

General Engineering Laboratories, Inc., Charleston, SC.  
2040 Savage Rd  
Charleston SC 29407

## Chain of Custody/Analysis Request

**COC/Lab Request #:**  
2013-914

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[illegible]

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4238 EVENT NAME: LA/Pueblo (TA-21 and General Surveillance Monitoring Group)  
 Q3 MY2013 Sampling  
 Event\_Pueblo  
 SAMPLE ID: CAPU-13-34774 WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED (MM/DD/YYYY):		06/03/2013	FIELD MATRIX:	WG	
TIME COLLECTED (HH:MM):		1139	MEDIA:	UA	
PRS ID:		ok	SAMPLE TECH CODE:	UA	
LOCATION ID: POI-4			FIELD PREP:	UF	
LOCATION TYPE: MON			FIELD QC TYPE:	REG	
PORT: SINGLE COMPLETION			SAMPLE USAGE:	INV	

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
MA	WSP-GrossA/B	1 LITER POLY	1	NONE	Y	ok
	WSP-RAD	1 GAL POLY	1	HNO3	Y	
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	Y	

## SAMPLE COMMENTS:

MA

## LOCATION COMMENTS:

MA

## FIELD PARAMETERS:

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

## COLLECTED BY (PRINT)

J. Romero

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 6/3/13 1250	RECEIVED BY (Printed Name) (Signature)	Date/Time 6/3/13 1250
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 05/29/2013



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4238 EVENT NAME: LA/Pueblo (TA-21 and General Surveillance Monitoring Group)  
Q3 MY2013 Sampling  
Event\_Pueblo

SAMPLE ID: CAPU-13-34782 WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		06/03/2013	FIELD MATRIX:	WG	dk
TIME COLLECTED (HH:MM):		1139	MEDIA:	UA	↓
PRS ID:		dk	SAMPLE TECH CODE:	UA	6/3/13 RSP
LOCATION ID: POI-4		↓	FIELD PREP:	F	dk
LOCATION TYPE: MON		↓	FIELD QC TYPE: REG		↓
PORT: SINGLE COMPLETION		↓	SAMPLE USAGE: INV		↓

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-CL04	250 ML POLY	1	ICE	↓	NA
	WSP-GENINORG	1 LITER POLY	1	ICE	↓	↓
	WSP-Met+B+SN+SR+U	1 LITER POLY	1	HNO3	↓	↓
↓	WSP-NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4	↓	↓

## SAMPLE COMMENTS:

NA

## LOCATION COMMENTS:

NA

## FIELD PARAMETERS:

Dissolved Oxygen 7.40 mg/L      Oxidation-Reduction Potential 130.1 MV      pH 6.96 SU  
Specific Conductance 600 uS/cm      Temperature 11.65 deg C      Turbidity 9.9 NTU

COLLECTED BY (PRINT) J. Romero

RELINQUISHED BY (Printed Name) <u>Adrian Stokes</u> (Signature) <u>[Signature]</u>	Date/Time <u>6/3/13</u> <u>1250</u>	RECEIVED BY (Printed Name) <u>S. Sherwood</u> (Signature) <u>[Signature]</u>	Date/Time <u>6/3/13</u> <u>1250</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 05/29/2013

## Data Validation Report

Chain Of Custody No. 2013-914

## 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
	326938 EPA:120.1	1				
	326938 EPA:150.1	1				
	326938 EPA:160.1	1				
	326938 EPA:245.2	1				
	326938 EPA:300.0	1				
	326938 EPA:310.1	1				
	326938 EPA:350.1	1				
	326938 EPA:351.2	1				
	326938 EPA:353.2	1				
	326938 EPA:365.4	1				
	326938 EPA:900	1				
	326938 EPA:901.1	1				
	326938 EPA:905.0	1				
	326938 HASL-300:AM-241	1				
	326938 HASL-300:ISOPU	1				
	326938 HASL-300:ISOU	1				
	326938 SM:A2340B	1				
	326938 SW-846:6010B	1				
	326938 SW-846:6020	1				
	326938 SW-846:6850	1				
	326938 SW-846:9060	1				

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups
	326938 EPA:120.1	1306822	1306822		1						
	326938 EPA:150.1	1306111	1306111		1						
	326938 EPA:160.1	1306109	1306109		1					1	
	326938 EPA:245.2	1305902	1305901		1					1	1
	326938 EPA:300.0	1306689	1306689		1					1	
	326938 EPA:310.1	1306856	1306856		1					1	1
	326938 EPA:350.1	1305434	1305433		1					1	1
	326938 EPA:351.2	1306064	1306063		1					1	1
	326938 EPA:353.2	1305432	1305432		1					1	
	326938 EPA:365.4	1306384	1306383		1					1	2
	326938 EPA:900	1308529	1308529		1					1	1
	326938 EPA:901.1	1305935	1305935		1					1	
	326938 EPA:905.0	1305999	1305999		1					1	1
	326938 HASL-300:AM-241	1304594	1304594		1					1	
	326938 HASL-300:ISOPU	1304597	1304597		1					1	
	326938 HASL-300:ISOU	1304598	1304598		1					1	
	326938 SM:A2340B	1311156	1311156		1						
	326938 SW-846:6010B	1306962	1306961		1					1	1
	326938 SW-846:6020	1306964	1306963		1					1	1
	326938 SW-846:6850	1306713	1306712		1					1	1
	326938 SW-846:9060	1307044	1307044		1					1	

## 2. Distribution Of Analytes In EDD.

[illegible]



Analytical Method	Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spikes	TICS
EPA:120.1	GENERAL CHEMISTRY	CAPU-13-34781	1202889244	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPU-13-34782	326938002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1202889242	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CALA-13-33433	1202887341	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPU-13-34782	326938002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1202887343	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CALA-13-33433	1202887334	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPU-13-34782	326938002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1202887336	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1202887333	MB	1	0	0	0
EPA:245.2	INORGANIC	CAPU-13-34782	1202886819	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAPU-13-34782	1202886820	MS	0	0	1	0
EPA:245.2	INORGANIC	CAPU-13-34782	326938002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1202886818	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1202886817	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CALA-13-33434	1202888803	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPU-13-34782	326938002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1202888805	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1202888802	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPU-13-34782	326938002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPU-13-34784	1202889347	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPU-13-34784	1202889348	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202889344	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202889343	MB	2	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CALA-13-33433	1202887243	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CALA-13-33433	1202887244	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAPU-13-34782	326938002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1202885528	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1202885527	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPU-13-34774	1202887251	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPU-13-34774	1202887252	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAPU-13-34774	326938001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1202887250	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1202887249	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CALA-13-33433	1202887245	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPU-13-34782	326938002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1202885526	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1202885521	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CALA-13-33433	1202887966	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CALA-13-33433	1202887968	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAPU-13-34782	1202887967	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPU-13-34782	1202887969	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAPU-13-34782	326938002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1202887970	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1202887965	MB	1	0	0	0
EPA:900	RAD	CAPU-13-34774	326938001	REG	2	0	0	0
EPA:900	RAD	CAPU-13-34775	1202893585	DUP	2	0	0	0
EPA:900	RAD	CAPU-13-34775	1202893586	MS	0	0	2	0
EPA:900	RAD	CAPU-13-34775	1202893587	MSD	0	0	2	0
EPA:900	RAD	LCS	1202893588	LCS	0	0	2	0
EPA:900	RAD	MB	1202893584	MB	2	0	0	0
EPA:901.1	RAD	CALA-13-33425	1202886901	DUP	5	0	0	0
EPA:901.1	RAD	CAPU-13-34774	326938001	REG	5	0	0	0
EPA:901.1	RAD	LCS	1202886902	LCS	0	0	3	0
EPA:901.1	RAD	MB	1202886900	MB	5	0	0	0

EPA:905.0	RAD	CAPU-13-34774	1202887095	DUP	1	0	0	0
EPA:905.0	RAD	CAPU-13-34774	1202887096	MS	0	0	1	0
EPA:905.0	RAD	CAPU-13-34774	326938001	REG	1	0	0	0
EPA:905.0	RAD	LCS	1202887097	LCS	0	0	1	0
EPA:905.0	RAD	MB	1202887094	MB	1	0	0	0
HASL-300:AM-241	RAD	CAMO-13-30585	1202883318	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAPU-13-34774	326938001	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1202883319	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1202883317	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAMO-13-30585	1202883321	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAPU-13-34774	326938001	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1202883322	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1202883320	MB	2	0	0	0
HASL-300:ISOU	RAD	CAMO-13-30585	1202883334	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAPU-13-34774	326938001	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1202883335	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1202883333	MB	3	0	0	0
SM-A2340B	INORGANIC	CAPU-13-34782	326938002	REG	1	0	0	0
SW-846:6010B	INORGANIC	CAPU-13-34782	326938002	REG	17	0	0	0
SW-846:6010B	INORGANIC	CAPU-13-34788	1202889610	DUP	17	0	0	0
SW-846:6010B	INORGANIC	CAPU-13-34788	1202889611	MS	0	0	17	0
SW-846:6010B	INORGANIC	LCS	1202889609	LCS	0	0	17	0
SW-846:6010B	INORGANIC	MB	1202889608	MB	17	0	0	0
SW-846:6020	INORGANIC	CAPU-13-34782	326938002	REG	11	0	0	0
SW-846:6020	INORGANIC	CAPU-13-34788	1202889615	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAPU-13-34788	1202889616	MS	0	0	11	0
SW-846:6020	INORGANIC	LCS	1202889614	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1202889613	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CALA-13-33434	1202888869	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CALA-13-33434	1202888870	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPU-13-34782	326938002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1202888868	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1202888867	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPU-13-34774	1202889801	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPU-13-34774	326938001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1202889805	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1202889800	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		Lab
Sample ID	Sample ID	Blank	Method	Matrix	Name	Result	Qualifier	Units	Detection Limit
MB	1202885527	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0434		mg/L	0.05



MB	1202889613	METHOD BLANK	SW-846:6020	W	Molybdenum	0.173	J	ug/L	0.5
MB	1202889613	METHOD BLANK	SW-846:6020	W	Nickel	0.602	J	ug/L	2

## Any samples affected by the presence of contaminants in blanks?

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
CAPU-13-34782	MB	1202885527	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	mg/L	0.0434	0.0721		0.05	Y

## 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
CAPU-13-34774	1202887252		EPA:351.2	Total Kjeldahl Nitrogen	1306063	6/12/2013	W	86.6		110	90
CAPU-13-34774	1202887252		EPA:351.2	Total Kjeldahl Nitrogen	1306063	6/12/2013	W	86.6		110	90
CAPU-13-34775	1202893586	1202893587	EPA:900	Gross alpha	1308529	6/26/2013	W	94.2	109	125	75

## 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?

Field	Lab	Lab Duplicate	Analytical	Parameter	Sample	Sample	Dup Sample		Detected	Detected	
Sample ID	SampleID	Sample ID	Method	Name	Matrix	Result	Result	Units	In Sample	In Dup	RPD
CAPU-13-34774	326938001	1202887251	EPA:351.2	Total Kjeldahl Nitrogen	W	0.194	0.15	mg/L	Y	Y	25.6

## 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
POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N
POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N
POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N
POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N
POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N



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

Rejection	RPD	RPD	Limit
Limit			
10			
10			
10	14.9	2.13	

RPD  
Limit

20

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
0.018	pCi/L	0.018	pCi/L	0.0455	0.00848	W	6/3/2013		1304594	VAL	Y
4.26	pCi/L	4.26	pCi/L	6.29	1.68	W	6/3/2013		1305935	VAL	Y
1.24	pCi/L	1.24	pCi/L	6	1.5	W	6/3/2013		1305935	VAL	Y
2.04	pCi/L	2.04	pCi/L	2.52	0.962	W	6/3/2013		1308529	VAL	Y
-1.05	pCi/L	-1.05	pCi/L	10.2	2.95	W	6/3/2013		1305935	VAL	Y

POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N
POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N
POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N
POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N
POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N
POI-4	2013-914	CAPU-13-34774	REG	INIT	GENERAL CHEMISTRY	EPA:351.2	Total Kjeldahl Nitrogen		J-	I6a	Y
POI-4	2013-914	CAPU-13-34774	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N
POI-4	2013-914	CAPU-13-34782	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N

**Reason Code****Description**

I4

the sample result is &lt;5x the concentration of related analyte in the method blank.

I6a

The associated matrix spike recovery was below the lower acceptance limit (LAL) but &gt;10%. Follow the external laboratory limits located within the associated data package.

J\_LAB

The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL

NQ

The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualify. The analyte is detected in the sample.

R5

Analyte is not detected because the amount reported is less than the MDC.

U\_LAB

The analytical laboratory qualified the analyte as not detected.

**14. Useable Result Count.**

Field	Location	Sample	Analytical	No. Unuseable	Total No. Of
Sample ID	ID	Purpose	Method	Records	Records
CAPU-13-34774	POI-4	REG	EPA:351.2	0	1
CAPU-13-34774	POI-4	REG	EPA:900	0	2
CAPU-13-34774	POI-4	REG	EPA:901.1	0	5
CAPU-13-34774	POI-4	REG	EPA:905.0	0	1
CAPU-13-34774	POI-4	REG	HASL-300:AM-241	0	1
CAPU-13-34774	POI-4	REG	HASL-300:ISOPU	0	2
CAPU-13-34774	POI-4	REG	HASL-300:ISOU	0	3
CAPU-13-34774	POI-4	REG	SW-846:9060	0	1
CAPU-13-34782	POI-4	REG	EPA:120.1	0	1
CAPU-13-34782	POI-4	REG	EPA:150.1	0	1
CAPU-13-34782	POI-4	REG	EPA:160.1	0	1
CAPU-13-34782	POI-4	REG	EPA:245.2	0	1
CAPU-13-34782	POI-4	REG	EPA:300.0	0	4
CAPU-13-34782	POI-4	REG	EPA:310.1	0	2
CAPU-13-34782	POI-4	REG	EPA:350.1	0	1
CAPU-13-34782	POI-4	REG	EPA:353.2	0	1
CAPU-13-34782	POI-4	REG	EPA:365.4	0	1
CAPU-13-34782	POI-4	REG	SM:A2340B	0	1
CAPU-13-34782	POI-4	REG	SW-846:6010B	0	17
CAPU-13-34782	POI-4	REG	SW-846:6020	0	11
CAPU-13-34782	POI-4	REG	SW-846:6850	0	1



-1.51E-09	pCi/L	-1.51E-09	pCi/L	0.0212	0.00717	W	6/3/2013		1304597	VAL	Y
0.00906	pCi/L	0.00906	pCi/L	0.0446	0.00848	W	6/3/2013		1304597	VAL	Y
-1.15	pCi/L	-1.15	pCi/L	72.7	19.7	W	6/3/2013		1305935	VAL	Y
-1.77	pCi/L	-1.77	pCi/L	5.94	1.9	W	6/3/2013		1305935	VAL	Y
0.35	pCi/L	0.35	pCi/L	0.478	0.148	W	6/3/2013		1305999	VAL	Y
0.194	mg/L	0.194	mg/L			W	6/3/2013		1306064	VAL	Y
0.042	pCi/L	0.042	pCi/L	0.0726	0.0196	W	6/3/2013		1304598	VAL	Y
0.0721	mg/L	0.0721	mg/L			W	6/3/2013		1305434	VAL	Y



July 02, 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: 326938  
SDG: 2013-914

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on June 05, 2013, and analyzed for General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4485.

Sincerely,

Hope Taylor for  
Valerie Davis  
Project Manager

Purchase Order: 63641-10  
Chain of Custody: 2013-914  
Enclosures





**ARS International (63641-10)**  
**LANL-WQH Water Samples**  
**Work Order #: 326938**  
**SDG: 2013-914**

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# Case Narrative

**Case Narrative for  
ARS International (63641-10)  
LANL-WQH Water Samples  
Workorder #: 326938  
SDG # : 2013-914**

**July 02, 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 June 05, 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. The containers for Gross A/B were preserved prior to analysis. 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>
326938001	CAPU-13-34774
326938002	CAPU-13-34782

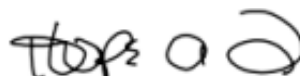
**Case Narrative**

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, Perchlorates by LCMSMS and Radiochemistry.

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.



Hope Taylor for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 02 July 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

[illegible]

**Special Instructions:**

Relinquished by:

Relinquished by:

Relinquished by:

Date/Time:

Date/Time:

Date/Time:

Received by:

Received by:

Received by:

1000

[illegible]

---

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: LANL		SDG/AR/COC/Work Order: 2013-914	
Received By: Patricia Dent		Date Received: JUN 5, 2013	
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?		X	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <b>0CPM</b>
Classified Radioactive II or III by RSO?		X	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		X	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		X	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		X	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	X			Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	X			Preservation Method: Ice bags    Blue ice    Dry ice    None    Other (describe) *all temperatures are recorded in Celsius <b>4,5C</b>
2a Daily check performed and passed on IR temperature gun?	X			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <b>61524649</b>
3 Chain of custody documents included with shipment?	X			
4 Sample containers intact and sealed?	X			Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
5 Samples requiring chemical preservation at proper pH?			X	Sample ID's, containers affected and observed pH: <b>CALA-13-34774 for Gross A/B</b> If Preservation added, Lot#: <b>NX0409-75</b>
6 VOA vials free of headspace (defined as < 6mm bubble)?		X		Sample ID's and containers affected:
7 Are Encore containers present?			X	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	X			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	X			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	X			Sample ID's affected:
11 Number of containers received match number indicated on COC?	X			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?			X	<b>Clients</b>
13 COC form is properly signed in relinquished/received sections?	X			
14 Carrier and tracking number.				Circle Applicable: FedEx Air    FedEx Ground    UPS    Field Services    Courier    Other  <b>5462 9833 0549 4C 5462 9833 0527 5C</b> <b>5462 9833 0538 5C</b>

Comments (Use Continuation Form if needed):



**Subject:** Sample receipt issue from 06/05/13  
**From:** Pat Dent <Pat.Dent@gel.com>  
**Date:** 6/5/2013 5:12 PM  
**To:** "Keith R. Greene" <kgreene@lanl.gov>  
**CC:** "team.davis" <team.davis@gel.com>, LANL@amrad.com

Containers received for Gross A/B was preserved prior to analysis.

**RN#2013-911**  
WST16-13-36094 The lab received 1 container doubled with TPH+DRO & 8260B  
the lab did not receive container for TPH+GRO

**RN#2013-913**  
CALA-13-33417 the lab received 1 8260b container instead of 2 as indicated on chain.

Thanks!!

--  
Patricia Dent  
Project Manager Assistant  
GEL Laboratories, LLC  
2040 Savage Rd.  
Charleston, S.C. 29407  
Main: 843-556-8171 Ext 4264  
Fax: 843-766-1178  
Email: [pad@gel.com](mailto:pad@gel.com)  
Web: [www.gel.com](http://www.gel.com)

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: 04JUN13  
ACTWGT: 55.0 LB MAN  
CAD: 0014176/CAFE2511

BILL SENDER

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

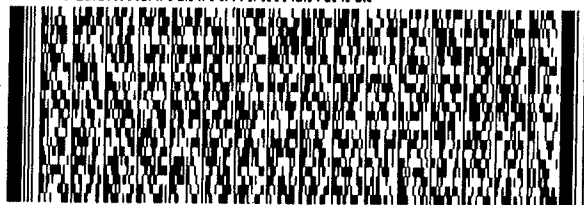
**CHARLESTON SC 29407**

(843) 556-8171

REF: WE991158W100

4c

580C 07/188C



**FedEx**  
Express



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2 of 2

MPS# 5462 9833 0549  
0263

Mstr# 5462 9833 0538

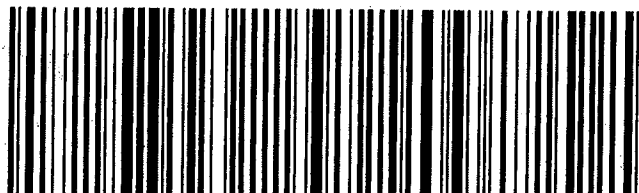
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**WED - 05 JUN 10:30A**  
**PRIORITY OVERNIGHT**

**XX CHSA**

**29407**  
**SC-US CHS**

Part 6 156149-434 R1T2 08/10



FONZ

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

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 04JUN13  
ACTWGT: 52.0 LB MAN  
CAD: 0014176/CAFE2511

BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: XF8005010300

5c



FedEx  
Express



J111311060125

TRK# 5462 9833 0527  
0201

WED - 05 JUN 10:30A  
PRIORITY OVERNIGHT

XX CHSA

29407  
SC-US CHS



Part 2 155148-434 R172 0870

ORIGIN ID: SAFA (505) 665-9965  
KEITH GREENE  
LOS ALAMOS NATL LAB  
7A00 BLDG 1237 DPW 03  
LOS ALAMOS NM 87545  
UNITED STATES US

SHIP DATE: 04 JUN 13  
ACTWGT: 42.0 LB MAN  
CAD: 0014176/CAFE2511  
SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407  
(843) 556-8171  
REF: WE991158W100

5C

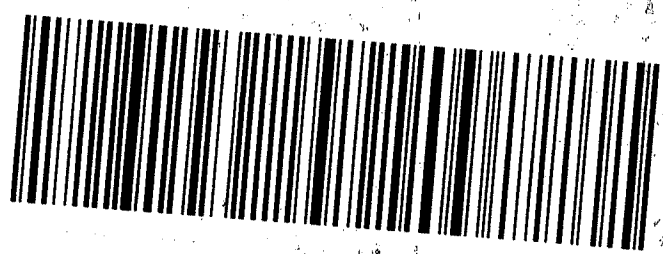


1 of 2  
TRK# 5462 9833 0538  
0201  
HH MASTER HH

WED - 05 JUN 10:30A  
PRIORITY OVERNIGHT

XX CHSA

29407  
SC-US CHS



Part 8 156148-434 R1T2 05/10



# **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 2013-914**

**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: 1306713

Prep Batch Number: 1306712

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
326938002	CAPU-13-34782
1202888871	Interference Check Sample (ICS)
1202888867	Method Blank (MB)
1202888868	Laboratory Control Sample (LCS)
1202888869	327024002(CALA-13-33434) Matrix Spike (MS)
1202888870	327024002(CALA-13-33434) 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 327024002 (CALA-13-33434) from SDG 2013-916 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**

Due to poor injection of the MSD, both matrix spikes were re-analyzed the following day. The re-analysis data are reported.

## **Miscellaneous Information**

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

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

A data exception report (DER) was not generated for this SDG.

### **Manual Integrations**

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 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: 2013-914 GEL Work Order: 326938

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

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

#### Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 26 JUN 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: 1306712Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPU-13-34782Date Received: 05-JUN-13GEL Job No (SDG): 2013-914GEL Sample ID: 326938002Date Filtered: 13-JUN-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	0.306	ug/L		1	13-JUN-13 19:16	per0613016a
	Perchlorate Isotope Ratio			3.11			1	13-JUN-13 19:16	per0613016a
14797-73-0	Perchlorate-101	.05	.2	0.305	ug/L		1	13-JUN-13 19:16	per0613016a
	Perchlorate-O(18)			0.519	ug/L		1	13-JUN-13 19:16	per0613016a

^ 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):** 2013-914

**Extract Batch Code:** 1306712

**Date Filtered:** 13-JUN-13

**Matrix:** WATER

**Sample ID:** 1202888868

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.222	ug/L	111		85 - 115
Perchlorate Isotope Ratio		3.17				-
Perchlorate-101	0.200	.217	ug/L	108		85 - 115
Perchlorate-O(18)		.568	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):** 2013-914

**Extract Batch Code:** 1306712

**Date Extracted:** 13-JUN-13

**GEL MS/PS ID:** 1202888869

**Client ID:** CALA-13-33434

**GEL MSD/PSD ID:** 1202888870

**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	0.491	ug/L	0.667	87.9	.67	89.7	.518	30	75 - 125
Perchlorate Isotope Ratio	0	3.12		3.08		3.08		.0359		-
Perchlorate-101	0.200	0.487	ug/L	0.683	97.6	.686	99.4	.553	30	75 - 125
Perchlorate-O(18)	0	0.504	ug/L	0.498		.508		1.93		-

^ 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: 1306712Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 13-JUN-13GEL Job No (SDG): 2013-914GEL Sample ID: 1202888867Date Filtered: 13-JUN-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	13-JUN-13 18:44	per0613012a
	Perchlorate Isotope Ratio						1	13-JUN-13 18:44	per0613012a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	13-JUN-13 18:44	per0613012a
	Perchlorate-O(18)			0.506	ug/L		1	13-JUN-13 18:44	per0613012a

^ 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: 1306712Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 13-JUN-13GEL Job No (SDG): 2013-914GEL Sample ID: 1202888868Date Filtered: 13-JUN-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	0.222	ug/L		1	13-JUN-13 18:52	per0613013a
	Perchlorate Isotope Ratio			3.17			1	13-JUN-13 18:52	per0613013a
14797-73-0	Perchlorate-101	.05	.2	0.217	ug/L		1	13-JUN-13 18:52	per0613013a
	Perchlorate-O(18)			0.568	ug/L		1	13-JUN-13 18:52	per0613013a

^ 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: 1306712Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2013-914GEL Sample ID: 1202888871Date Filtered: 13-JUN-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	13-JUN-13 19:00	per0613014a
	Perchlorate Isotope Ratio			3.3			1	13-JUN-13 19:00	per0613014a
14797-73-0	Perchlorate-101	.05	.2	0.189	ug/L	J	1	13-JUN-13 19:00	per0613014a
	Perchlorate-O(18)			0.523	ug/L		1	13-JUN-13 19:00	per0613014a

^ 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: 1306712Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CALA-13-33434MSDate Received: 06-JUN-13GEL Job No (SDG): 2013-914GEL Sample ID: 1202888869Date Filtered: 13-JUN-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	0.667	ug/L		1	14-JUN-13 18:04	per0614012a
	Perchlorate Isotope Ratio			3.08			1	14-JUN-13 18:04	per0614012a
14797-73-0	Perchlorate-101	.05	.2	0.683	ug/L		1	14-JUN-13 18:04	per0614012a
	Perchlorate-O(18)			0.498	ug/L		1	14-JUN-13 18:04	per0614012a

^ 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: 1306712Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CALA-13-33434MSDDate Received: 06-JUN-13GEL Job No (SDG): 2013-914GEL Sample ID: 1202888870Date Filtered: 13-JUN-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	0.670	ug/L		1	14-JUN-13 18:12	per0614013a
	Perchlorate Isotope Ratio			3.08			1	14-JUN-13 18:12	per0614013a
14797-73-0	Perchlorate-101	.05	.2	0.686	ug/L		1	14-JUN-13 18:12	per0614013a
	Perchlorate-O(18)			0.508	ug/L		1	14-JUN-13 18:12	per0614013a

^ 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 2013-914**

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
326938002	CAPU-13-34782
1202889608	Method Blank (MB) <b>ICP</b>
1202889609	Laboratory Control Sample (LCS)
1202889612	327280002(CAPU-13-34788L) Serial Dilution (SD)
1202889610	327280002(CAPU-13-34788D) Sample Duplicate (DUP)
1202889611	327280002(CAPU-13-34788S) Matrix Spike (MS)
1202889613	Method Blank (MB) <b>ICP-MS</b>
1202889614	Laboratory Control Sample (LCS)
1202889617	327280002(CAPU-13-34788L) Serial Dilution (SD)
1202889615	327280002(CAPU-13-34788D) Sample Duplicate (DUP)
1202889616	327280002(CAPU-13-34788S) Matrix Spike (MS)
1202886817	Method Blank (MB) <b>CVAA</b>
1202886818	Laboratory Control Sample (LCS)
1202886821	326938002(CAPU-13-34782L) Serial Dilution (SD)
1202886819	326938002(CAPU-13-34782D) Sample Duplicate (DUP)
1202886820	326938002(CAPU-13-34782S) Matrix Spike (MS)

**Method/Analysis Information**

<b>Analytical Batch:</b>	1306962, 1306964, 1305902 and 1311156
<b>Prep Batch :</b>	1306961, 1306963 and 1305901
<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
<b>Prep Method :</b>	SW846 3005A and EPA 245.1/245.2 Prep

## **Preparation/Analytical Method Verification**

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

### **System Configuration**

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

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with 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-ICP was performed on a PE 7300 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 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: 327280002 (CAPU-13-34788)-ICP and ICP-MS and 326938002 (CAPU-13-34782)-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 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 RL, a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements.

**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. Sample 326938002 required a 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 (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.

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

Hardness = 2.497 (Ca) + 4.118 (Mg)

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

**Certification Statement**

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

**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: 02/28/13

# **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: 2013-914 GEL Work Order: 326938

**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



02/28/13

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

**SDG No:** 2013-914**CONTRACT:** ESHL00210**METHOD TYPE:** EPA**SAMPLE ID:** 326938002**BASIS:** As Received**DATE COLLECTED** 03-JUN-13**CLIENT ID:** CAPU-13-34782**LEVEL:** Low**DATE RECEIVED** 05-JUN-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	06/07/13 10:11	060713W1-9	1305902

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

SDG No: 2013-914

CONTRACT: ESHL00210

METHOD TYPE: SW846

SAMPLE ID: 326938002

BASIS: As Received

DATE COLLECTED 03-JUN-13

CLIENT ID: CAPU-13-34782

LEVEL: Low

DATE RECEIVED 05-JUN-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	06/19/13 11:49	061913A-1	1306962
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	06/20/13 20:17	130620-4	1306964
7440-38-2	Arsenic	2.14	ug/L	J	1.7	5	5	1	MS	BAJ	06/21/13 09:35	130620-7	1306964
7440-39-3	Barium	114	ug/L		1	5	5	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7440-42-8	Boron	236	ug/L		15	50	50	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	BAJ	06/20/13 20:17	130620-4	1306964
7440-70-2	Calcium	51200	ug/L		50	200	200	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7440-47-3	Chromium	2.09	ug/L	J	2	10	10	1	MS	BAJ	06/20/13 20:17	130620-4	1306964
7440-48-4	Cobalt	1.5	ug/L	J	1	5	5	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	06/20/13 20:17	130620-4	1306964
7439-95-4	Magnesium	12800	ug/L		110	300	300	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7439-98-7	Molybdenum	1.95	ug/L		0.165	0.5	0.5	1	MS	BAJ	06/20/13 20:17	130620-4	1306964
7440-02-0	Nickel	11.4	ug/L		0.5	2	2	1	MS	BAJ	06/20/13 20:17	130620-4	1306964
7440-09-7	Potassium	8820	ug/L		50	150	150	1	P	HSC	06/19/13 14:21	061913A-2	1306962
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	BAJ	06/21/13 09:35	130620-7	1306964
7631-86-9	Silica	56100	ug/L		53	213	213	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	BAJ	06/20/13 20:17	130620-4	1306964
7440-23-5	Sodium	45900	ug/L		100	300	300	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7440-24-6	Strontium	257	ug/L		1	5	5	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	BAJ	06/20/13 20:17	130620-4	1306964
7440-31-5	Tin	50	ug/L	U	12.5	50	50	5	P	HSC	06/20/13 12:10	062013C-3	1306962
7440-61-1	Uranium	2.83	ug/L		0.067	0.2	0.2	1	MS	BAJ	06/21/13 13:08	130621-8	1306964
7440-62-2	Vanadium	4.15	ug/L	J	1	5	5	1	P	HSC	06/19/13 11:49	061913A-1	1306962
7440-66-6	Zinc	22.1	ug/L		3.3	10	10	1	P	HSC	06/19/13 11:49	061913A-1	1306962

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

**SDG No:** 2013-914**CONTRACT:** ESHL00210**METHOD TYPE:****SAMPLE ID:** 326938002      **BASIS:** As Received      **DATE COLLECTED** 03-JUN-13**CLIENT ID:** CAPU-13-34782      **LEVEL:** Low      **DATE RECEIVED** 05-JUN-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	181	mg/L		0.453	1.24	1.24	1		JJ2	06/27/13 16:28		1311156

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1305902	1305901	EPA 245.1/245.2 Prep	20	mL	20	mL	06/06/13	AXS5
1306962	1306961	SW846 3005A	50	mL	50	mL	06/18/13	MTM1
1306964	1306963	SW846 3005A	50	mL	50	mL	06/18/13	MTM1

**\*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.** 2013-914  
**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>
1202886817	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2
1202889608	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1202889613	Antimony	1	ug/L	+/-3	U	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	0.173	ug/L	+/-0.5	J	MS	0.165	0.5
	Nickel	0.602	ug/L	+/-2	J	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.** 2013-914 **Client ID:** CAPU-13-34782S**Contract:** ESHL00210 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 326938002 **Spike ID:** 1202886820

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	1.99		0.067	U	2	99.5		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2013-914 Client ID: CAPU-13-34788S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 327280002 Spike ID: 1202889611

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	4900		68	U	5000	97.3		P
Barium	ug/L	75-125	554		62.4		500	98.2		P
Beryllium	ug/L	75-125	499		1	U	500	99.9		P
Boron	ug/L	75-125	653		157		500	99.3		P
Calcium	ug/L		42900		37200		5000	115	N/A	P
Cobalt	ug/L	75-125	476		1	U	500	95.2		P
Copper	ug/L	75-125	516		5.54	J	500	102		P
Iron	ug/L	75-125	5020		30	U	5000	99.8		P
Magnesium	ug/L	75-125	12000		6830		5000	102		P
Manganese	ug/L	75-125	486		4.03	J	500	96.3		P
Potassium	ug/L	75-125	7060		2170		5000	97.9		P
Silica	ug/L		81700		69400		10700	114	N/A	P
Sodium	ug/L		28100		22500		5000	112	N/A	P
Strontium	ug/L	75-125	694		196		500	99.5		P
Tin	ug/L	75-125	509		2.5	U	500	102		P
Vanadium	ug/L	75-125	505		1.41	J	500	101		P
Zinc	ug/L	75-125	492		3.42	J	500	97.8		P

## \*Analytical Methods:

P SW846 3005/6010B

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2013-914 Client ID: CAPU-13-34788S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 327280002 Spike ID: 1202889616

<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	57.3		1	U	50	114		MS
Arsenic	ug/L	75-125	51.8		1.7	U	50	102		MS
Cadmium	ug/L	75-125	56.4		0.11	U	50	113		MS
Chromium	ug/L	75-125	57.8		3.23	J	50	109		MS
Lead	ug/L	75-125	55.6		0.5	U	50	111		MS
Molybdenum	ug/L	75-125	59.6		1.09		50	117		MS
Nickel	ug/L	75-125	70.5		20.1		50	101		MS
Selenium	ug/L	75-125	54.4		1.5	U	50	109		MS
Silver	ug/L	75-125	57.6		0.2	U	50	115		MS
Thallium	ug/L	75-125	53.4		0.45	U	50	107		MS
Uranium	ug/L	75-125	46.5		0.261		50	92.4		MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

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

**SDG No.:** 2013–914**Lab Code:** GEL**Contract:** ESHL00210**Client ID:** CAPU–13–34782D**Matrix:** LIQUID**Level:** Low**Sample ID:** 326938002**Duplicate ID:** 1202886819**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.: 2013-914

Lab Code: GEL

Contract: ESHL00210

Client ID: CAPU-13-34788D

Matrix: LIQUID

Level: Low

Sample ID: 327280002

Duplicate ID: 1202889610

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-20%	62.4		64.8		3.76		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	157		161		2.66		P
Calcium	ug/L	+/-20%	37200		38600		3.69		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L	+/-10	5.54 J		6.49 J		15.8		P
Iron	ug/L		30 U		34.4 J		200		P
Magnesium	ug/L	+/-20%	6830		7070		3.33		P
Manganese	ug/L	+/-10	4.03 J		4.16 J		3.24		P
Potassium	ug/L	+/-20%	2170		2170		.276		P
Silica	ug/L	+/-20%	69400		72000		3.67		P
Sodium	ug/L	+/-20%	22500		23100		2.83		P
Strontium	ug/L	+/-20%	196		204		3.93		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	1.41 J		2.24 J		45.2		P
Zinc	ug/L	+/-10	3.42 J		3.61 J		5.15		P

\*Analytical Methods:

P SW846 3005/6010B

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

SDG No.: 2013-914

Lab Code: GEL

Contract: ESHL00210

Client ID: CAPU-13-34788D

Matrix: LIQUID

Level: Low

Sample ID: 327280002

Duplicate ID: 1202889615

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		3.23 J		2 U		200		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.09		0.968		11.9		MS
Nickel	ug/L	+/-20%	20.1		19.8		1.29		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	0.261		0.265		1.52		MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2013-914

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>
1202886818	Mercury	ug/L	2	2.05		103	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2



## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2013-914

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>
1202889609								
	Beryllium	ug/L	500	499		99.7	80-120	P
	Boron	ug/L	500	490		98	80-120	P
	Calcium	ug/L	5000	5100		102	80-120	P
	Cobalt	ug/L	500	501		100	80-120	P
	Copper	ug/L	500	510		102	80-120	P
	Iron	ug/L	5000	5080		102	80-120	P
	Magnesium	ug/L	5000	5220		104	80-120	P
	Manganese	ug/L	500	500		100	80-120	P
	Potassium	ug/L	5000	5030		101	80-120	P
	Silica	ug/L	10700	10700		99.5	80-120	P
	Sodium	ug/L	5000	5140		103	80-120	P
	Strontium	ug/L	500	509		102	80-120	P
	Tin	ug/L	500	511		102	80-120	P
	Vanadium	ug/L	500	507		101	80-120	P
	Zinc	ug/L	500	495		99	80-120	P
	Aluminum	ug/L	5000	5020		100	80-120	P
	Barium	ug/L	500	499		99.8	80-120	P

## \*Analytical Methods:

P SW846 3005/6010B

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2013-914

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>
1202889614								
	Antimony	ug/L	50	52.3		105	80-120	MS
	Arsenic	ug/L	50	49		98	80-120	MS
	Cadmium	ug/L	50	52.6		105	80-120	MS
	Chromium	ug/L	50	51.1		102	80-120	MS
	Lead	ug/L	50	51.4		103	80-120	MS
	Molybdenum	ug/L	50	49.2		98.3	80-120	MS
	Nickel	ug/L	50	55.6		111	80-120	MS
	Selenium	ug/L	50	54		108	80-120	MS
	Silver	ug/L	50	55.1		110	80-120	MS
	Thallium	ug/L	50	48.3		96.6	80-120	MS
	Uranium	ug/L	50	50.9		102	80-120	MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2013-914 **Client ID:** CAPU-13-34782L**Contract:** ESHL00210**Matrix:** LIQUID **Level:** Low**Sample ID:** 326938002 **Serial Dilution ID:** 1202886821

<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. 2013-914

Client ID: CAPU-13-34788L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 327280002

Serial Dilution ID: 1202889612

<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	62.4		63.7		1.97		10	P
Beryllium	1	U	5	U				P
Boron	157		150	J	4.1			P
Calcium	37200		37100		.33		10	P
Cobalt	1	U	5	U				P
Copper	5.54	J	15	U	100			P
Iron	30	U	150	U				P
Magnesium	6830		6950		1.68		10	P
Manganese	4.03	J	10	U	100			P
Potassium	2170		2380		9.93			P
Silica	69400		68300		1.7		10	P
Sodium	22500		22900		1.95		10	P
Strontium	196		197		.382		10	P
Tin	2.5	U	12.5	U				P
Vanadium	1.41	J	5.94	J	320			P
Zinc	3.42	J	16.5	U	100			P

## \*Analytical Methods:

P SW846 3005/6010B

## METALS

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## Serial Dilution Sample Summary

SDG NO. 2013-914

Client ID: CAPU-13-34788L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 327280002

Serial Dilution ID: 1202889617

<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	3.23	J	10	U	100			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.09		1.18	J	7.8			MS
Nickel	20.1		20.8		3.73			MS
Selenium	1.5	U	7.5	U				MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.26	J				MS
Uranium	.261		.45	J	72.4			MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

# **General Chem Analysis**

# Case Narrative

**General Chemistry Narrative  
ARS International (ARSL)  
SDG 2013-914**

**Method/Analysis Information**

**Product:** Carbon, Total Organic

**Analytical Batch:** 1307044

**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>
326938001	CAPU-13-34774
1202889800	Method Blank (MB)
1202889801	326938001(CAPU-13-34774) Sample Duplicate (DUP)
1202889803	326938001(CAPU-13-34774) Post Spike (PS)
1202889805	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: 326938001 (CAPU-13-34774).

##### **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:** 1306822

**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>
326938002	CAPU-13-34782
1202889242	Laboratory Control Sample (LCS)
1202889244	327172002(CAPU-13-34781) 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.

### **Calibration Verification Information**

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

### **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: 327172002 (CAPU-13-34781).

**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:** 1306111 **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>
326938002	CAPU-13-34782
1202887341	326937002(CALA-13-33433) Sample Duplicate (DUP)
1202887343	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 sample was selected for QC analysis: 326937002 (CALA-13-33433).

**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: 1202887341 (CALA-13-33433) and 326938002 (CAPU-13-34782).

**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: 1193677 1202887341 (CALA-13-33433) and 326938002 (CAPU-13-34782).

**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:** 1306689

**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>
326938002	CAPU-13-34782
1202888802	Method Blank (MB)
1202888803	327024002(CALA-13-33434) Sample Duplicate (DUP)
1202888804	327024002(CALA-13-33434) Post Spike (PS)
1202888805	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# 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 Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

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

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 327024002 (CALA-13-33434).

**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 values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1202888803 (CALA-13-33434).

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The following sample in this sample group was diluted due to high concentration: 326938002 (CAPU-13-34782).

**Sample Re-analysis**

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

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

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

**Manual Integrations**

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202888803 (CALA-13-33434), 1202888804 (CALA-13-33434) and 326938002 (CAPU-13-34782).

**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:** 1305434      **Method:** EPA 350.1 Nitrogen and Ammonia L

**Prep Batch :** 1305433      **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>
326938002	CAPU-13-34782
1202885527	Method Blank (MB)
1202885528	Laboratory Control Sample (LCS)
1202887243	326937002(CALA-13-33433) Sample Duplicate (DUP)
1202887244	326937002(CALA-13-33433) Matrix Spike (MS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 326937002 (CALA-13-33433).

**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 Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: 1202887243 (CALA-13-33433).

**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: 1194331 1202887243 (CALA-13-33433).

**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>	1306064	<b>Method:</b>	Nitrogen and Total Kjeldahl (TKN)
<b>Prep Batch :</b>	1306063	<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>
326938001	CAPU-13-34774
1202887249	Method Blank (MB)
1202887250	Laboratory Control Sample (LCS)
1202887251	326938001(CAPU-13-34774) Sample Duplicate (DUP)
1202887252	326938001(CAPU-13-34774) 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.

### **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: 326938001 (CAPU-13-34774).

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

The spike recovery falls outside of the established acceptance limits due to matrix interference: 1202887252 (CAPU-13-34774).

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

One or more of the values for the sample and/or duplicate are less than 5 times the Practical Quantitation Limit (PQL), and the difference is within one PQL value; therefore, the RPD is not applicable. 1202887251 (CAPU-13-34774).

**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: 1202887249 (MB), 1202887250 (LCS), 1202887251 (CAPU-13-34774), 1202887252 (CAPU-13-34774) and 326938001 (CAPU-13-34774).

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

The following DER was generated for this SDG: 1193916 1202887252 (CAPU-13-34774).

**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>	1305432	<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>
326938002	CAPU-13-34782
1202885521	Method Blank (MB)
1202885526	Laboratory Control Sample (LCS)
1202887245	326937002(CALA-13-33433) Sample Duplicate (DUP)
1202887247	326937002(CALA-13-33433) Post Spike (PS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 8.

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

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

### **Calibration Information**

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 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: 326937002 (CALA-13-33433).

**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 high concentration: 326938002 (CAPU-13-34782).

**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>	1306384	<b>Method:</b>	EPA 365.4 Phosphorus and Total in
<b>Prep Batch :</b>	1306383	<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>
326938002	CAPU-13-34782
1202887965	Method Blank (MB)
1202887966	326937002(CALA-13-33433) Sample Duplicate (DUP)
1202887967	326938002(CAPU-13-34782) Sample Duplicate (DUP)
1202887968	326937002(CALA-13-33433) Matrix Spike (MS)
1202887969	326938002(CAPU-13-34782) Matrix Spike (MS)
1202887970	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-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: 326937002 (CALA-13-33433) and 326938002 (CAPU-13-34782).

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages

electronically. The following change from traditional packages should be noted:

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

### **Method/Analysis Information**

**Product:** Solids, Total Dissolved

**Analytical Batch:** 1306109

**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>
326938002	CAPU-13-34782
1202887333	Method Blank (MB)
1202887334	326937002(CALA-13-33433) Sample Duplicate (DUP)
1202887336	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: 326937002 (CALA-13-33433).

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Sample Aliquot**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

**Product:** Alkalinity

**Analytical Batch:** 1306856      **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>
326938002	CAPU-13-34782
1202889343	Method Blank (MB)
1202889344	Laboratory Control Sample (LCS)
1202889347	327025002(CAPU-13-34784) Sample Duplicate (DUP)
1202889348	327025002(CAPU-13-34784) 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**

#### **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: 327025002 (CAPU-13-34784).

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Certification Statement**

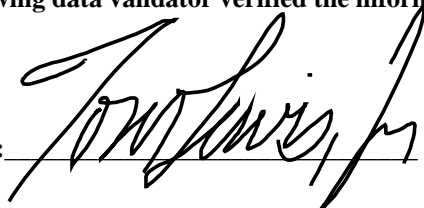
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

**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:**

28Jun13

# **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: 2013-914 GEL Work Order: 326938

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

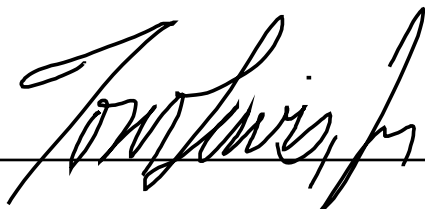
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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 "Tom 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: June 27, 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: 2013-914

Client Sample ID: CAPU-13-34774  
Sample ID: 326938001  
Matrix: w  
Collect Date: 03-JUN-13 11:39  
Receive Date: 05-JUN-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		1.64	0.330	1.00	mg/L	1	TSM	06/14/13	1533	1307044	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl		0.194	0.033	0.100	mg/L	1	KLP1	06/12/13	1650	1306064	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	06/11/13	1800	1306063

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 351.2	

Notes:

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: June 27, 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: 2013-914

Client Sample ID: CAPU-13-34782  
Sample ID: 326938002  
Matrix: w  
Collect Date: 03-JUN-13 11:39  
Receive Date: 05-JUN-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		621	1.00	1.00	umhos/cm	1	LXA1	06/11/13	1115	1306822	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 7.90C	H	7.26	0.010	0.100	SU	1	LYG1	06/06/13	0759	1306111	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	J	0.118	0.067	0.200	mg/L	1	MAR1	06/17/13	2253	1306689	3
Fluoride		0.297	0.033	0.100	mg/L	1					
Chloride		47.7	0.670	2.00	mg/L	10	MAR1	06/27/13	0432	1306689	4
Sulfate		30.9	1.33	4.00	mg/L	10					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia		0.0721	0.017	0.050	mg/L	1	KLP1	06/13/13	1428	1305434	5
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		4.10	0.085	0.250	mg/L	5	KLP1	06/17/13	1337	1305432	6
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P		0.973	0.017	0.050	mg/L	1	KLP1	06/11/13	1350	1306384	7
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		373	3.40	14.3	mg/L		LYG1	06/06/13	1045	1306109	8
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		171	0.725	1.00	mg/L		LXA1	06/10/13	1339	1306856	9
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	06/13/13	1255	1305433
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	06/10/13	1800	1306383

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## Certificate of Analysis

Report Date: June 27, 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: 2013-914

Client Sample ID: CAPU-13-34782  
Sample ID: 326938002

Project: ESHL00210  
Client ID: ARSL001

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The following Analytical Methods were performed:

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

**Notes:**

# **Quality Control Summary**



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## QC Summary

Report Date: June 27, 2013

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

Contact: Mr. Keith Greene

Workorder: 326938

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1307044										
QC1202889801	326938001	DUP									
Total Organic Carbon Average		1.64		1.57	mg/L	4.37	^	(+/-1.00)	TSM	06/14/13	16:06
QC1202889805	LCS										
Total Organic Carbon Average	10.0			10.1	mg/L			(85%-115%)		06/14/13	13:56
QC1202889800	MB										
Total Organic Carbon Average			U	ND	mg/L					06/14/13	13:47
QC1202889803	326938001	PS									
Total Organic Carbon Average	10.0	1.64		11.6	mg/L			(65%-120%)		06/14/13	16:26
<b>Conductivity Analysis</b>											
Batch	1306822										
QC1202889244	327172002	DUP									
Conductivity		447		451	umhos/cm	0.891		(0%-10%)	LXA1	06/11/13	11:22
QC1202889242	LCS										
Conductivity	1410			1440	umhos/cm			(95%-105%)		06/11/13	11:08
<b>Electrode Analysis</b>											
Batch	1306111										
QC1202887341	326937002	DUP									
pH		H	8.23	H	8.25	SU	0.243	(0%-10%)	LYG1	06/06/13	07:58
QC1202887343	LCS										
pH	7.00			7.00	SU			(99%-101%)		06/06/13	07:54
<b>Ion Chromatography</b>											
Batch	1306689										
QC1202888803	327024002	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MAR1	06/17/13	23:52
Chloride			3.52		3.57	mg/L	1.24	(0%-20%)			
Fluoride			0.299		0.306	mg/L	2.18	^	(+/-0.100)		
Sulfate			3.47		3.45	mg/L	0.468	(0%-20%)			
QC1202888805	LCS										
Bromide	1.25			1.26	mg/L			(90%-110%)		06/17/13	21:53

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## QC Summary

Workorder: 326938

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1306689										
Chloride	5.00			4.77	mg/L		95.3	(90%-110%)	MAR1	06/17/13	21:53
Fluoride	2.50			2.50	mg/L		100	(90%-110%)			
Sulfate	10.0			9.97	mg/L		99.7	(90%-110%)			
QC1202888802	MB										
Bromide			U	ND	mg/L					06/17/13	21:23
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1202888804	327024002	PS									
Bromide	1.25	U	ND	1.38	mg/L		106	(90%-110%)		06/18/13	00:22
Chloride	5.00		3.52	8.83	mg/L		106	(90%-110%)			
Fluoride	2.50		0.299	2.93	mg/L		105	(90%-110%)			
Sulfate	10.0		3.47	13.9	mg/L		105	(90%-110%)			
<b>Nutrient Analysis</b>											
Batch	1305432										
QC1202887245	326937002	DUP									
Nitrogen, Nitrate/Nitrite			0.152	0.155	mg/L	1.95	^	(+/-0.050)	KLP1	06/17/13	11:17
QC1202885526	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.02	mg/L		102	(90%-110%)		06/17/13	10:55
QC1202885521	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					06/17/13	10:54
QC1202887247	326937002	PS									
Nitrogen, Nitrate/Nitrite	1.00		0.152	1.11	mg/L		95.8	(90%-110%)		06/17/13	11:19
Batch	1305434										
QC1202887243	326937002	DUP									
Nitrogen, Ammonia			0.0707	U	ND	mg/L	N/A	^	(+/-0.050)	KLP1	06/13/13 14:26
QC1202885528	LCS										
Nitrogen, Ammonia	1.00			1.01	mg/L		101	(90%-110%)		06/13/13	14:12

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## QC Summary

Workorder: 326938

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1305434										
QC1202885527 MB											
Nitrogen, Ammonia			J	0.0434	mg/L				KLP1	06/13/13	14:11
QC1202887244 326937002 MS											
Nitrogen, Ammonia	1.00	0.0707		1.02	mg/L		94.9	(90%-110%)		06/13/13	14:27
Batch	1306064										
QC1202887251 326938001 DUP											
Nitrogen, Total Kjeldahl		0.194		0.150	mg/L	25.6 ^		(+/-0.100)	KLP1	06/12/13	16:51
QC1202887250 LCS											
Nitrogen, Total Kjeldahl	1.00			1.01	mg/L		101	(90%-110%)		06/12/13	16:40
QC1202887249 MB											
Nitrogen, Total Kjeldahl			U	ND	mg/L					06/12/13	16:40
QC1202887252 326938001 MS											
Nitrogen, Total Kjeldahl	1.00	0.194		1.06	mg/L		86.6*	(90%-110%)		06/12/13	16:52
Batch	1306384										
QC1202887966 326937002 DUP											
Phosphorus, Total as P	J	0.0335	J	0.0289	mg/L	14.7 ^		(+/-0.050)	KLP1	06/11/13	13:48
QC1202887967 326938002 DUP											
Phosphorus, Total as P		0.973		0.974	mg/L	0.103		(0%-31%)		06/11/13	13:50
QC1202887970 LCS											
Phosphorus, Total as P	1.00			0.965	mg/L		96.5	(76%-120%)		06/11/13	13:46
QC1202887965 MB											
Phosphorus, Total as P			U	ND	mg/L					06/11/13	13:45
QC1202887968 326937002 MS											
Phosphorus, Total as P	1.00	J	0.0335	1.05	mg/L		102	(62%-139%)		06/11/13	13:49
QC1202887969 326938002 MS											
Phosphorus, Total as P	1.00	0.973		1.93	mg/L		95.7	(62%-139%)		06/11/13	13:51
<b>Solids Analysis</b>											
Batch	1306109										
QC1202887334 326937002 DUP											
Total Dissolved Solids		111		103	mg/L	1.38		(0%-10%)	LYG1	06/06/13	10:45
QC1202887336 LCS											
Total Dissolved Solids	300			290	mg/L		96.7	(95%-105%)		06/06/13	10:45

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## QC Summary

Workorder: 326938

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Solids Analysis</b>											
Batch	1306109										
QC1202887333	MB										
Total Dissolved Solids			U	ND	mg/L				LYG1	06/06/13	10:45
<b>Titration Analysis</b>											
Batch	1306856										
QC1202889347	327025002	DUP									
Alkalinity, Total as CaCO3			105	104	mg/L	3.24		(0%-20%)	LXA1	06/10/13	17:30
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1202889344	LCS										
Alkalinity, Total as CaCO3	50.0			51.9	mg/L		104	(90%-110%)		06/10/13	12:36
QC1202889343	MB										
Alkalinity, Total as CaCO3			U	ND	mg/L					06/10/13	12:35
Carbonate alkalinity (CaCO3)			U	ND	mg/L						
QC1202889348	327025002	MS									
Alkalinity, Total as CaCO3	50.0		105	155	mg/L		99.5	(80%-120%)		06/10/13	17:31

### Notes:

- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B The target analyte was detected in the associated blank.
- 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
- E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- E Concentration of the target analyte exceeds the instrument calibration range
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- FA Failed analysis.
- FB Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies
- H Analytical holding time was exceeded

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## QC Summary

Workorder: 326938

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
J	Value is estimated										
JNX	Non Calibrated Compound										
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.										
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.										
M	M if above MDC and less than LLD										
M	REMP Result > MDC/CL and < RDL										
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	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	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.										
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.										
UI	Gamma Spectroscopy--Uncertain identification										
UJ	Compound cannot be extracted										
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
Y	QC Samples were not spiked with this compound										
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										
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> 12-JUN-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/SW-846 9040C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ALMX, CARE, ESHL
<b>Batch ID:</b> 1306111	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 326937(2013-913),326938(2013-914),327013,327014(EUI-9289)</b> <b>Application Issues:</b> Sample received out of holding			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Sample received out of holding:  326937 002  326938 002  327013 001,002,003,004  327014 001  QC 1202887341DUP,1202887342DUP		1. Sample received out of holding	

**Originator's Name:**

Lisa Gregory 12-JUN-13

**Data Validator/Group Leader:**

Jamie Johnson 24-JUN-13

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 12-JUN-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> AECM, CBMW, ESHL, INMN,
<b>Batch ID:</b> 1306064	<b>Sample Numbers:</b> See below.		
<b>Potentially affected work order(s)(SDG):</b> 326937(2013-913),326938(2013-914),326947,326948,327024(2013-916),327025(2013-917),327026,327046,327047,327096,327141 <b>Application Issues:</b> Failed Recovery for MS/PS			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Failed Recovery for MS: QC 1202887252MS, QC 1202887948MS		1. The spike recoveries fall outside of the established acceptance limits due to matrix interference: 1202887948	

**Originator's Name:**  
Kristen Parson 12-JUN-13

**Data Validator/Group Leader:**  
Julia Hamilton 13-JUN-13



DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 13-JUN-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 350.1	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ARSL
<b>Batch ID:</b> 1305434	<b>Sample Numbers:</b> See below.		
<b>Potentially affected work order(s)(SDG):</b> 326804,326805,326921,326925,326931,326937(2013-913),326938(2013-914),326947,326948,326978,327007,327045,327048 <b>Application Issues:</b> Failed RPD for DUP			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Failed RPD for DUP: QC 1202887243DUP		1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample.	

**Originator's Name:**  
Kristen Parson 13-JUN-13

**Data Validator/Group Leader:**  
Julia Hamilton 14-JUN-13

# **Radiological Analysis**

**Radiochemistry Case Narrative  
ARS International (ARSL)  
SDG 2013-914  
Work Order 326938**

**Method/Analysis Information**

**Product:** Alphaspec Am241 Liquid  
**Analytical Method:** DOE EML HASL-300, Am-05-RC Modified  
**Analytical Batch Number:** 1304594

<b>Sample ID</b>	<b>Client ID</b>
326938001	CAPU-13-34774
1202883317	Method Blank (MB)
1202883318	326426001(CAMO-13-30585) Sample Duplicate (DUP)
1202883319	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-RAD-A-011 REV# 24.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

Aliquots for samples 1202883317 (MB) and 1202883319 (LCS) were changed to 1.0 per client request.

**Designated QC**

The following sample was used for QC: 326426001 (CAMO-13-30585). The QC was from ARSL work order 326426.

**QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

##### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

##### **Sample Re-prep/Re-analysis**

Sample 1202883318 (CAMO-13-30585) was recounted due to high MDC. The recount is reported.

#### **Miscellaneous Information:**

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

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

##### **Manual Integration**

No manual integrations were performed on data in this batch.

##### **Additional Comments**

The MDCs are calculated using a blank population.

##### **Blank Decision Level**

The blank result is less than the decision level.

#### **Qualifier Information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

<b>Product:</b>	<b>Alphaspec Pu, Liquid</b>
Analytical Method:	DOE EML HASL-300, Pu-11-RC Modified
Analytical Batch Number:	1304597

<b>Sample ID</b>	<b>Client ID</b>
326938001	CAPU-13-34774
1202883320	Method Blank (MB)
1202883321	326426001(CAMO-13-30585) Sample Duplicate (DUP)
1202883322	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-RAD-A-011 REV# 24.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244.

#### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

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

#### **Blank Information**

Aliquots for samples 1202883320 (MB) and 1202883322 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 326426001 (CAMO-13-30585). The QC was from ARSL work order 326426.

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The blank result is less than 1.65 times the CSU.

### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Sample Re-prep/Re-analysis**

Samples 1202883321 (CAMO-13-30585) and 326938001 (CAPU-13-34774) were recounted due to high MDCs. The recounts are reported.

### **Miscellaneous Information:**

#### **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: DER 1194544 was generated due to Other. 1. Sample 326938001 did not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-242 tracer. 1. The sample meets the tracer yield requirement, the detection limit, and the tracer peak is within the Pu-242 region of interest. Reporting results.

#### **Manual Integration**

No manual integrations were performed on data in this batch.

#### **Additional Comments**

The MDCs are calculated using a blank population.

#### **Blank Decision Level**

The Pu-238 blank result is greater than the decision level but less than the MDC.

### **Qualifier Information**

Manual qualifiers were not required.

### **Method/Analysis Information**

**Product:** Alphaspec U, Liquid  
**Analytical Method:** DOE EML HASL-300, U-02-RC Modified  
**Analytical Batch Number:** 1304598

<b>Sample ID</b>	<b>Client ID</b>
326938001	CAPU-13-34774
1202883333	Method Blank (MB)
1202883334	326426001(CAMO-13-30585) Sample Duplicate (DUP)
1202883335	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-RAD-A-011 REV# 24.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244.

#### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

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

#### **Blank Information**

Aliquots for samples 1202883333 (MB) and 1202883335 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 326426001 (CAMO-13-30585). The QC was from ARSL work order 326426.

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

##### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

##### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

#### **Miscellaneous Information:**

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

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

##### **Manual Integration**

No manual integrations were performed on data in this batch.

##### **Additional Comments**

The MDCs are calculated using a blank population.

##### **Blank Decision Level**

The blank result is less than the decision level.

#### **Qualifier Information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

**Product:**                      **Gammasec**

Analytical Method:            EPA 901.1

Analytical Batch Number:    1305935

<b>Sample ID</b>	<b>Client ID</b>
326938001	CAPU-13-34774
1202886900	Method Blank (MB)
1202886901	326937001(CALA-13-33425) Sample Duplicate (DUP)
1202886902	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-RAD-A-013 REV# 25.

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibrations were performed in July 2012, August 2012, January 2013 and May 2013.

##### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

##### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

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

##### **Blank Information**

The blank volume is representative of the sample volume in this batch.

##### **Designated QC**

The following sample was used for QC: 326937001 (CALA-13-33425). The QC was from ARSL work order 326937.

##### **QC Information**

All of the QC samples met the required acceptance limits.

##### **CSU**

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

##### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

##### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

#### **Miscellaneous Information:**

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

Data exception reports are generated to document any 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 sample set.

##### **Blank Decision Level**

The blank (1202886900 (MB)) result for Cs-137 is greater than the decision level but less than the MDC.

#### **Qualifier Information**

Manual qualifiers were not required.



## Method/Analysis Information

**Product:** GFPC, Sr90, liquid

Analytical Method: EPA 905.0 Modified

Analytical Batch Number: 1305999

<b>Sample ID</b>	<b>Client ID</b>
326938001	CAPU-13-34774
1202887094	Method Blank (MB)
1202887095	326938001(CAPU-13-34774) Sample Duplicate (DUP)
1202887096	326938001(CAPU-13-34774) Matrix Spike (MS)
1202887097	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-RAD-A-004 REV# 16.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in March 2013.

#### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

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

#### **Blank Information**

Aliquots for samples 1202887094 (MB) and 1202887097 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 326938001 (CAPU-13-34774). The QC was from ARSL work order 326938.

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The blank result is less than 1.65 times the CSU.

## **Technical Information:**

### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

### **Sample Re-prep/Re-analysis**

Sample 1202887095 (CAPU-13-34774) was recounted due to high MDC. The recount is reported. Sample 1202887094 (MB) was recounted due to a suspected blank false positive. The recount is reported.

### **Chemical Recoveries**

All chemical recoveries meet the required acceptance limits for this sample set.

## **Miscellaneous Information:**

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

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

### **Additional Comments**

The matrix spike, 1202887096 (CAPU-13-34774), aliquot was reduced to conserve sample volume.

### **Blank Decision Level**

The blank result is less than the decision level.

### **Qualifier Information**

Manual qualifiers were not required.

## **Method/Analysis Information**

<b>Product:</b>	<b>WSP-GrossA/B</b>
Analytical Method:	EPA 900.0/SW846 9310
Analytical Batch Number:	1308529

<b>Sample ID</b>	<b>Client ID</b>
326938001	CAPU-13-34774
1202893584	Method Blank (MB)
1202893585	327623001(CAPU-13-34775) Sample Duplicate (DUP)
1202893586	327623001(CAPU-13-34775) Matrix Spike (MS)
1202893587	327623001(CAPU-13-34775) Matrix Spike Duplicate (MSD)
1202893588	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-RAD-A-001 REV# 16.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in December 2012.

#### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

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

#### **Blank Information**

Aliquots for samples 1202893584 (MB) and 1202893588 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 327623001 (CAPU-13-34775). The QC was from ARSL work order 327623.

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The blank result is less than 1.65 times the CSU.

### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Sample Re-prep/Re-analysis**

Sample 1202893586 (CAPU-13-34775) was recounted due to high recovery. The recount is reported. Sample 1202893585 (CAPU-13-34775) was recounted due to high relative percent difference/relative error ratio. The recount is reported.

#### **Chemical Recoveries**

All chemical recoveries meet the required acceptance limits for this sample set.

#### **Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating, especially to a dull red heat. For this sample set, the prepared planchet was counted for beta activity before being flamed. After flaming, the planchet was counted for alpha activity.

### **Miscellaneous Information:**

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

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

**Additional Comments**

The matrix spike and matrix spike duplicate, 1202893586 (CAPU-13-34775) and 1202893587 (CAPU-13-34775), aliquots were reduced to conserve sample volume.

**Blank Decision Level**

The blank result is less than the decision level.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

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

## **GEL LABORATORIES LLC**

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### **Qualifier Definition Report for**

ARSL001 ARS International (63641-10)

Client SDG: 2013-914 GEL Work Order: 326938

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

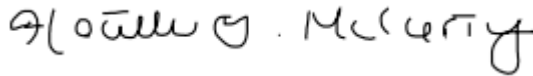
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

**Review/Validation**

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

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

**Signature:**



**Name: Heather McCarty**

**Date: 28 JUN 2013**

**Title: Analyst II**

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 14-JUN-13	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ALPHA SPECTROMETER	<b>Test / Method:</b> DOE EML HASL-300, Pu-11-RC Modified	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ARSL
<b>Batch ID:</b> 1304597	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 326426(2013-886),326937(2013-913),326938(2013-914)</b> <b>Application Issues:</b> Other			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Sample 326938001 did not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-242 tracer.		1. The sample meets the tracer yield requirement, the detection limit, and the tracer peak is within the Pu-242 region of interest. Reporting results.	

**Originator's Name:**  
Melanie Aycock 14-JUN-13

**Data Validator/Group Leader:**  
Jessica Davis 17-JUN-13

# **Sample Data Summary**

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Report Date: June 28, 2013

Client Sample ID: CAPU-13-34774  
Sample ID: 326938001  
Matrix: w  
Collect Date: 03-JUN-13  
Receive Date: 05-JUN-13  
Collector: Client  
Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>Alphaspec Am241 Liquid "As Received"</i>														
Americium-241	U	0.018	+/-0.00848	0.0455	0.0187	+/-0.00852	0.050	pCi/L		MXS2	06/11/13	0944	1304594	1
<i>Alphaspec Pu, Liquid "As Received"</i>														
Plutonium-238	U	-1.51E-09	+/-0.00717	0.0212	0.00753	+/-0.00717	0.050	pCi/L		MXS2	06/13/13	1012	1304597	2
Plutonium-239/240	U	0.00906	+/-0.00848	0.0446	0.0192	+/-0.00849	0.050	pCi/L						
<i>Alphaspec U, Liquid "As Received"</i>														
Uranium-234		1.44	+/-0.0792	0.0934	0.0409	+/-0.127	1.00	pCi/L		MXS2	06/11/13	1947	1304598	3
Uranium-235/236	U	0.042	+/-0.0196	0.0726	0.0292	+/-0.0199	1.00	pCi/L						
Uranium-238		1.02	+/-0.0664	0.0596	0.0241	+/-0.0969	0.500	pCi/L						
<b>Rad Gamma Spec Analysis</b>														
<i>Gammasec "As Received"</i>														
Cesium-137	U	4.26	+/-1.68	6.29	2.90	+/-1.95	8.00	pCi/L		MXR1	06/07/13	0745	1305935	4
Cobalt-60	U	1.24	+/-1.50	6.00	2.63	+/-1.53	8.00	pCi/L						
Neptunium-237	U	-1.05	+/-2.95	10.2	4.82	+/-2.96	10.0	pCi/L						
Potassium-40	U	-1.15	+/-19.7	72.7	32.6	+/-19.7	10.0	pCi/L						
Sodium-22	U	-1.77	+/-1.90	5.94	2.61	+/-1.95	10.0	pCi/L						
<b>Rad Gas Flow Proportional Counting</b>														
<i>GFPC, Sr90, liquid "As Received"</i>														
Strontium-90	U	0.350	+/-0.148	0.478	0.227	+/-0.150	0.500	pCi/L		JXR1	06/12/13	1949	1305999	5
<i>WSP-GrossA/B "As Received"</i>														
Beta		13.9	+/-0.710	1.79	0.871	+/-1.37	3.00	pCi/L		DYT1	06/24/13	1851	1308529	6
Alpha	U	2.04	+/-0.962	2.52	0.719	+/-0.977	3.00	pCi/L		DYT1	06/26/13	1600	1308529	7

### The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	EPA 901.1
5	EPA 905.0 Modified
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1304594	75.4	(50%-105%)
Plutonium-242 Tracer	Alphaspec Pu, Liquid "As Received"	1304597	70.1	(50%-105%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1304598	52.4	(50%-105%)



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## Certificate of Analysis

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

Report Date: June 28, 2013

Contact: Mr. Keith Greene

Project: LANL-WQH Water Samples

Client Sample ID: CAPU-13-34774

Sample ID: 326938001

Project: ESHL00210

Client ID: ARSL001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Strontium Carrier		GFPC, Sr90, liquid "As Received"						1305999	74.9	(50%-105%)				

### Notes:

TPU and Counting Uncertainty are calculated at the 68% confidence level (1-sigma).

# Quality Control Data

# GEL LABORATORIES LLC

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## QC Summary

Report Date: June 28, 2013

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**Client :** Los Alamos National Laboratory  
**PO Box 1663**  
**TA-03, SM271, Drop Pt. 02U, Rm111**  
**Los Alamos, New Mexico**  
**Contact: Mr. Keith Greene**  
**Workorder: 326938**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1304594										
QC1202883318	326426001	DUP									
Americium-241	U	0.0173	U	-0.0056	pCi/L	0.621		(0-1)	MXS2	06/13/1311:22	
	Uncert:	+/-0.0096		+/-0.00886							
	TPU:	+/-0.00962		+/-0.00886							
**Americium-243 Tracer	2.62	2.35		1.55	pCi/L		59.3	(50%-105%)			
	Uncert:	+/-0.0802		+/-0.0855							
	TPU:	+/-0.135		+/-0.142							
QC1202883319	LCS										
Americium-241	1.41			1.43	pCi/L		101	(80%-120%)	MXS2	06/11/1309:44	
	Uncert:			+/-0.0686							
	TPU:			+/-0.0975							
**Americium-243 Tracer	2.09			1.14	pCi/L		54.6	(50%-105%)			
	Uncert:			+/-0.0824							
	TPU:			+/-0.131							
QC1202883317	MB										
Americium-241			U	0.00224	pCi/L				MXS2	06/11/1309:44	
	Uncert:			+/-0.005							
	TPU:			+/-0.005							
**Americium-243 Tracer	2.09			1.65	pCi/L		78.8	(50%-105%)			
	Uncert:			+/-0.0681							
	TPU:			+/-0.113							
Batch	1304597										
QC1202883321	326426001	DUP									
Plutonium-238	U	0.00432	U	-0.00234	pCi/L	0.290		(0-1)	MXS2	06/13/1310:12	
	Uncert:	+/-0.00529		+/-0.00619							
	TPU:	+/-0.00529		+/-0.00619							
Plutonium-239/240	U	0.0173	U	0.00936	pCi/L	0.280		(0-1)			
	Uncert:	+/-0.00748		+/-0.00662							
	TPU:	+/-0.00751		+/-0.00663							
**Plutonium-242 Tracer	2.44	1.76		1.67	pCi/L		68.3	(50%-105%)			
	Uncert:	+/-0.0727		+/-0.0762							
	TPU:	+/-0.123		+/-0.128							
QC1202883322	LCS										
Plutonium-238				0.0246	pCi/L			(80%-120%)	MXS2	06/11/1309:44	
	Uncert:			+/-0.00922							
	TPU:			+/-0.00929							
Plutonium-239/240	1.97			2.06	pCi/L		105	(80%-120%)			
	Uncert:			+/-0.0717							
	TPU:			+/-0.118							
**Plutonium-242 Tracer	1.95			1.37	pCi/L		70.2	(50%-105%)			
	Uncert:			+/-0.0696							
	TPU:			+/-0.113							
QC1202883320	MB										

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## QC Summary

Workorder: 326938

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1304597										
Plutonium-238			U	0.00928	pCi/L				MXS2	06/11/1309:44	
				Uncert: +/-0.00656							
				TPU: +/-0.00658							
Plutonium-239/240			U	0.00232	pCi/L						
				Uncert: +/-0.00519							
				TPU: +/-0.00519							
**Plutonium-242 Tracer	1.95			1.49	pCi/L		76.1	(50%-105%)			
				Uncert: +/-0.0674							
				TPU: +/-0.110							
Batch	1304598										
QC1202883334	326426001	DUP									
Uranium-234		0.212		0.190	pCi/L	0.172		(0-1)	MXS2	06/11/1319:47	
		Uncert: +/-0.0313		+/-0.0257							
		TPU: +/-0.0346		+/-0.0286							
Uranium-235/236		U 0.0103	U	0.0117	pCi/L	0.0322		(0-1)			
		Uncert: +/-0.0126		+/-0.0104							
		TPU: +/-0.0126		+/-0.0104							
Uranium-238		0.124		0.123	pCi/L	0.0111		(0-1)			
		Uncert: +/-0.0242		+/-0.0208							
		TPU: +/-0.0257		+/-0.0223							
**Uranium-232 Tracer	2.69	1.38		1.91	pCi/L		71	(50%-105%)			
		Uncert: +/-0.106		+/-0.0927							
		TPU: +/-0.214		+/-0.201							
QC1202883335	LCS										
Uranium-234				2.49	pCi/L				MXS2	06/11/1319:47	
				Uncert: +/-0.0747							
				TPU: +/-0.178							
Uranium-235/236				0.0965	pCi/L						
				Uncert: +/-0.0168							
				TPU: +/-0.0179							
Uranium-238	2.70			2.73	pCi/L		101	(80%-120%)			
				Uncert: +/-0.0784							
				TPU: +/-0.194							
**Uranium-232 Tracer	2.15			1.62	pCi/L		75.3	(50%-105%)			
				Uncert: +/-0.0696							
				TPU: +/-0.156							
QC1202883333	MB										
Uranium-234			U	0.00452	pCi/L				MXS2	06/11/1319:47	
				Uncert: +/-0.00553							
				TPU: +/-0.00554							
Uranium-235/236			U	-0.00279	pCi/L						
				Uncert: +/-0.00624							
				TPU: +/-0.00625							
Uranium-238			U	0.00678	pCi/L						
				Uncert: +/-0.00505							
				TPU: +/-0.00507							
**Uranium-232 Tracer	2.15			1.72	pCi/L		79.9	(50%-105%)			
				Uncert: +/-0.0702							

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 326938

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1304598										
		TPU:		+/-0.157							
Rad Gamma Spec											
Batch	1305935										
QC1202886901	326937001	DUP									
Cesium-137		U	0.594	U	-0.786	pCi/L	0.225	(0-1)	MXR1	06/07/1309:59	
		Uncert:	+/-1.23		+/-1.82						
		TPU:	+/-1.24		+/-1.83						
Cobalt-60		U	-2.16	U	-1.92	pCi/L	0.032	(0-1)			
		Uncert:	+/-1.35		+/-2.17						
		TPU:	+/-1.44		+/-2.22						
Neptunium-237		U	5.58	U	5.23	pCi/L	0.0261	(0-1)			
		Uncert:	+/-2.68		+/-3.47						
		TPU:	+/-2.98		+/-3.68						
Potassium-40		U	10.1	U	-45.1	pCi/L	0.686	(0-1)			
		Uncert:	+/-16.9		+/-20.7						
		TPU:	+/-16.9		+/-23.3						
Sodium-22		U	1.09	U	-1.74	pCi/L	0.411	(0-1)			
		Uncert:	+/-1.37		+/-2.00						
		TPU:	+/-1.39		+/-2.04						
QC1202886902	LCS										
Americium-241		2780			2860	pCi/L		103	(80%-120%)	MXR1	06/07/1309:47
		Uncert:			+/-139						
		TPU:			+/-266						
Cesium-137		6010			6000	pCi/L		99.8	(80%-120%)		
		Uncert:			+/-58.3						
		TPU:			+/-289						
Cobalt-60		5250			5220	pCi/L		99.4	(80%-120%)		
		Uncert:			+/-63.9						
		TPU:			+/-231						
Neptunium-237				U	8.86	pCi/L					
		Uncert:			+/-23.0						
		TPU:			+/-23.1						
Potassium-40				U	148	pCi/L					
		Uncert:			+/-51.1						
		TPU:			+/-61.7						
Sodium-22				U	1.50	pCi/L					
		Uncert:			+/-6.83						
		TPU:			+/-6.84						
QC1202886900	MB										
Cesium-137				U	2.06	pCi/L			MXR1	06/07/1307:46	
		Uncert:			+/-2.40						
		TPU:			+/-2.41						
Cobalt-60				U	0.0137	pCi/L					
		Uncert:			+/-1.02						
		TPU:			+/-1.02						
Neptunium-237				U	-0.478	pCi/L					
		Uncert:			+/-2.40						
		TPU:			+/-2.40						

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1305935										
Potassium-40			U	-5.23	pCi/L						
				Uncert:							
				TPU:							
Sodium-22			U	1.34	pCi/L						
				Uncert:							
				TPU:							
<b>Rad Gas Flow</b>											
Batch	1305999										
QC1202887095	326938001	DUP									
Strontium-90		U	0.350	U	0.350	pCi/L	0.000136	(0-1)	JXR1	06/14/1312:39	
				Uncert:	+/-0.148						
				TPU:	+/-0.150						
**Strontium Carrier		8.55	6.40		5.30	mg		62	(50%-105%)		
QC1202887097	LCS										
Strontium-90		24.3			26.1	pCi/L		107	(80%-120%)	JXR1	06/12/1319:49
				Uncert:	+/-0.764						
				TPU:	+/-2.21						
**Strontium Carrier		8.55			6.50	mg		76	(50%-105%)		
QC1202887094	MB										
Strontium-90				U	-0.819	pCi/L			JXR1	06/13/1317:43	
				Uncert:	+/-0.0765						
				TPU:	+/-0.0765						
**Strontium Carrier		8.55			6.30	mg		73.7	(50%-105%)		
QC1202887096	326938001	MS									
Strontium-90		243	U	0.350	277	pCi/L		114	(75%-125%)	JXR1	06/12/1319:49
				Uncert:	+/-0.148						
				TPU:	+/-0.150						
**Strontium Carrier		8.55			6.00	mg		70.2	(50%-105%)		
Batch	1308529										
QC1202893585	327623001	DUP									
Alpha		U	-0.0322	U	0.431	pCi/L	0.231	(0-1)	DYT1	06/26/1317:21	
				Uncert:	+/-0.464						
				TPU:	+/-0.464						
Beta		U	0.373	U	1.05	pCi/L	0.206	(0-1)		06/25/1317:45	
				Uncert:	+/-0.753						
				TPU:	+/-0.754						
QC1202893588	LCS										
Alpha		12.3			13.7	pCi/L		111	(80%-120%)	DYT1	06/26/1317:41
				Uncert:	+/-0.643						
				TPU:	+/-1.43						
Beta		48.5			54.5	pCi/L		112	(80%-120%)		06/24/1316:29
				Uncert:	+/-0.952						
				TPU:	+/-4.60						
QC1202893584	MB										
Alpha				U	-0.0731	pCi/L			DYT1	06/26/1317:21	
				Uncert:	+/-0.0167						
				TPU:	+/-0.017						
Beta			U	-0.104	pCi/L					06/24/1318:48	

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1308529										
			Uncert:			+/-0.0438					
			TPU:			+/-0.0438					
QC1202893586	327623001	MS									
Alpha	82.3	U	-0.0322	77.5	pCi/L		94.2	(75%-125%)	DYT1	06/27/13	12:54
			Uncert:			+/-4.18					
			TPU:			+/-8.01					
Beta	1940	U	0.373	2190	pCi/L		113	(75%-125%)		06/24/13	16:29
			Uncert:			+/-38.7					
			TPU:			+/-186					
QC1202893587	327623001	MSD									
Alpha	82.3	U	-0.0322	90.0	pCi/L	0.370	109	(0-1)	DYT1	06/26/13	17:21
			Uncert:			+/-4.76					
			TPU:			+/-8.88					
Beta	1940	U	0.373	2290	pCi/L	0.129	118	(0-1)		06/24/13	16:29
			Uncert:			+/-39.3					
			TPU:			+/-194					

### Notes:

TPU and Counting Uncertainty are calculated at the 68% confidence level (1-sigma).

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B The target analyte was detected in the associated blank.
- 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
- E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- E Concentration of the target analyte exceeds the instrument calibration range
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- FA Failed analysis.
- FB Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies
- H Analytical holding time was exceeded
- J Value is estimated
- JNX Non Calibrated Compound
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMF Result > MDC/CL and < RDL
- 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

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
N	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	RPD or %Recovery limits do not apply.									
N1	See case narrative									
ND	Analyte concentration is not detected above the detection limit									
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.									
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.									
UI	Gamma Spectroscopy--Uncertain identification									
UJ	Compound cannot be extracted									
UJ	Gamma Spectroscopy--Uncertain identification									
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.									
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.									
Y	QC Samples were not spiked with this compound									
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									
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.

\*\* Indicates analyte is a surrogate/tracer compound.

^ 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.

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.