCS											
Nitrogen, Ammonia	1.00			1.01	mg/L		101	(90%-110%)		08/06/13	13:33
QC1202921247 MB											

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1319983										
Nitrogen, Ammonia			J	0.0441	mg/L				KLP1	08/06/13	13:33
QC1202921250 329546002 MS											
Nitrogen, Ammonia	1.00	0.0986		1.18	mg/L		108	(90%-110%)		08/06/13	13:36
QC1202921251 330736001 MS											
Nitrogen, Ammonia	1.00	0.663		1.62	mg/L		95.7	(90%-110%)		08/06/13	14:44
<b>Solids Analysis</b>											
Batch	1317422										
QC1202915197 330089003 DUP											
Total Dissolved Solids		246		244	mg/L	0.583		(0%-10%)	LYG1	07/25/13	13:53
QC1202915198 LCS											
Total Dissolved Solids	300			290	mg/L		96.7	(95%-105%)		07/25/13	13:53
QC1202915196 MB											
Total Dissolved Solids			U	ND	mg/L					07/25/13	13:53
<b>Titration Analysis</b>											
Batch	1319311										
QC1202919730 330187002 DUP											
Alkalinity, Total as CaCO3		85.3		85.8	mg/L	0.608		(0%-20%)	LXA1	08/01/13	15:27
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1202919729 LCS											
Alkalinity, Total as CaCO3	50.0			52.0	mg/L		104	(90%-110%)		08/01/13	14:57
QC1202919731 330187002 MS											
Alkalinity, Total as CaCO3	50.0	85.3		137	mg/L		103	(80%-120%)		08/01/13	15:36

- Notes:**
- < Result is less than value reported
  - > Result is greater than value reported
  - B The target analyte was detected in the associated blank.
  - E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
  - H Analytical holding time was exceeded
  - J Value is estimated
  - N/A RPD or %Recovery limits do not apply.
  - N1 See case narrative
  - ND Analyte concentration is not detected above the detection limit

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
d	5-day BOD--The 2:1 depletion requirement was not met for this sample										
e	5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes										
h	Preparation or preservation holding time was exceeded										

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

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

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

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

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

# Miscellaneous

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 31-JUL-13	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ELECTRODE	<b>Test / Method:</b> EPA 150.1	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1318847	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 329718(2013-1172),329748(2013-1177),329767(2013-1181),329854(2013-1217),329855(2013-1218),329857(2013-1219),329862(2013-1223),329865(2013-1224),329960(2013-1238),329961(2013-1239),329963(2013-1242),329965(2013-1245),329966(2013-1247),330006(2013-1260)  <b>Application Issues:</b>  Sample received out of holding			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. Sample received out of holding:  329718 002  329748 014  329767 002  329854 002,004,007  329855 001  329857 001  329862 002  329865 002  329960 002  329961 002,004,007,009  329963 007  329965 007  329966 007  330006 002,004  QC 1202918635DUP,1202918636DUP		1. Sample received out of holding	

**Originator's Name:**

Lisa Gregory 31-JUL-13

**Data Validator/Group Leader:**

Jamie Johnson 07-AUG-13



### DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 06-AUG-13	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LACHAT Flow Injection Analyzer	<b>Test / Method:</b> EPA 351.2	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1315708	<b>Sample Numbers:</b> See below.		
<p><b>Potentially affected work order(s)(SDG):</b> 329377(2013-1101),329545(2013-1128),329546(2013-1129),329653(2013-1150),329718(2013-1172),329767(2013-1181),329854(2013-1217),329862(2013-1223),329865(2013-1224),329903,329960(2013-1238),330006(2013-1260),330074,330087(2013-1292),330089(2013-1293),330090(2013-1294),330453(2013-1370)</p> <p><b>Application Issues:</b></p> <p>Failed Recovery for MS/PS</p>			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Failed Recovery for MS:</p> <p>QC 1202910857MS</p>		<p>1. The spike recovery falls outside of the established acceptance limits due to matrix interference.</p>	

**Originator's Name:**

Kristen Parson 06-AUG-13

**Data Validator/Group Leader:**

Julia Hamilton 06-AUG-13