

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

## Chain of Custody/Analysis Request

COC/Lab Request #:  
2013-935

Page 1 of 1

Client Contact:

Lab Agreement # : 126310011

Site Name: Los Alamos National Laboratory

Project Number :

Analysis Turnaround Time:

24 Hour - ☐ Other - ☐

7 Day - ☐

14 Day - ☐

21 Day - ☐

28 Day - ☒

Rad Screening Info:

Field Sample ID

Sample Date

Sample  
Time

Sample  
Matrix

WSP-CL04

WSP-GENINORG

WSP-GrossA/B

WSP-H-3

WSP-Met+B+SN+SR+U

WSP-NH3+NO3/NO2+PO4

WSP-RAD

WSP-TKN+TOC

Special Instructions:

CAPU-13-34780

Jun 6 2013

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Special Instructions:

Relinquished by:

Relinquished by:

Relinquished by:

Date/Time:

Date/Time:

Date/Time:

Received by:

Received by:

Received by:

6/7/13 3 pm

## 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-13-34770

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		06/06/2013	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1156	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: TW-2Ar		↓	FIELD PREP:	UF	OK
LOCATION TYPE:		↓	FIELD QC TYPE:	FD	↓
PORT: SINGLE COMPLETION		↓	SAMPLE USAGE:	QC	↓

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-GrossA/B	1 LITER POLY	1	NONE	Y	NA
↓	WSP-H-3	250 ML AMBER GLASS	1	ICE	↓	↓
↓	WSP-RAD	1 GAL POLY	1	HNO3	↓	↓
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS:

NA

LOCATION COMMENTS:

NA

FIELD PARAMETERS:

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

COLLECTED BY (PRINT) W. Shaw

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 6/6/13	RECEIVED BY (Printed Name) (Signature)	Date/Time 6/6/13
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-13-34771 WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		06/06/2013	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1156	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: TW-2Ar		↓	FIELD PREP:	F	OK
LOCATION TYPE:		↓	FIELD QC TYPE:	FD	↓
PORT: SINGLE COMPLETION			SAMPLE USAGE:	QC	↓

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-CL04	250 ML POLY	1	ICE	Y	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 NA mg/L      Oxidation-Reduction Potential NA MV      pH NA SU  
Specific Conductance NA uS/cm      Temperature NA deg C      Turbidity NA NTU

COLLECTED BY (PRINT) W. Shaw

RELINQUISHED BY (Printed Name) William Shaw (Signature) <i>[Signature]</i>	Date/Time 6/6/2013	RECEIVED BY (Printed Name) M. Martin (Signature) <i>[Signature]</i>	Date/Time 6/6/2013
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-13-34780 WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED (MM/DD/YYYY):		06/06/2013	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1156	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: TW-2Ar		↓	FIELD PREP:	UF	OK
LOCATION TYPE: MON		↓	FIELD QC TYPE: REG		↓
PORT: SINGLE COMPLETION		↓	SAMPLE USAGE: INV		↓

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-GrossA/B	1 LITER POLY	1	NONE	Y	NA
↓	WSP-H-3	250 ML AMBER GLASS	1	ICE	↓	↓
↓	WSP-RAD	1 GAL POLY	1	HNO3	↓	↓
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

## SAMPLE COMMENTS:

Sampled within 50' of running diesel generator

LOCATION COMMENTS: NA

## FIELD PARAMETERS:

Dissolved Oxygen 8.18 mg/L      Oxidation-Reduction Potential 128.6 MV      pH 6.69 SU  
Specific Conductance 385 uS/cm      Temperature 14.80 deg C      Turbidity 0.6 NTU

COLLECTED BY (PRINT) D. W. Shaw  
DF 6/6/13

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 1310 6/6/13	RECEIVED BY (Printed Name) (Signature)	Date/Time 6/6/13 1310
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-13-34788 WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED (MM/DD/YYYY):		06/06/2013	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1156	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: TW-2Ar		↓	FIELD PREP:	F	OK
LOCATION TYPE: MON		↓	FIELD QC TYPE: REG		↓
PORT: SINGLE COMPLETION		↓	SAMPLE USAGE: INV		↓

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-CL04	250 ML POLY	1	ICE	Y	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 NA mg/L Oxidation-Reduction Potential NA MV pH NA SU  
Specific Conductance NA uS/cm Temperature NA deg C Turbidity NA NTU

COLLECTED BY (PRINT) W. Shaw

RELINQUISHED BY (Printed Name) William Shaw (Signature) <i>[Signature]</i>	Date/Time 1310 6/6/13	RECEIVED BY (Printed Name) <i>[Signature]</i> (Signature) <i>[Signature]</i>	Date/Time 6/6/13 1310
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. 2013-935

## 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
	327280 EPA:120.1	1	1	1		
	327280 EPA:150.1	1	1	1		
	327280 EPA:160.1	1	1	1		
	327280 EPA:245.2	1	1	1		
	327280 EPA:300.0	1	1	1		
	327280 EPA:310.1	1	1	1		
	327280 EPA:350.1	1	1	1		
	327280 EPA:351.2	1	1	1		
	327280 EPA:353.2	1	1	1		
	327280 EPA:365.4	1	1	1		
	327280 EPA:900	1	1	1		
	327280 EPA:901.1	1	1	1		
	327280 EPA:905.0	1	1	1		
	327280 EPA:906.0	1	1	1		
	327280 HASL-300:AM-241	1	1	1		
	327280 HASL-300:ISOPU	1	1	1		
	327280 HASL-300:ISOU	1	1	1		
	327280 SM:A2340B	1	1	1		
	327280 SW-846:6010B	1	1	1		
	327280 SW-846:6020	1	1	1		
	327280 SW-846:6850	1	1	1		
	327280 SW-846:9060	1	1	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
	327280 EPA:120.1	1308081	1308081	1	1	1					
	327280 EPA:150.1	1308135	1308135	1	1	1					
	327280 EPA:160.1	1307079	1307079	1	1	1				1	
	327280 EPA:245.2	1306762	1306759	1	1	1				1	1
	327280 EPA:300.0	1307067	1307067	1	1	1				1	
	327280 EPA:310.1	1307658	1307658	1	1	1				2	1
	327280 EPA:350.1	1308128	1308126	1	1	1				1	1
	327280 EPA:351.2	1308288	1308287	1	1	1				1	2
	327280 EPA:353.2	1308114	1308114	1	1	1				1	
	327280 EPA:365.4	1307629	1307628	1	1	1				1	1
	327280 EPA:900	1308529	1308529	1	1	1				1	1
	327280 EPA:901.1	1306868	1306868	1	1	1				1	
	327280 EPA:905.0	1306838	1306838	1	1	1				1	1
	327280 EPA:906.0	1307540	1307540	1	1	1				1	1
	327280 HASL-300:AM-241	1306855	1306855	1	1	1				1	
	327280 HASL-300:ISOPU	1306858	1306858	1	1	1				1	
	327280 HASL-300:ISOU	1306860	1306860	1	1	1				1	
	327280 SM:A2340B	1311156	1311156	1	1	1					
	327280 SW-846:6010B	1306962	1306961	1	1	1				1	1
	327280 SW-846:6020	1306964	1306963	1	1	1				1	1
	327280 SW-846:6850	1306713	1306712	1	1	1				1	1
	327280 SW-846:9060	1307044	1307044	1	1	1				1	

[illegible]

## 2. Distribution Of Analytes In EDD.

Analytical Method	Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spikes	TICS
EPA:120.1	GENERAL CHEMISTRY	CALA-13-33429	1202892397	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPU-13-34771	327280004	FD	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPU-13-34788	327280002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY		1202892399	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAPU-13-34771	327280004	FD	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPU-13-34783	1202892561	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPU-13-34788	327280002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1202892559	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CALA-13-33429	1202889916	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPU-13-34771	327280004	FD	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPU-13-34788	327280002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1202889917	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1202889915	MB	1	0	0	0
EPA:245.2	INORGANIC	CAPU-13-34771	327280004	FD	1	0	0	0
EPA:245.2	INORGANIC	CAPU-13-34788	1202888994	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAPU-13-34788	1202888995	MS	0	0	1	0
EPA:245.2	INORGANIC	CAPU-13-34788	327280002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1202888993	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1202888992	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CALA-13-33429	1202889876	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPU-13-34771	327280004	FD	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPU-13-34788	327280002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1202889878	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1202889875	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CALA-13-33429	1202891329	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CALA-13-33429	1202891330	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAPU-13-34771	327280004	FD	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPU-13-34788	327280002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202891328	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202892334	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202891327	MB	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202892333	MB	2	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPU-13-34771	327280004	FD	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPU-13-34781	1202892528	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPU-13-34781	1202892530	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAPU-13-34788	327280002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1202892532	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1202892527	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPU-13-34770	327280003	FD	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPU-13-34773	1202892934	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPU-13-34773	1202892936	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAPU-13-34778	1202892935	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPU-13-34778	1202892937	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAPU-13-34780	327280001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1202892938	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1202892933	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPU-13-34771	327280004	FD	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPU-13-34781	1202892482	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPU-13-34788	327280002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1202892487	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1202892480	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPU-13-34771	327280004	FD	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPU-13-34781	1202891261	DUP	1	0	0	0



EPA:365.4	GENERAL CHEMISTRY	CAPU-13-34781	1202891263	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAPU-13-34788	327280002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1202891265	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1202891260	MB	1	0	0	0
EPA:900	RAD	CAPU-13-34770	327280003	FD	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	CAPU-13-34780	327280001	REG	2	0	0	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	CAPU-13-34770	327280003	FD	5	0	0	0
EPA:901.1	RAD	CAPU-13-34780	1202889386	DUP	5	0	0	0
EPA:901.1	RAD	CAPU-13-34780	327280001	REG	5	0	0	0
EPA:901.1	RAD	LCS	1202889387	LCS	0	0	3	0
EPA:901.1	RAD	MB	1202889385	MB	5	0	0	0
EPA:905.0	RAD	CALA-13-33411	1202889288	DUP	1	0	0	0
EPA:905.0	RAD	CALA-13-33411	1202889289	MS	0	0	1	0
EPA:905.0	RAD	CAPU-13-34770	327280003	FD	1	0	0	0
EPA:905.0	RAD	CAPU-13-34780	327280001	REG	1	0	0	0
EPA:905.0	RAD	LCS	1202889290	LCS	0	0	1	0
EPA:905.0	RAD	MB	1202889287	MB	1	0	0	0
EPA:906.0	RAD	CAPU-13-34770	327280003	FD	1	0	0	0
EPA:906.0	RAD	CAPU-13-34780	1202891034	DUP	1	0	0	0
EPA:906.0	RAD	CAPU-13-34780	1202891035	MS	0	0	1	0
EPA:906.0	RAD	CAPU-13-34780	327280001	REG	1	0	0	0
EPA:906.0	RAD	LCS	1202891036	LCS	0	0	1	0
EPA:906.0	RAD	MB	1202891033	MB	1	0	0	0
HASL-300:AM-241	RAD	CAPU-13-34770	327280003	FD	1	0	0	0
HASL-300:AM-241	RAD	CAPU-13-34780	1202889341	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAPU-13-34780	327280001	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1202889342	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1202889340	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAPU-13-34770	327280003	FD	2	0	0	0
HASL-300:ISOPU	RAD	CAPU-13-34780	1202889354	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAPU-13-34780	327280001	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1202889355	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1202889353	MB	2	0	0	0
HASL-300:ISOU	RAD	CAPU-13-34770	327280003	FD	3	0	0	0
HASL-300:ISOU	RAD	CAPU-13-34780	1202889361	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAPU-13-34780	327280001	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1202889362	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1202889360	MB	3	0	0	0
SM:A2340B	INORGANIC	CAPU-13-34771	327280004	FD	1	0	0	0
SM:A2340B	INORGANIC	CAPU-13-34788	327280002	REG	1	0	0	0
SW-846:6010B	INORGANIC	CAPU-13-34771	327280004	FD	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	CAPU-13-34788	327280002	REG	17	0	0	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-13-34771	327280004	FD	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	CAPU-13-34788	327280002	REG	11	0	0	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-13-34771	327280004	FD	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPU-13-34788	327280002	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-13-34770	327280003	FD	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPU-13-34774	1202889801	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPU-13-34780	327280001	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	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
MB	1202891260	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.0384	J	mg/L	0.05
MB	1202892527	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0223	J	mg/L	0.05

## 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-13-34788	MB	1202892527	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	mg/L	0.0223	0.0683		0.05	Y
CAPU-13-34771	MB	1202892527	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	mg/L	0.0223	0.0765		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	Recrvy	Recrvy	Limit	Limit
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?

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

Rejection Limit	RPD	RPD Limit
10	14.9	2.13

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	Units	Detected	Detected	RPD
Sample ID	SampleID	Sample ID	Method	Name	Matrix	Result	Result		In Sample	In Dup	
CAPU-13-34780	327280001	1202889361	HASL-300:ISOU	Uranium-234	W	0.181	0.214	pCi/L	Y	Y	16.6
CAPU-13-34780	327280001	1202889361	HASL-300:ISOU	Uranium-238	W	0.0829	0.134	pCi/L	Y	Y	46.9

## 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
TW-2Ar	2013-935	CAPU-13-34770	FD	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34770	FD	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34770	FD	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34770	FD	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34770	FD	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34770	FD	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34770	FD	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34770	FD	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34770	FD	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34770	FD	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34771	FD	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	HASL-300:ISOU	Uranium-234		J	R10	Y
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N
TW-2Ar	2013-935	CAPU-13-34780	REG	INIT	RAD	HASL-300:ISOU	Uranium-238		J	R10	Y
TW-2Ar	2013-935	CAPU-13-34788	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N

RPD  
Limit0.0506  
0.0323

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	pCi/L	0	pCi/L	0.0692	0.0214	W	6/6/2013		1306855	VAL	Y
-0.55	pCi/L	-0.55	pCi/L	4.89	1.37	W	6/6/2013		1306868	VAL	Y
0.113	pCi/L	0.113	pCi/L	2.07	0.442	W	6/6/2013		1308529	VAL	Y
0.355	pCi/L	0.355	pCi/L	9.55	3.17	W	6/6/2013		1306868	VAL	Y
0.0105	pCi/L	0.0105	pCi/L	0.0197	0.00632	W	6/6/2013		1306858	VAL	Y
0.0211	pCi/L	0.0211	pCi/L	0.0415	0.00894	W	6/6/2013		1306858	VAL	Y
-6.66	pCi/L	-6.66	pCi/L	64.6	17.9	W	6/6/2013		1306868	VAL	Y
1.7	pCi/L	1.7	pCi/L	4.79	1.09	W	6/6/2013		1306868	VAL	Y
0.0317	pCi/L	0.0317	pCi/L	0.482	0.136	W	6/6/2013		1306838	VAL	Y
0.0205	pCi/L	0.0205	pCi/L	0.0406	0.0088	W	6/6/2013		1306860	VAL	Y
0.0765	mg/L	0.0765	mg/L			W	6/6/2013		1308128	VAL	Y
0.00292	pCi/L	0.00292	pCi/L	0.0443	0.00772	W	6/6/2013		1306855	VAL	Y
-1.08	pCi/L	-1.08	pCi/L	4.75	1.4	W	6/6/2013		1306868	VAL	Y
2.2	pCi/L	2.2	pCi/L	5.63	1.21	W	6/6/2013		1306868	VAL	Y
0.604	pCi/L	0.604	pCi/L	2.99	0.757	W	6/6/2013		1308529	VAL	Y
5.49	pCi/L	5.49	pCi/L	9.91	2.75	W	6/6/2013		1306868	VAL	Y
-0.00474	pCi/L	-0.00474	pCi/L	0.0222	0.00474	W	6/6/2013		1306858	VAL	Y
0.0118	pCi/L	0.0118	pCi/L	0.0467	0.00854	W	6/6/2013		1306858	VAL	Y
-31.3	pCi/L	-31.3	pCi/L	54.7	14.8	W	6/6/2013		1306868	VAL	Y
-0.3	pCi/L	-0.3	pCi/L	5.41	1.41	W	6/6/2013		1306868	VAL	Y
0.0632	pCi/L	0.0632	pCi/L	0.495	0.14	W	6/6/2013		1306838	VAL	Y
0.181	pCi/L	0.181	pCi/L	0.0492	0.0214	W	6/6/2013		1306860	VAL	Y
0.0138	pCi/L	0.0138	pCi/L	0.0383	0.00831	W	6/6/2013		1306860	VAL	Y
0.0829	pCi/L	0.0829	pCi/L	0.0314	0.0147	W	6/6/2013		1306860	VAL	Y
0.0683	mg/L	0.0683	mg/L			W	6/6/2013		1308128	VAL	Y

Reason Code	Description
I4	the sample result is $\leq 5 \times$ the concentration of related analyte in the method blank.
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.
R10	Associated duplicate sample has DER or RER> the analytical laboratory's acceptance limits.
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-13-34770	TW-2Ar	FD	EPA:351.2	0	1
CAPU-13-34770	TW-2Ar	FD	EPA:900	0	2
CAPU-13-34770	TW-2Ar	FD	EPA:901.1	0	5
CAPU-13-34770	TW-2Ar	FD	EPA:905.0	0	1
CAPU-13-34770	TW-2Ar	FD	EPA:906.0	0	1
CAPU-13-34770	TW-2Ar	FD	HASL-300:AM-241	0	1
CAPU-13-34770	TW-2Ar	FD	HASL-300:ISOPU	0	2
CAPU-13-34770	TW-2Ar	FD	HASL-300:ISOU	0	3
CAPU-13-34770	TW-2Ar	FD	SW-846:9060	0	1
CAPU-13-34771	TW-2Ar	FD	EPA:120.1	0	1
CAPU-13-34771	TW-2Ar	FD	EPA:150.1	0	1
CAPU-13-34771	TW-2Ar	FD	EPA:160.1	0	1
CAPU-13-34771	TW-2Ar	FD	EPA:245.2	0	1
CAPU-13-34771	TW-2Ar	FD	EPA:300.0	0	4
CAPU-13-34771	TW-2Ar	FD	EPA:310.1	0	2
CAPU-13-34771	TW-2Ar	FD	EPA:350.1	0	1
CAPU-13-34771	TW-2Ar	FD	EPA:353.2	0	1
CAPU-13-34771	TW-2Ar	FD	EPA:365.4	0	1
CAPU-13-34771	TW-2Ar	FD	SM:A2340B	0	1
CAPU-13-34771	TW-2Ar	FD	SW-846:6010B	0	17
CAPU-13-34771	TW-2Ar	FD	SW-846:6020	0	11
CAPU-13-34771	TW-2Ar	FD	SW-846:6850	0	1
CAPU-13-34780	TW-2Ar	REG	EPA:351.2	0	1
CAPU-13-34780	TW-2Ar	REG	EPA:900	0	2
CAPU-13-34780	TW-2Ar	REG	EPA:901.1	0	5
CAPU-13-34780	TW-2Ar	REG	EPA:905.0	0	1
CAPU-13-34780	TW-2Ar	REG	EPA:906.0	0	1
CAPU-13-34780	TW-2Ar	REG	HASL-300:AM-241	0	1
CAPU-13-34780	TW-2Ar	REG	HASL-300:ISOPU	0	2
CAPU-13-34780	TW-2Ar	REG	HASL-300:ISOU	0	3
CAPU-13-34780	TW-2Ar	REG	SW-846:9060	0	1
CAPU-13-34788	TW-2Ar	REG	EPA:120.1	0	1
CAPU-13-34788	TW-2Ar	REG	EPA:150.1	0	1
CAPU-13-34788	TW-2Ar	REG	EPA:160.1	0	1
CAPU-13-34788	TW-2Ar	REG	EPA:245.2	0	1
CAPU-13-34788	TW-2Ar	REG	EPA:300.0	0	4
CAPU-13-34788	TW-2Ar	REG	EPA:310.1	0	2
CAPU-13-34788	TW-2Ar	REG	EPA:350.1	0	1
CAPU-13-34788	TW-2Ar	REG	EPA:353.2	0	1
CAPU-13-34788	TW-2Ar	REG	EPA:365.4	0	1
CAPU-13-34788	TW-2Ar	REG	SM:A2340B	0	1
CAPU-13-34788	TW-2Ar	REG	SW-846:6010B	0	17
CAPU-13-34788	TW-2Ar	REG	SW-846:6020	0	11

CAPU-13-34788	TW-2Ar	REG	SW-846:6850	0	1
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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: 327280  
SDG: 2013-935

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on June 08, 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,

Valerie Davis  
Project Manager

Purchase Order: 63641-10  
Chain of Custody: 2013-935  
Enclosures





**ARS International (63641-10)**  
**LANL-WQH Water Samples**  
**Work Order #: 327280**  
**SDG: 2013-935**

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# Case Narrative

**Case Narrative for  
ARS International (63641-10)  
LANL-WQH Water Samples  
Workorder #: 327280  
SDG # : 2013-935**

**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 08, 2013 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
327280001	CAPU-13-34780
327280002	CAPU-13-34788
327280003	CAPU-13-34770
327280004	CAPU-13-34771

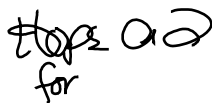
**Case Narrative**

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.



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**

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

## Chain of Custody/Analysis Request

**COC/Lab Request #:**  
2013-935

Page 1 of 1

[illegible]



## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <u>LANZ</u>		SDG/AR/COC/Work Order: <u>2013-935</u>
Received By: <u>MTK</u>		Date Received: <u>6-8-13</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>Open</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Ice bags <u>Blue ice</u> Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>4502182</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If yes, immediately deliver to Volatiles laboratory
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
14 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air <u>5462 9833</u> FedEx Ground UPS 0803 20°C RADCHEM 0814 4°C 0799 4°C

Comments (Use Continuation Form if needed):



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

SHIP DATE: 07JUN13  
ACTWGT: 60.0 LB MAN  
CAD: 0014176/CAFE25

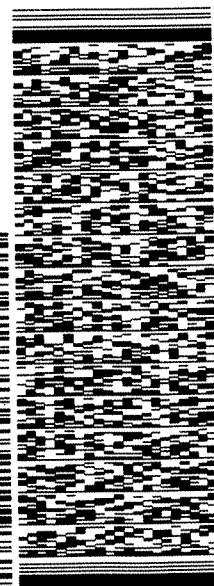
BILL

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171  
REF: WE991158W100

FedEx  
Express

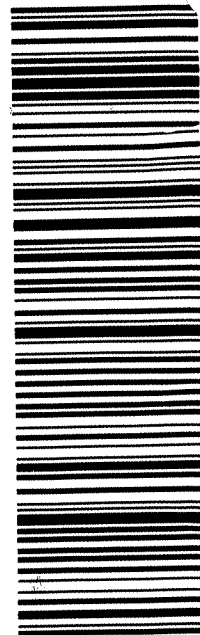


1 of 3  
SATURDAY 12:00P  
PRIORITY OVERNIGHT

TRK# 5462 9833 0799  
0201  
HH MASTER HH

X0 CHSA

29407  
SC-US CHS



Part # 156148-434 RIT2 09/10 \*

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

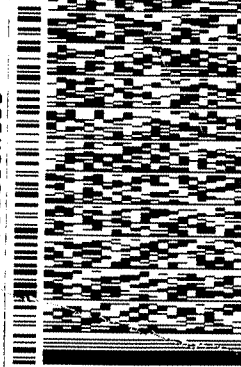
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ACTWGT: 31.0 LB MAN  
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BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171  
REF: WE991158W100



FedEx  
Express

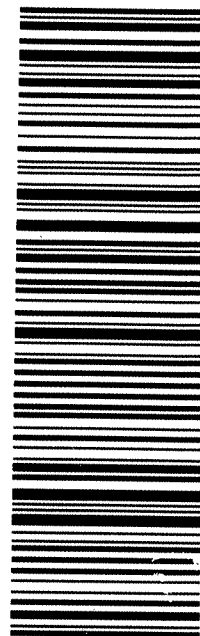


3 of 3  
SATURDAY 12:00P  
PRIORITY OVERNIGHT

MPS# 5462 9833 0814  
0201  
Mstr# 5462 9833 0799

X0 CHSA

29407  
SC-US CHS



Part # 156148-434 RIT2 09/10 \*

580C1/D777/108C

52101106060125

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

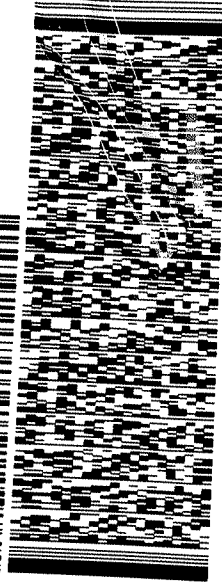
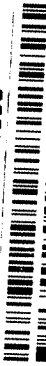
SHIP DATE: 07JUN13  
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CAD: 0014176/CREF2511

BILL SENDER

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

**CHARLESTON SC 29407**  
(843) 556-8171

REF: WE991158W100



FedEx  
Express



J11131186068125

2 of 3

MPS# 5462 9833 0803

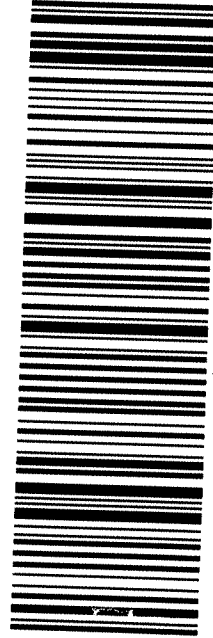
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**X0 CHSA**

**SATURDAY 12:00P**  
**PRIORITY OVERNIGHT**

0201

**29407**  
SC-US CHS



Form # 156148-434 R112 08/10

580C1/D777/188C

# **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 2013-935**

**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>
327280002	CAPU-13-34788
327280004	CAPU-13-34771
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**

All associated initial calibration verification standards (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: 2013-935 GEL Work Order: 327280

#### 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-13-34788Date Received: 08-JUN-13GEL Job No (SDG): 2013-935GEL Sample ID: 327280002Date 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	0.475	ug/L		1	13-JUN-13 21:00	per0613029a
	Perchlorate Isotope Ratio			3.14			1	13-JUN-13 21:00	per0613029a
14797-73-0	Perchlorate-101	.05	.2	0.468	ug/L		1	13-JUN-13 21:00	per0613029a
	Perchlorate-O(18)			0.526	ug/L		1	13-JUN-13 21:00	per0613029a

^ 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.

CAPU-13-34771Date Received: 08-JUN-13GEL Job No (SDG): 2013-935GEL Sample ID: 327280004Date 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	0.495	ug/L		1	13-JUN-13 21:08	per0613030a
	Perchlorate Isotope Ratio			3.1			1	13-JUN-13 21:08	per0613030a
14797-73-0	Perchlorate-101	.05	.2	0.496	ug/L		1	13-JUN-13 21:08	per0613030a
	Perchlorate-O(18)			0.539	ug/L		1	13-JUN-13 21:08	per0613030a

^ 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): 2013-935

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):** 2013-935

**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): 2013-935GEL 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): 2013-935GEL 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): 2013-935GEL 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): 2013-935GEL 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): 2013-935GEL 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 2013-935**

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
327280002	CAPU-13-34788
327280004	CAPU-13-34771
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)
1202888992	Method Blank (MB) <b>CVAA</b>
1202888993	Laboratory Control Sample (LCS)
1202888996	327280002(CAPU-13-34788L) Serial Dilution (SD)
1202888994	327280002(CAPU-13-34788D) Sample Duplicate (DUP)
1202888995	327280002(CAPU-13-34788S) Matrix Spike (MS)

**Method/Analysis Information**

<b>Analytical Batch:</b>	1306962, 1306964, 1306762 and 1311156
<b>Prep Batch :</b>	1306961, 1306963 and 1306759
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 22, GL-MA-E-006 REV# 9, GL-MA-E-014 REV# 25, GL-MA-E-010 REV# 26 and GL-GC-E-107 REV# 8
<b>Analytical Method:</b>	SW846 3005/6010B, SW846 3005/6020 DOE-AL, EPA 245.1/245.2 and SM 2340 B

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

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

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

### **System Configuration**

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

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

The Metals analysis-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 sample was selected as the quality control (QC) sample for this SDG: 327280002 (CAPU-13-34788).

**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 instrument. The samples in this SDG did not require dilutions.

### **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: 06/28/13

# **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: 2013-935 GEL Work Order: 327280

**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:** 2013-935**CONTRACT:** ESHL00210**METHOD TYPE:** EPA**SAMPLE ID:** 327280002**BASIS:** As Received**DATE COLLECTED** 06-JUN-13**CLIENT ID:** CAPU-13-34788**LEVEL:** Low**DATE RECEIVED** 08-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	06/11/13 11:51	061113W2-8	1306762

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

SDG No: 2013-935

CONTRACT: ESHL00210

METHOD TYPE: SW846

SAMPLE ID: 327280002

BASIS: As Received

DATE COLLECTED 06-JUN-13

CLIENT ID: CAPU-13-34788

LEVEL: Low

DATE RECEIVED 08-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 12:23	061913A-1	1306962
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	06/20/13 21:24	130620-3	1306964
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	BAJ	06/21/13 09:45	130620-6	1306964
7440-39-3	Barium	62.4	ug/L		1	5	5	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7440-42-8	Boron	157	ug/L		15	50	50	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	BAJ	06/20/13 21:24	130620-3	1306964
7440-70-2	Calcium	37200	ug/L		50	200	200	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7440-47-3	Chromium	3.23	ug/L	J	2	10	10	1	MS	BAJ	06/20/13 21:24	130620-3	1306964
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7440-50-8	Copper	5.54	ug/L	J	3	10	10	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	06/20/13 21:24	130620-3	1306964
7439-95-4	Magnesium	6830	ug/L		110	300	300	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7439-96-5	Manganese	4.03	ug/L	J	2	10	10	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7439-98-7	Molybdenum	1.09	ug/L		0.165	0.5	0.5	1	MS	BAJ	06/20/13 21:24	130620-3	1306964
7440-02-0	Nickel	20.1	ug/L		0.5	2	2	1	MS	BAJ	06/20/13 21:24	130620-3	1306964
7440-09-7	Potassium	2170	ug/L		50	150	150	1	P	HSC	06/19/13 14:06	061913A-2	1306962
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	BAJ	06/21/13 09:45	130620-6	1306964
7631-86-9	Silica	69400	ug/L		53	213	213	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	BAJ	06/20/13 21:24	130620-3	1306964
7440-23-5	Sodium	22500	ug/L		100	300	300	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7440-24-6	Strontium	196	ug/L		1	5	5	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	BAJ	06/20/13 21:24	130620-3	1306964
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	06/19/13 14:06	061913A-2	1306962
7440-61-1	Uranium	0.261	ug/L		0.067	0.2	0.2	1	MS	BAJ	06/21/13 13:30	130621-7	1306964
7440-62-2	Vanadium	1.41	ug/L	J	1	5	5	1	P	HSC	06/19/13 12:23	061913A-1	1306962
7440-66-6	Zinc	3.42	ug/L	J	3.3	10	10	1	P	HSC	06/19/13 12:23	061913A-1	1306962

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

**SDG No:** 2013-935**CONTRACT:** ESHL00210**METHOD TYPE:****SAMPLE ID:** 327280002**BASIS:** As Received**DATE COLLECTED** 06-JUN-13**CLIENT ID:** CAPU-13-34788**LEVEL:** Low**DATE RECEIVED** 08-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	121	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
1306762	1306759	EPA 245.1/245.2 Prep	20	mL	20	mL	06/10/13	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

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

**SDG No:** 2013-935**CONTRACT:** ESHL00210**METHOD TYPE:** EPA**SAMPLE ID:** 327280004**BASIS:** As Received**DATE COLLECTED** 06-JUN-13**CLIENT ID:** CAPU-13-34771**LEVEL:** Low**DATE RECEIVED** 08-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	06/11/13 11:57	061113W2-8	1306762

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

SDG No: 2013-935

CONTRACT: ESHL00210

METHOD TYPE: SW846

SAMPLE ID: 327280004

BASIS: As Received

DATE COLLECTED 06-JUN-13

CLIENT ID: CAPU-13-34771

LEVEL: Low

DATE RECEIVED 08-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 12:35	061913A-1	1306962
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	06/20/13 21:51	130620-3	1306964
7440-38-2	Arsenic	4.72	ug/L	J	1.7	5	5	1	MS	BAJ	06/20/13 21:51	130620-3	1306964
7440-39-3	Barium	65	ug/L		1	5	5	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7440-42-8	Boron	164	ug/L		15	50	50	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	BAJ	06/20/13 21:51	130620-3	1306964
7440-70-2	Calcium	38800	ug/L		50	200	200	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7440-47-3	Chromium	2.55	ug/L	J	2	10	10	1	MS	BAJ	06/20/13 21:51	130620-3	1306964
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7440-50-8	Copper	5.88	ug/L	J	3	10	10	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	06/20/13 21:51	130620-3	1306964
7439-95-4	Magnesium	7100	ug/L		110	300	300	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7439-96-5	Manganese	3.94	ug/L	J	2	10	10	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7439-98-7	Molybdenum	0.908	ug/L		0.165	0.5	0.5	1	MS	BAJ	06/20/13 21:51	130620-3	1306964
7440-02-0	Nickel	19.4	ug/L		0.5	2	2	1	MS	BAJ	06/20/13 21:51	130620-3	1306964
7440-09-7	Potassium	2250	ug/L		50	150	150	1	P	HSC	06/19/13 14:58	061913A-2	1306962
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	BAJ	06/20/13 21:51	130620-3	1306964
7631-86-9	Silica	72500	ug/L		53	213	213	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	BAJ	06/20/13 21:51	130620-3	1306964
7440-23-5	Sodium	23200	ug/L		100	300	300	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7440-24-6	Strontium	204	ug/L		1	5	5	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	BAJ	06/20/13 21:51	130620-3	1306964
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	06/19/13 14:58	061913A-2	1306962
7440-61-1	Uranium	0.270	ug/L		0.067	0.2	0.2	1	MS	BAJ	06/21/13 13:39	130621-7	1306964
7440-62-2	Vanadium	2.07	ug/L	J	1	5	5	1	P	HSC	06/19/13 12:35	061913A-1	1306962
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	06/19/13 12:35	061913A-1	1306962

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

**SDG No:** 2013-935**CONTRACT:** ESHL00210**METHOD TYPE:****SAMPLE ID:** 327280004**BASIS:** As Received**DATE COLLECTED** 06-JUN-13**CLIENT ID:** CAPU-13-34771**LEVEL:** Low**DATE RECEIVED** 08-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	126	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
1306762	1306759	EPA 245.1/245.2 Prep	20	mL	20	mL	06/10/13	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.** 2013-935  
**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>
1202888992	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.** 2013-935 **Client ID:** CAPU-13-34788S**Contract:** ESHL00210 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 327280002 **Spike ID:** 1202888995

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	2		0.067	U	2	100		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2013-935 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>
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
Aluminum	ug/L	75-125	4900		68	U	5000	97.3		P
Barium	ug/L	75-125	554		62.4		500	98.2		P

\*Analytical Methods:

P SW846 3005/6010B

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2013-935

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.:** 2013-935**Lab Code:** GEL**Contract:** ESHL00210**Client ID:** CAPU-13-34788D**Matrix:** LIQUID**Level:** Low**Sample ID:** 327280002**Duplicate ID:** 1202888994**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.: 2013-935

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.: 2013-935

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. 2013-935

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>
1202888993	Mercury	ug/L	2	2.05		103	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2



## METALS

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## Laboratory Control Sample Summary

SDG NO. 2013-935

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								
	Aluminum	ug/L	5000	5020		100	80-120	P
	Barium	ug/L	500	499		99.8	80-120	P
	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

## \*Analytical Methods:

P SW846 3005/6010B

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2013-935

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.** 2013-935 **Client ID:** CAPU-13-34788L**Contract:** ESHL00210**Matrix:** LIQUID **Level:** Low**Sample ID:** 327280002 **Serial Dilution ID:** 1202888996

<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. 2013-935

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. 2013-935

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 2013-935**

**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>
327280001	CAPU-13-34780
327280003	CAPU-13-34770
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:** 1308081

**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>
327280002	CAPU-13-34788
327280004	CAPU-13-34771
1202892397	327279002(CALA-13-33429) Sample Duplicate (DUP)
1202892399	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-009 REV# 11.

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

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

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

The LCS spike recovery met the acceptance limits.

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

The following sample was selected for QC analysis: 327279002 (CALA-13-33429).

### **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:** 1308135 **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>
327280002	CAPU-13-34788
327280004	CAPU-13-34771
1202892559	Laboratory Control Sample (LCS)
1202892561	327623002(CAPU-13-34783) Sample Duplicate (DUP)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-008 REV# 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: 327623002 (CAPU-13-34783).

**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: 327280002 (CAPU-13-34788) and 327280004 (CAPU-13-34771).

**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: 1194703 327280002 (CAPU-13-34788) and 327280004 (CAPU-13-34771).

**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:** 1307067

**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>
327280002	CAPU-13-34788
327280004	CAPU-13-34771
1202889875	Method Blank (MB)
1202889876	327279002(CALA-13-33429) Sample Duplicate (DUP)
1202889877	327279002(CALA-13-33429) Post Spike (PS)
1202889878	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: 327279002 (CALA-13-33429).

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

The spike recovery falls outside of the established acceptance limits due to matrix interference: 1202889877 (CALA-13-33429).

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The following samples in this sample group were diluted due to high concentration: 1202889876 (CALA-13-33429), 1202889877 (CALA-13-33429), 327280002 (CAPU-13-34788) and 327280004 (CAPU-13-34771).

**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: 1195123 1202889877 (CALA-13-33429).

**Manual Integrations**

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202889876 (CALA-13-33429), 1202889877 (CALA-13-33429), 327280002 (CAPU-13-34788) and 327280004 (CAPU-13-34771).

**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:** 1308128      **Method:** EPA 350.1 Nitrogen and Ammonia L

**Prep Batch :** 1308126      **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>
327280002	CAPU-13-34788
327280004	CAPU-13-34771
1202892527	Method Blank (MB)
1202892528	327172002(CAPU-13-34781) Sample Duplicate (DUP)
1202892530	327172002(CAPU-13-34781) Matrix Spike (MS)
1202892532	Laboratory Control Sample (LCS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 327172002 (CAPU-13-34781).

**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**

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. 1202892528 (CAPU-13-34781).

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1308288	<b>Method:</b>	Nitrogen and Total Kjeldahl (TKN)
<b>Prep Batch :</b>	1308287	<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>
327280001	CAPU-13-34780
327280003	CAPU-13-34770
1202892933	Method Blank (MB)
1202892934	327172001(CAPU-13-34773) Sample Duplicate (DUP)
1202892935	327172003(CAPU-13-34778) Sample Duplicate (DUP)
1202892936	327172001(CAPU-13-34773) Matrix Spike (MS)
1202892937	327172003(CAPU-13-34778) Matrix Spike (MS)
1202892938	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-104 REV# 14.

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

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

### **Calibration Information**

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

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

The following samples were selected for QC analysis: 327172001 (CAPU-13-34773) and 327172003 (CAPU-13-34778).

**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 Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: 1202892934 (CAPU-13-34773). The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1202892935 (CAPU-13-34778).

**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: 1197089 1202892934 (CAPU-13-34773).

**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>	1308114	<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>
327280002	CAPU-13-34788
327280004	CAPU-13-34771
1202892480	Method Blank (MB)
1202892482	327172002(CAPU-13-34781) Sample Duplicate (DUP)
1202892485	327172002(CAPU-13-34781) Post Spike (PS)
1202892487	Laboratory Control Sample (LCS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 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: 327172002 (CAPU-13-34781).

**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 samples in this sample group were diluted due to high concentration: 1202892482 (CAPU-13-34781), 1202892485 (CAPU-13-34781), 327280002 (CAPU-13-34788) and 327280004 (CAPU-13-34771).

**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>	1307629	<b>Method:</b>	EPA 365.4 Phosphorus and Total in
<b>Prep Batch :</b>	1307628	<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>
327280002	CAPU-13-34788
327280004	CAPU-13-34771
1202891260	Method Blank (MB)
1202891261	327172002(CAPU-13-34781) Sample Duplicate (DUP)
1202891263	327172002(CAPU-13-34781) Matrix Spike (MS)
1202891265	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 sample was selected for QC analysis: 327172002 (CAPU-13-34781).

##### **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 following sample was re-analyzed due to instrument failure: 1202891265 (LCS).

#### **Miscellaneous Information**

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

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

##### **Additional Comments**

Additional comments were not required for this SDG.

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

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

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

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

### **Method/Analysis Information**

**Product:** Solids, Total Dissolved

**Analytical Batch:** 1307079

**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>
327280002	CAPU-13-34788
327280004	CAPU-13-34771
1202889915	Method Blank (MB)
1202889916	327279002(CALA-13-33429) Sample Duplicate (DUP)
1202889917	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: 327279002 (CALA-13-33429).

**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:** 1307658      **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>
327280002	CAPU-13-34788
327280004	CAPU-13-34771
1202891327	Method Blank (MB)
1202891328	Laboratory Control Sample (LCS)
1202891329	327279002(CALA-13-33429) Sample Duplicate (DUP)
1202891330	327279002(CALA-13-33429) 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: 327279002 (CALA-13-33429).

**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**

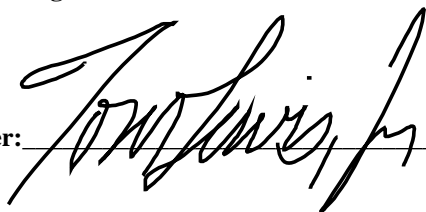
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

**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:

04July13

# **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: 2013-935 GEL Work Order: 327280

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

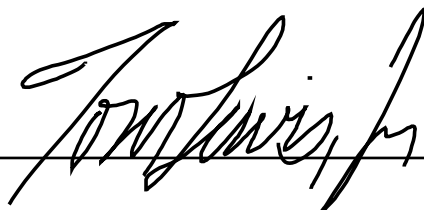
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: July 2, 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: 2013-935

Client Sample ID: CAPU-13-34780  
Sample ID: 327280001  
Matrix: W  
Collect Date: 06-JUN-13 11:56  
Receive Date: 08-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		1.53	0.330	1.00	mg/L	1	TSM	06/14/13	2048	1307044	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1	KLP1	06/25/13	1109	1308288	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	06/24/13	1600	1308287

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: July 2, 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: 2013-935

Client Sample ID: CAPU-13-34788  
Sample ID: 327280002  
Matrix: W  
Collect Date: 06-JUN-13 11:56  
Receive Date: 08-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		385	1.00	1.00	umhos/cm	1	LXA1	06/14/13	1526	1308081	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 11.8C	H	7.22	0.010	0.100	SU	1	LXA1	06/14/13	1205	1308135	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	J	0.0802	0.067	0.200	mg/L	1	VH1	06/13/13	2138	1307067	3
Fluoride		0.160	0.033	0.100	mg/L	1					
Chloride		40.2	0.670	2.00	mg/L	10	VH1	06/14/13	1846	1307067	4
Sulfate		22.1	1.33	4.00	mg/L	10					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia		0.0683	0.017	0.050	mg/L	1	KLP1	06/19/13	1319	1308128	5
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		2.78	0.085	0.250	mg/L	5	KLP1	06/24/13	1123	1308114	6
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P		0.217	0.017	0.050	mg/L	1	KLP1	06/17/13	1545	1307629	7
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		296	3.40	14.3	mg/L		LYG1	06/11/13	0841	1307079	8
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		70.7	0.725	1.00	mg/L		LXA1	06/13/13	1521	1307658	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	06/19/13	1230	1308126
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	06/14/13	1600	1307628

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## Certificate of Analysis

Report Date: July 2, 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: 2013-935

Client Sample ID: CAPU-13-34788  
Sample ID: 327280002

Project: ESHL00210  
Client ID: ARSL001

The following Analytical Methods were performed:

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

**Notes:**

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

Client SDG: 2013-935

Client Sample ID: CAPU-13-34770  
Sample ID: 327280003  
Matrix: W  
Collect Date: 06-JUN-13 11:56  
Receive Date: 08-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		1.47	0.330	1.00	mg/L	1	TSM	06/14/13	2121	1307044	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl	J	0.0576	0.033	0.100	mg/L	1	KLP1	06/25/13	1114	1308288	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	06/24/13	1600	1308287

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 351.2	

Notes:



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Report Date: July 2, 2013

Company : Los Alamos National Laboratory  
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Los Alamos, New Mexico 87545

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

Client SDG: 2013-935

Client Sample ID: CAPU-13-34771  
Sample ID: 327280004  
Matrix: W  
Collect Date: 06-JUN-13 11:56  
Receive Date: 08-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		384	1.00	1.00	umhos/cm	1	LXA1	06/14/13	1526	1308081	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 15.1C	H	7.16	0.010	0.100	SU	1	LXA1	06/14/13	1211	1308135	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	J	0.0987	0.067	0.200	mg/L	1	VH1	06/13/13	2209	1307067	3
Fluoride		0.170	0.033	0.100	mg/L	1					
Chloride		41.1	0.670	2.00	mg/L	10	VH1	06/14/13	1917	1307067	4
Sulfate		22.7	1.33	4.00	mg/L	10					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia		0.0765	0.017	0.050	mg/L	1	KLP1	06/19/13	1320	1308128	5
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		2.84	0.085	0.250	mg/L	5	KLP1	06/24/13	1125	1308114	6
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P		0.233	0.017	0.050	mg/L	1	KLP1	06/17/13	1546	1307629	7
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		281	3.40	14.3	mg/L		LYG1	06/11/13	0841	1307079	8
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		72.8	0.725	1.00	mg/L		LXA1	06/13/13	1530	1307658	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	06/19/13	1230	1308126
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	06/14/13	1600	1307628

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## Certificate of Analysis

Report Date: July 2, 2013

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

Client SDG: 2013-935

Client Sample ID: CAPU-13-34771  
Sample ID: 327280004

Project: ESHL00210  
Client ID: ARSL001

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 120.1	
2	EPA 150.1	
3	EPA 300.0	
4	EPA 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**

# GEL LABORATORIES LLC

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## QC Summary

Report Date: July 2, 2013

Page 1 of 5

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

Contact: Mr. Keith Greene

Workorder: 327280

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	1308081										
QC1202892397	327279002	DUP									
Conductivity		381		384	umhos/cm	0.784		(0%-10%)	LXA1	06/14/13	15:25
QC1202892399	LCS										
Conductivity	1410			1440	umhos/cm			(95%-105%)		06/14/13	15:24
<b>Electrode Analysis</b>											
Batch	1308135										
QC1202892561	327623002	DUP									
pH		H	7.63	H	7.61	SU	0.262	(0%-10%)	LXA1	06/14/13	15:19
QC1202892559	LCS										
pH	7.00			7.00	SU			(99%-101%)		06/14/13	11:50
<b>Ion Chromatography</b>											
Batch	1307067										
QC1202889876	327279002	DUP									
Bromide		1.30		1.31	mg/L	0.637		(0%-20%)	VH1	06/13/13	20:36
Chloride		14.8		15.4	mg/L	3.82		(0%-20%)		06/14/13	17:45
Fluoride		0.798		0.830	mg/L	3.91		(0%-20%)		06/13/13	20:36
Sulfate		19.8		19.7	mg/L	0.661		(0%-20%)		06/14/13	17:45
QC1202889878	LCS										
Bromide	1.25			1.37	mg/L			(90%-110%)		06/13/13	19:34

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## QC Summary

Workorder: 327280

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1307067										
Chloride	5.00			4.89	mg/L		97.9	(90%-110%)	VH1	06/13/13	19:34
Fluoride	2.50			2.55	mg/L		102	(90%-110%)			
Sulfate	10.0			10.1	mg/L		101	(90%-110%)			
QC1202889875	MB										
Bromide			U	ND	mg/L					06/13/13	19:04
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1202889877	327279002	PS									
Bromide	1.25	1.30		2.59	mg/L		103	(90%-110%)		06/18/13	03:06
Chloride	5.00	2.96		8.71	mg/L		115 *	(90%-110%)		06/14/13	18:15
Fluoride	2.50	0.798		3.49	mg/L		108	(90%-110%)		06/18/13	03:06
Sulfate	10.0	3.96		15.9	mg/L		119 *	(90%-110%)		06/14/13	18:15
<b>Nutrient Analysis</b>											
Batch	1307629										
QC1202891261	327172002	DUP									
Phosphorus, Total as P		2.26		2.07	mg/L	8.78		(0%-31%)	KLP1	06/17/13	15:42
QC1202891265	LCS										
Phosphorus, Total as P	1.00			1.07	mg/L		107	(76%-120%)		06/17/13	15:51
QC1202891260	MB										
Phosphorus, Total as P			J	0.0384	mg/L					06/17/13	15:39
QC1202891263	327172002	MS									
Phosphorus, Total as P	1.00	2.26		3.25	mg/L		99	(62%-139%)		06/17/13	15:42
Batch	1308114										
QC1202892482	327172002	DUP									
Nitrogen, Nitrate/Nitrite		2.54		2.47	mg/L	2.79		(0%-20%)	KLP1	06/24/13	11:14
QC1202892487	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.03	mg/L		103	(90%-110%)		06/24/13	11:04

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## QC Summary

Workorder: 327280

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1308114										
QC1202892480 MB											
Nitrogen, Nitrate/Nitrite			U	ND	mg/L				KLP1	06/24/13	11:03
QC1202892485 327172002 PS											
Nitrogen, Nitrate/Nitrite	1.00	0.508		1.52	mg/L		101	(90%-110%)		06/24/13	11:20
Batch	1308128										
QC1202892528 327172002 DUP											
Nitrogen, Ammonia		0.137		0.090	mg/L	41.4 ^		(+/-0.050)	KLP1	06/19/13	13:16
QC1202892532 LCS											
Nitrogen, Ammonia	1.00			1.01	mg/L		101	(90%-110%)		06/19/13	13:14
QC1202892527 MB											
Nitrogen, Ammonia			J	0.0223	mg/L					06/19/13	13:14
QC1202892530 327172002 MS											
Nitrogen, Ammonia	1.00	0.137		1.22	mg/L		108	(90%-110%)		06/19/13	13:17
Batch	1308288										
QC1202892934 327172001 DUP											
Nitrogen, Total Kjeldahl		0.476		0.282	mg/L	51.2* ^		(+/-0.100)	KLP1	06/25/13	11:04
QC1202892935 327172003 DUP											
Nitrogen, Total Kjeldahl		U	ND	J	0.0413	mg/L	N/A			06/25/13	11:07
QC1202892938 LCS											
Nitrogen, Total Kjeldahl	1.00			1.07	mg/L		107	(90%-110%)		06/25/13	11:02
QC1202892933 MB											
Nitrogen, Total Kjeldahl			U	ND	mg/L					06/25/13	11:02
QC1202892936 327172001 MS											
Nitrogen, Total Kjeldahl	1.00	0.476		1.38	mg/L		90.4	(90%-110%)		06/25/13	11:05
QC1202892937 327172003 MS											
Nitrogen, Total Kjeldahl	1.00	U	ND	1.00	mg/L		100	(90%-110%)		06/25/13	11:07
<b>Solids Analysis</b>											
Batch	1307079										
QC1202889916 327279002 DUP											
Total Dissolved Solids		256		231	mg/L	9.97		(0%-10%)	LYG1	06/11/13	08:41
QC1202889917 LCS											
Total Dissolved Solids	300			300	mg/L		100	(95%-105%)		06/11/13	08:41

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## QC Summary

Workorder: 327280

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Solids Analysis</b>											
Batch	1307079										
QC1202889915 MB											
Total Dissolved Solids			U	ND	mg/L				LYG1	06/11/13	08:41
<b>Titration Analysis</b>											
Batch	1307658										
QC1202891329 327279002 DUP											
Alkalinity, Total as CaCO3		130		133	mg/L	1.59		(0%-20%)	LXA1	06/13/13	15:01
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1202891328 LCS											
Alkalinity, Total as CaCO3	50.0			52.4	mg/L		105	(90%-110%)		06/13/13	11:01
QC1202891327 MB											
Alkalinity, Total as CaCO3			U	ND	mg/L					06/13/13	11:00
Carbonate alkalinity (CaCO3)			U	ND	mg/L						
QC1202891330 327279002 MS											
Alkalinity, Total as CaCO3	50.0	130		182	mg/L		103	(80%-120%)		06/13/13	15:11

### Notes:

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

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## QC Summary

Workorder: 327280

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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

[illegible]

**Data Validator/Group Leader:**  
 Jamie Johnson                      26-JUN-13

DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 17-JUN-13	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> IC	<b>Test / Method:</b> EPA 300.0	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1307067	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 327279(2013-934),327280(2013-935)</b> <b>Application Issues:</b> Failed Recovery for MS/PS			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. Failed Recovery for MS/PS:  QC 1202889877PS		1. The MS/PS failed required acceptance limits for Chloride and Sulfate due to matrix interference. Of the remaining anions in the MS/PS, several meet required acceptance limits. The deviation is noted in the Case Narrative and DER, and the data has been reported.	

**Originator's Name:**

Virginia Winger 18-JUN-13

**Data Validator/Group Leader:**

Thomas Lewis 02-JUL-13

### DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 25-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, EPA 351.2 SC	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1308288	<b>Sample Numbers:</b> See below.		
<b>Potentially affected work order(s)(SDG):</b> 327172(2013-926),327279(2013-934),327280(2013-935),327394,327396(2013-940),327527(2013-947),327622(2013-951),327623(2013-952),327635,327704(2013-956),327705(2013-957),327706(2013-958),327707(2013-959)  <b>Application Issues:</b>  Failed RPD for DUP			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. Failed RPD for DUP:  QC 1202892934DUP		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 25-JUN-13

**Data Validator/Group Leader:**

Julia Hamilton 25-JUN-13

# **Radiological Analysis**

**Radiochemistry Case Narrative  
ARS International (ARSL)  
SDG 2013-935  
Work Order 327280**

**Method/Analysis Information**

**Product:** Alphaspec Am241 Liquid  
**Analytical Method:** DOE EML HASL-300, Am-05-RC Modified  
**Analytical Batch Number:** 1306855

<b>Sample ID</b>	<b>Client ID</b>
327280001	CAPU-13-34780
327280003	CAPU-13-34770
1202889340	Method Blank (MB)
1202889341	327280001(CAPU-13-34780) Sample Duplicate (DUP)
1202889342	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 1202889340 (MB) and 1202889342 (LCS) were changed to 1.0 per client request.

**Designated QC**

The following sample was used for QC: 327280001 (CAPU-13-34780). The QC was from ARSL work order 327280.

**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. The following DER was generated for this SDG: DER 1196859 was generated due to RDL less than MDA. 1. Sample 327280003 did not meet the Am-241 detection limit. 1. The sample did meet the tracer yield requirement and has over 400 tracer counts. When a blank population is performed the MDC may be greater than the detection limit due to the high standard deviation. 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 blank result is less than the decision level.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** Alphaspec Pu, Liquid  
**Analytical Method:** DOE EML HASL-300, Pu-11-RC Modified  
**Analytical Batch Number:** 1306858

<b>Sample ID</b>	<b>Client ID</b>
327280001	CAPU-13-34780
327280003	CAPU-13-34770
1202889353	Method Blank (MB)
1202889354	327280001(CAPU-13-34780) Sample Duplicate (DUP)
1202889355	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 1202889353 (MB) and 1202889355 (LCS) were changed to 1.0 per client request.

##### **Designated QC**

The following sample was used for QC: 327280001 (CAPU-13-34780). The QC was from ARSL work order 327280.

##### **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:** Alphaspec U, Liquid

Analytical Method: DOE EML HASL-300, U-02-RC Modified

Analytical Batch Number: 1306860

<b>Sample ID</b>	<b>Client ID</b>
327280001	CAPU-13-34780
327280003	CAPU-13-34770
1202889360	Method Blank (MB)
1202889361	327280001(CAPU-13-34780) Sample Duplicate (DUP)
1202889362	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 1202889360 (MB) and 1202889362 (LCS) were changed to 1.0 per client request.

**Designated QC**

The following sample was used for QC: 327280001 (CAPU-13-34780). The QC was from ARSL work order 327280.

**QC Information**

All of the QC samples met the required acceptance limits.

**CSU**

The U-233/234 blank result is greater than 1.65 times the CSU but less than the MDC.

**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:    1306868

<b>Sample ID</b>	<b>Client ID</b>
327280001	CAPU-13-34780
327280003	CAPU-13-34770
1202889385	Method Blank (MB)
1202889386	327280001(CAPU-13-34780) Sample Duplicate (DUP)
1202889387	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, May 2013 and June 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: 327280001 (CAPU-13-34780). The QC was from ARSL work order 327280.

**QC Information**

All of the QC samples met the required acceptance limits.

**CSU**

The blank (1202889385 (MB)) results for Be-7, Cs-137 and I-131 are greater than 1.65 times the CSU but less than the MDC.

**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 (1202889385 (MB)) results for Be-7 and Cs-137 are 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: 1306838

<b>Sample ID</b>	<b>Client ID</b>
327280001	CAPU-13-34780
327280003	CAPU-13-34770
1202889287	Method Blank (MB)
1202889288	327024006(CALA-13-33411) Sample Duplicate (DUP)
1202889289	327024006(CALA-13-33411) Matrix Spike (MS)
1202889290	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 1202889287 (MB) and 1202889290 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 327024006 (CALA-13-33411). The QC was from ARSL work order 327024.

**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.

**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, 1202889289 (CALA-13-33411), 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>
327280001	CAPU-13-34780
327280003	CAPU-13-34770
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. Sample 327280001 (CAPU-13-34780) was recounted due to results more negative than the three sigma TPU. The second count 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.

**Method/Analysis Information**

<b>Product:</b>	<b>WSP-H-3</b>
Analytical Method:	EPA 906.0 Modified
Analytical Batch Number:	1307540

<b>Sample ID</b>	<b>Client ID</b>
327280001	CAPU-13-34780
327280003	CAPU-13-34770
1202891033	Method Blank (MB)
1202891034	327280001(CAPU-13-34780) Sample Duplicate (DUP)
1202891035	327280001(CAPU-13-34780) Matrix Spike (MS)
1202891036	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-002 REV# 21.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in August 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**

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

##### **Designated QC**

The following sample was used for QC: 327280001 (CAPU-13-34780). The QC was from ARSL work order 327280.

##### **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 1202891034 (CAPU-13-34780), 327280001 (CAPU-13-34780) and 327280003 (CAPU-13-34770) were recounted to verify sample results. The recount results are similar to the original results. Original results are being 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.

##### **Additional Comments**

Additional comments were not required for this sample set.

##### **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**

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

### **Qualifier Definition Report for**

ARSL001 ARS International (63641-10)

Client SDG: 2013-935 GEL Work Order: 327280

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

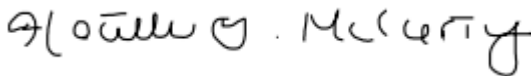
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

**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: 29 JUN 2013**

**Title: Analyst II**

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 24-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, Am-05-RC Modified	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1306855	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 327279(2013-934),327280(2013-935)</b> <b>Application Issues:</b> RDL less than MDA			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Sample 327280003 did not meet the Am-241 detection limit.		1. The sample did meet the tracer yield requirement and has over 400 tracer counts. When a blank population is performed the MDC may be greater than the detection limit due to the high standard deviation. Reporting results.	

**Originator's Name:**

Melanie Aycock 24-JUN-13

**Data Validator/Group Leader:**

Jessica Davis 25-JUN-13

# Sample Data Summary

# GEL LABORATORIES LLC

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

## 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 29, 2013

Client Sample ID: CAPU-13-34780  
Sample ID: 327280001  
Matrix: W  
Collect Date: 06-JUN-13  
Receive Date: 08-JUN-13  
Collector: Client

Project: ESHL00210  
Client ID: ARSL001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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### Rad Alpha Spec Analysis

#### *Alphaspec Am241 Liquid "As Received"*

Americium-241	U	0.00292	+/-0.00772	0.0443	0.0182	+/-0.00772	0.050	pCi/L		NXP2	06/21/13	1456	1306855	1
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#### *Alphaspec Pu, Liquid "As Received"*

Plutonium-238	U	-0.00474	+/-0.00474	0.0222	0.00788	+/-0.00474	0.050	pCi/L		NXP2	06/21/13	1534	1306858	2
Plutonium-239/240	U	0.0118	+/-0.00854	0.0467	0.0201	+/-0.00856	0.050	pCi/L						

#### *Alphaspec U, Liquid "As Received"*

Uranium-234		0.181	+/-0.0214	0.0492	0.0216	+/-0.0243	1.00	pCi/L		NXP2	06/21/13	1421	1306860	3
Uranium-235/236	U	0.0138	+/-0.00831	0.0383	0.0154	+/-0.00835	1.00	pCi/L						
Uranium-238		0.0829	+/-0.0147	0.0314	0.0127	+/-0.0156	0.500	pCi/L						

### Rad Gamma Spec Analysis

#### *Gammaspect "As Received"*

Cesium-137	U	-1.08	+/-1.40	4.75	2.10	+/-1.43	8.00	pCi/L		MXR1	06/13/13	1129	1306868	4
Cobalt-60	U	2.20	+/-1.21	5.63	2.41	+/-1.31	8.00	pCi/L						
Neptunium-237	U	5.49	+/-2.75	9.91	4.59	+/-3.03	10.0	pCi/L						
Potassium-40	U	-31.3	+/-14.8	54.7	23.3	+/-16.5	10.0	pCi/L						
Sodium-22	U	-0.30	+/-1.41	5.41	2.32	+/-1.41	10.0	pCi/L						

### Rad Gas Flow Proportional Counting

#### *GFPC, Sr90, liquid "As Received"*

Strontium-90	U	0.0632	+/-0.140	0.495	0.225	+/-0.140	0.500	pCi/L		JXR1	06/23/13	1252	1306838	5
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#### *WSP-GrossA/B "As Received"*

Beta		2.48	+/-0.603	1.92	0.936	+/-0.637	3.00	pCi/L		DYT1	06/24/13	1853	1308529	6
Alpha	U	0.604	+/-0.757	2.99	1.00	+/-0.759	3.00	pCi/L		DYT1	06/27/13	1254	1308529	7

### Rad Liquid Scintillation Analysis

#### *WSP-H-3 "As Received"*

Tritium		188	+/-54.4	174	84.5	+/-57.5	200	pCi/L		BYS1	06/18/13	1226	1307540	8
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### 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
8	EPA 906.0 Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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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 29, 2013

Contact: Mr. Keith Greene

Project: LANL-WQH Water Samples

Client Sample ID: CAPU-13-34780  
Sample ID: 327280001

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				
Americium-243 Tracer		Alphaspec Am241 Liquid "As Received"						1306855	76.7	(50%-105%)				
Plutonium-242 Tracer		Alphaspec Pu, Liquid "As Received"						1306858	70.3	(50%-105%)				
Uranium-232 Tracer		Alphaspec U, Liquid "As Received"						1306860	75.1	(50%-105%)				
Strontium Carrier		GFPC, Sr90, liquid "As Received"						1306838	69.0	(50%-105%)				

### Notes:

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

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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 29, 2013

Contact: Mr. Keith Greene

Project: LANL-WQH Water Samples

Client Sample ID: CAPU-13-34770

Sample ID: 327280003

Matrix: W

Collect Date: 06-JUN-13

Receive Date: 08-JUN-13

Collector: Client

Project: ESHL00210

Client ID: ARSL001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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### Rad Alpha Spec Analysis

*Alphaspec Am241 Liquid "As Received"*

Americium-241	U	0.00	+/-0.0214	0.0692	0.0284	+/-0.0214	0.050	pCi/L		NXP2	06/21/13	1456	1306855	1
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*Alphaspec Pu, Liquid "As Received"*

Plutonium-238	U	0.0105	+/-0.00632	0.0197	0.00701	+/-0.00634	0.050	pCi/L		NXP2	06/21/13	1534	1306858	2
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Plutonium-239/240	U	0.0211	+/-0.00894	0.0415	0.0179	+/-0.00898	0.050	pCi/L						
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*Alphaspec U, Liquid "As Received"*

Uranium-234		0.202	+/-0.0231	0.0521	0.0229	+/-0.0265	1.00	pCi/L		NXP2	06/21/13	1421	1306860	3
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Uranium-235/236	U	0.0205	+/-0.0088	0.0406	0.0163	+/-0.00889	1.00	pCi/L						
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Uranium-238		0.083	+/-0.0148	0.0333	0.0134	+/-0.0157	0.500	pCi/L						
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### Rad Gamma Spec Analysis

*Gammaspec "As Received"*

Cesium-137		11.7	+/-2.77	4.32	1.96	+/-2.81	8.00	pCi/L		MXR1	06/14/13	1158	1306868	4
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Cobalt-60	U	-0.55	+/-1.37	4.89	2.14	+/-1.38	8.00	pCi/L						
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Neptunium-237	U	0.355	+/-3.17	9.55	4.50	+/-3.17	10.0	pCi/L						
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Potassium-40	U	-6.66	+/-17.9	64.6	29.2	+/-17.9	10.0	pCi/L						
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Sodium-22	U	1.70	+/-1.09	4.79	2.10	+/-1.09	10.0	pCi/L						
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### Rad Gas Flow Proportional Counting

*GFPC, Sr90, liquid "As Received"*

Strontium-90	U	0.0317	+/-0.136	0.482	0.221	+/-0.136	0.500	pCi/L		JXR1	06/23/13	1252	1306838	5
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*WSP-GrossA/B "As Received"*

Beta		2.78	+/-0.516	1.62	0.788	+/-0.567	3.00	pCi/L		DYT1	06/24/13	1953	1308529	6
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Alpha	U	0.113	+/-0.442	2.07	0.675	+/-0.443	3.00	pCi/L		DYT1	06/26/13	1601	1308529	7
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### Rad Liquid Scintillation Analysis

*WSP-H-3 "As Received"*

Tritium		203	+/-55.5	177	85.8	+/-59.0	200	pCi/L		BYS1	06/18/13	1429	1307540	8
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### 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
8	EPA 906.0 Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1306855	51.6	(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 29, 2013

Contact: Mr. Keith Greene

Project: LANL-WQH Water Samples

Client Sample ID: CAPU-13-34770  
Sample ID: 327280003

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				
Plutonium-242 Tracer		Alphaspec Pu, Liquid "As Received"						1306858	82.2	(50%-105%)				
Uranium-232 Tracer		Alphaspec U, Liquid "As Received"						1306860	72.1	(50%-105%)				
Strontium Carrier		GFPC, Sr90, liquid "As Received"						1306838	59.6	(50%-105%)				

### Notes:

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

# Quality Control Data



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## QC Summary

Report Date: June 29, 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:** 327280

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1306855										
QC1202889341	327280001	DUP									
Americium-241	U	0.00292	U	0.00293	pCi/L	0.000312		(0-1)	NXP2	06/21/1314:56	
	Uncert:	+/-0.00772		+/-0.00775							
	TPU:	+/-0.00772		+/-0.00775							
**Americium-243 Tracer	2.62	2.01		1.97	pCi/L		75.2	(50%-105%)			
	Uncert:	+/-0.087		+/-0.0872							
	TPU:	+/-0.144		+/-0.144							
QC1202889342	LCS										
Americium-241	1.41			1.39	pCi/L		98.2	(80%-120%)	NXP2	06/21/1314:56	
	Uncert:			+/-0.0593							
	TPU:			+/-0.0855							
**Americium-243 Tracer	2.09			1.54	pCi/L		73.7	(50%-105%)			
	Uncert:			+/-0.0715							
	TPU:			+/-0.117							
QC1202889340	MB										
Americium-241			U	0.0104	pCi/L				NXP2	06/21/1314:56	
	Uncert:			+/-0.00636							
	TPU:			+/-0.00638							
**Americium-243 Tracer	2.09			1.44	pCi/L		68.6	(50%-105%)			
	Uncert:			+/-0.0733							
	TPU:			+/-0.119							
Batch	1306858										
QC1202889354	327280001	DUP									
Plutonium-238	U	-0.00474	U	0.0101	pCi/L	0.686		(0-1)	NXP2	06/21/1315:34	
	Uncert:	+/-0.00474		+/-0.00606							
	TPU:	+/-0.00474		+/-0.00608							
Plutonium-239/240	U	0.0118	U	0.0101	pCi/L	0.0571		(0-1)			
	Uncert:	+/-0.00854		+/-0.0067							
	TPU:	+/-0.00856		+/-0.00671							
**Plutonium-242 Tracer	2.44	1.71		2.01	pCi/L		82.4	(50%-105%)			
	Uncert:	+/-0.0763		+/-0.0703							
	TPU:	+/-0.128		+/-0.121							
QC1202889355	LCS										
Plutonium-238			U	0.0154	pCi/L			(80%-120%)	NXP2	06/21/1315:34	
	Uncert:			+/-0.00568							
	TPU:			+/-0.00571							
Plutonium-239/240	1.97			1.93	pCi/L		98	(80%-120%)			
	Uncert:			+/-0.0577							
	TPU:			+/-0.0976							
**Plutonium-242 Tracer	1.95			1.61	pCi/L		82.4	(50%-105%)			
	Uncert:			+/-0.058							
	TPU:			+/-0.0985							
QC1202889353	MB										

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1306858										
Plutonium-238			U	-0.00528	pCi/L				NXP2	06/21/1315:34	
				Uncert: +/-0.00465							
				TPU: +/-0.00465							
Plutonium-239/240			U	0.00352	pCi/L						
				Uncert: +/-0.00431							
				TPU: +/-0.00431							
**Plutonium-242 Tracer	1.95			1.47	pCi/L		75.4	(50%-105%)			
				Uncert: +/-0.0588							
				TPU: +/-0.0994							
Batch	1306860										
QC1202889361	327280001	DUP									
Uranium-234		0.181		0.214	pCi/L	0.320		(0-1)	NXP2	06/21/1314:21	
		Uncert: +/-0.0214		+/-0.0231							
		TPU: +/-0.0243		+/-0.0269							
Uranium-235/236		U 0.0138	U	0.0171	pCi/L	0.0982		(0-1)			
		Uncert: +/-0.00831		+/-0.00805							
		TPU: +/-0.00835		+/-0.00813							
Uranium-238		0.0829		0.134	pCi/L	0.717		(0-1)			
		Uncert: +/-0.0147		+/-0.0178							
		TPU: +/-0.0156		+/-0.0198							
**Uranium-232 Tracer	2.69	2.02		2.14	pCi/L		79.3	(50%-105%)			
		Uncert: +/-0.0784		+/-0.0792							
		TPU: +/-0.188		+/-0.189							
QC1202889362	LCS										
Uranium-234				2.51	pCi/L				NXP2	06/21/1314:21	
		Uncert: +/-0.0686		+/-0.174							
		TPU: +/-0.174		0.130	pCi/L						
Uranium-235/236				0.130	pCi/L						
		Uncert: +/-0.0179		+/-0.0197							
		TPU: +/-0.0197		2.86	pCi/L		106	(80%-120%)			
Uranium-238	2.70			2.86	pCi/L						
		Uncert: +/-0.0732		+/-0.197							
		TPU: +/-0.197		1.62	pCi/L		75.2	(50%-105%)			
**Uranium-232 Tracer	2.15			1.62	pCi/L						
		Uncert: +/-0.0642		+/-0.152							
		TPU: +/-0.152									
QC1202889360	MB										
Uranium-234			U	0.0141	pCi/L				NXP2	06/21/1314:21	
		Uncert: +/-0.00667		+/-0.00673							
		TPU: +/-0.00673		0.0117	pCi/L						
Uranium-235/236			U	0.0117	pCi/L						
		Uncert: +/-0.00921		+/-0.00924							
		TPU: +/-0.00924		-0.0118	pCi/L						
Uranium-238			U	-0.0118	pCi/L						
		Uncert: +/-0.00782		+/-0.00782							
		TPU: +/-0.00782		1.21	pCi/L		56.1	(50%-105%)			
**Uranium-232 Tracer	2.15			1.21	pCi/L						
		Uncert: +/-0.072									

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## QC Summary

Workorder: 327280

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1306860										
		TPU:		+/-0.158							
Rad Gamma Spec											
Batch	1306868										
QC1202889386	327280001	DUP									
Cesium-137		U	-1.08	U	-0.289	pCi/L	0.139	(0-1)	MXR1	06/13/13	14:02
		Uncert:	+/-1.40		+/-1.42						
		TPU:	+/-1.43		+/-1.42						
Cobalt-60		U	2.20	U	-0.837	pCi/L	0.489	(0-1)			
		Uncert:	+/-1.21		+/-1.78						
		TPU:	+/-1.31		+/-1.79						
Neptunium-237		U	5.49	U	0.0831	pCi/L	0.506	(0-1)			
		Uncert:	+/-2.75		+/-2.31						
		TPU:	+/-3.03		+/-2.31						
Potassium-40		U	-31.3	U	2.10	pCi/L	0.390	(0-1)			
		Uncert:	+/-14.8		+/-26.3						
		TPU:	+/-16.5		+/-26.3						
Sodium-22		U	-0.30	U	-2.52	pCi/L	0.375	(0-1)			
		Uncert:	+/-1.41		+/-1.43						
		TPU:	+/-1.41		+/-1.55						
QC1202889387	LCS										
Americium-241	2780				2710	pCi/L	97.6	(80%-120%)	MXR1	06/13/13	11:30
		Uncert:			+/-105						
		TPU:			+/-177						
Cesium-137	6010				5990	pCi/L	99.6	(80%-120%)			
		Uncert:			+/-72.4						
		TPU:			+/-258						
Cobalt-60	5240				5190	pCi/L	99	(80%-120%)			
		Uncert:			+/-76.3						
		TPU:			+/-223						
Neptunium-237				U	-40.4	pCi/L					
		Uncert:			+/-28.0						
		TPU:			+/-29.5						
Potassium-40				U	15.9	pCi/L					
		Uncert:			+/-51.1						
		TPU:			+/-51.3						
Sodium-22				U	0.637	pCi/L					
		Uncert:			+/-9.58						
		TPU:			+/-9.59						
QC1202889385	MB										
Cesium-137				U	4.07	pCi/L					
		Uncert:			+/-2.08						
		TPU:			+/-2.09						
Cobalt-60				U	-1.75	pCi/L					
		Uncert:			+/-1.18						
		TPU:			+/-1.25						
Neptunium-237				U	3.72	pCi/L					
		Uncert:			+/-2.44						
		TPU:			+/-2.59						

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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	1306868										
Potassium-40			U	-10.5	pCi/L						
				+/-15.9							
				+/-16.1							
Sodium-22			U	0.00232	pCi/L						
				+/-1.10							
				+/-1.10							
<b>Rad Gas Flow</b>											
Batch	1306838										
QC1202889288	327024006	DUP									
Strontium-90		U	-0.138	U	0.301	pCi/L	0.788	(0-1)	JXR1	06/23/13	12:51
				+/-0.126							
				+/-0.126							
**Strontium Carrier	8.55	5.40		6.40	mg		74.9	(50%-105%)			
QC1202889290	LCS										
Strontium-90	24.2			26.6	pCi/L		110	(80%-120%)	JXR1	06/23/13	12:53
				+/-0.717							
				+/-2.42							
**Strontium Carrier	8.55			5.70	mg		66.7	(50%-105%)			
QC1202889287	MB										
Strontium-90			U	-0.0012	pCi/L				JXR1	06/23/13	12:51
				+/-0.0691							
				+/-0.0691							
**Strontium Carrier	8.55			5.90	mg		69	(50%-105%)			
QC1202889289	327024006	MS									
Strontium-90	243	U	-0.138		276	pCi/L	114	(75%-125%)	JXR1	06/23/13	12:51
				+/-0.126							
				+/-0.126							
**Strontium Carrier	8.55	5.40		5.80	mg		67.8	(50%-105%)			
Batch	1308529										
QC1202893585	327623001	DUP									
Alpha		U	-0.0322	U	0.431	pCi/L	0.231	(0-1)	DYT1	06/26/13	17:21
				+/-0.464							
				+/-0.464							
Beta		U	0.373	U	1.05	pCi/L	0.206	(0-1)		06/25/13	17:45
				+/-0.753							
				+/-0.754							
QC1202893588	LCS										
Alpha	12.3			13.7	pCi/L		111	(80%-120%)	DYT1	06/26/13	17:41
				+/-0.643							
				+/-1.43							
Beta	48.5			54.5	pCi/L		112	(80%-120%)		06/24/13	16:29
				+/-0.952							
				+/-4.60							
QC1202893584	MB										
Alpha			U	-0.0731	pCi/L				DYT1	06/26/13	17:21
				+/-0.0167							
				+/-0.017							
Beta			U	-0.104	pCi/L					06/24/13	18:48

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## QC Summary

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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:	+/-0.464							+/-4.18
			TPU:	+/-0.464							+/-8.01
Beta	1940	U	0.373	2190	pCi/L		113	(75%-125%)		06/24/13	16:29
			Uncert:	+/-0.753							+/-38.7
			TPU:	+/-0.754							+/-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:	+/-0.464							+/-4.76
			TPU:	+/-0.464							+/-8.88
Beta	1940	U	0.373	2290	pCi/L	0.129	118	(0-1)		06/24/13	16:29
			Uncert:	+/-0.753							+/-39.3
			TPU:	+/-0.754							+/-194
Rad Liquid Scintillation											
Batch	1307540										
QC1202891034	327280001	DUP									
Tritium			188	336	pCi/L	0.606		(0-1)	BYS1	06/18/13	18:36
			Uncert:	+/-54.4							+/-55.9
			TPU:	+/-57.5							+/-64.9
QC1202891036	LCS										
Tritium	1900			1750	pCi/L		92.3	(80%-120%)	BYS1	06/18/13	20:54
			Uncert:	+/-190							+/-190
			TPU:	+/-257							+/-257
QC1202891033	MB										
Tritium			U	-22.6	pCi/L				BYS1	06/18/13	16:33
			Uncert:	+/-50.2							+/-50.2
			TPU:	+/-50.2							+/-50.2
QC1202891035	327280001	MS									
Tritium	1900		188	1910	pCi/L		90.4	(75%-125%)	BYS1	06/18/13	20:38
			Uncert:	+/-54.4							+/-196
			TPU:	+/-57.5							+/-272

### 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
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- 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.

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## QC Summary

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
M	M if above MDC and less than LLD									
M	REMP Result > MDC/CL and < RDL									
N/A	RPD or %Recovery limits do not apply.									
N1	See case narrative									
ND	Analyte concentration is not detected above the detection limit									
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.									
R	Sample results are rejected									
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.									
UI	Gamma Spectroscopy--Uncertain identification									
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.									
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.									
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.