



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4234 EVENT NAME: LA/Pueblo (TA-21 and General Surveillance Monitoring Group)  
Q3 MY2013 Sampling Event

SAMPLE ID: CALA-13-33419 WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED (MM/DD/YYYY):		8/6/11/2013	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):		0947	MEDIA:	UA	ok
PRS ID:		ok	SAMPLE TECH CODE:	UA	PC
LOCATION ID: Vine Tree Spring			FIELD PREP:	UF	ok
LOCATION TYPE:			FIELD QC TYPE:	FTB	
PORT:			SAMPLE USAGE:	QC	

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	1	HCL DF 6/11/13	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT)

RELINQUISHED BY (Printed Name) <i>Greg Stoker</i> (Signature) <i>Greg Stoker</i>	Date/Time 8/11/13 1245	RECEIVED BY (Printed Name) <i>Sherwood</i> (Signature) <i>Sherwood</i>	Date/Time 8/11/13 1245
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: 4234 EVENT NAME: LA/Pueblo (TA-21 and General Surveillance Monitoring Group)  
Q3 MY2013 Sampling Event  
SAMPLE ID: CALA-13-33427 WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED (MM/DD/YYYY):		06/11/2013	FIELD MATRIX:	WG	
TIME COLLECTED (HH:MM):		0947	MEDIA:	UA	
PRS ID:		ok	SAMPLE TECH CODE:	UA	6/11/13 GSP PP
LOCATION ID: Vine Tree Spring			FIELD PREP:	UF	ok
LOCATION TYPE: SPR			FIELD QC TYPE:	REG	
PORT:			SAMPLE USAGE:	INV	

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	1X	NA
	WSP-GrossA/B	1 LITER POLY	1	NONE		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

## SAMPLE COMMENTS:

## LOCATION COMMENTS:

## FIELD PARAMETERS:

Dissolved Oxygen 6.99 mg/L Oxidation-Reduction Potential NA MV pH 7.71 SU  
Specific Conductance 311 uS/cm Temperature 14.20 deg C Turbidity 0.7 NTU

COLLECTED BY (PRINT) W. Shaw & D. Fellenz

RELINQUISHED BY (Printed Name) <u>[Signature]</u> (Signature)	Date/Time <u>6/11/13</u> <u>1245</u>	RECEIVED BY (Printed Name) <u>S. Sherwood</u> (Signature) <u>[Signature]</u>	Date/Time <u>6/11/13</u> <u>1245</u>
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: 4234 EVENT NAME: LA/Pueblo (TA-21 and General Surveillance Monitoring Group)  
Q3 MY2013 Sampling Event

SAMPLE ID: CALA-13-33435 WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		06/11/2013	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):		0947	MEDIA:	UA	ok
PRS ID:		ok	SAMPLE TECH CODE:	UA	PP
LOCATION ID: Vine Tree Spring		f	FIELD PREP:	F	ok
LOCATION TYPE: SPR		f	FIELD QC TYPE:	REG	f
PORT:		f	SAMPLE USAGE:	INV	f

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

## SAMPLE COMMENTS:

MA

## LOCATION COMMENTS:

MA

## FIELD PARAMETERS:

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

## COLLECTED BY (PRINT)

W. Sherwood

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 6/11/13 1245	RECEIVED BY (Printed Name) (Signature)	Date/Time 6/11/13 1245
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. 2013-947

## 1. Distribution Of Samples In EDD.

	Analytical	Regular	Field	Trip	Field	Equipment
SDG	Method	Samples	Duplicates	Blanks	Blanks	Blanks
327527	EPA:120.1	1				
327527	EPA:150.1	1				
327527	EPA:160.1	1				
327527	EPA:245.2	1				
327527	EPA:300.0	1				
327527	EPA:310.1	1				
327527	EPA:350.1	1				
327527	EPA:351.2	1				
327527	EPA:353.2	1				
327527	EPA:365.4	1				
327527	EPA:900	1				
327527	EPA:901.1	1				
327527	EPA:905.0	1				
327527	HASL-300:AM-241	1				
327527	HASL-300:ISOPU	1				
327527	HASL-300:ISOU	1				
327527	SM:A2340B	1				
327527	SW-846:6010B	1				
327527	SW-846:6020	1				
327527	SW-846:6850	1				
327527	SW-846:8260B	1			1	
327527	SW-846:9060	1				

	Analytical	Analysis	Prep	Regular	Field	Trip	Field	Equipment	Method	Matrix	Matrix
SDG	Method	Lot ID	Lot ID	Samples	Duplicates	Blanks	Blanks	Blanks	Blanks	Spikes	Spike Dups
327527	EPA:120.1	1308081	1308081	1							
327527	EPA:150.1	1308135	1308135	1							
327527	EPA:160.1	1308070	1308070	1						1	
327527	EPA:245.2	1307771	1307769	1						1	1
327527	EPA:300.0	1307985	1307985	1						1	
327527	EPA:310.1	1310345	1310345	1						2	1
327527	EPA:350.1	1308128	1308126	1						1	1
327527	EPA:351.2	1308288	1308287	1						1	2
327527	EPA:353.2	1308114	1308114	1						1	
327527	EPA:365.4	1307629	1307628	1						1	1
327527	EPA:900	1308529	1308529	1						1	1
327527	EPA:901.1	1307967	1307967	1						1	
327527	EPA:905.0	1307879	1307879	1						1	1
327527	HASL-300:AM-241	1307462	1307462	1						1	
327527	HASL-300:ISOPU	1307464	1307464	1						1	
327527	HASL-300:ISOU	1307467	1307467	1						1	
327527	SM:A2340B	1312560	1312560	1							
327527	SW-846:6010B	1307832	1307831	1						1	1
327527	SW-846:6020	1307830	1307829	1						1	1
327527	SW-846:6850	1308476	1308475	1						1	1
327527	SW-846:8260B	1309640	1309640	1			1			2	
327527	SW-846:9060	1307044	1307044	1						1	

Analytical	Post-Digestion	Lab Control	Lab Control	Blank	Blank	Lab	Storage	Preparation	Reagent
Spikes	Spikes	Samples	Sample Dups	Spikes	Spike Dups	Duplicates	Blanks	Blanks	Blanks
		1				1			
		1				1			
		1				1			
		1				1			
		1				1			
		2				1			
		1				1			
		1				2			
		1				1			
		1				1			
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		1				1			
		1				1			
		1				1			
		1				1			
		1				1			
		1				1			
		4							
		1				1			

## 2. Distribution Of Analytes In EDD.

Analytical Method	Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spikes	TICS
EPA:120.1	GENERAL CHEMISTRY	CALA-13-33429	1202892397	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CALA-13-33435	327527002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1202892399	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CALA-13-33435	327527002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPU-13-34783	1202892561	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1202892559	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CALA-13-33435	1202892385	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CALA-13-33435	327527002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1202892380	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1202892376	MB	1	0	0	0
EPA:245.2	INORGANIC	CALA-13-33435	1202891614	DUP	1	0	0	0
EPA:245.2	INORGANIC	CALA-13-33435	1202891615	MS	0	0	1	0
EPA:245.2	INORGANIC	CALA-13-33435	1202891617	MSD	0	0	1	0
EPA:245.2	INORGANIC	CALA-13-33435	327527002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1202891613	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1202891612	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CALA-13-33435	327527002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPU-13-34785	1202892154	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1202892156	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1202892153	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CALA-13-33431	1202898295	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CALA-13-33431	1202898296	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CALA-13-33435	327527002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202898292	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202898718	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202898291	MB	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202898717	MB	2	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CALA-13-33435	327527002	REG	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	LCS	1202892532	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1202892527	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CALA-13-33427	327527001	REG	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	LCS	1202892938	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1202892933	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CALA-13-33435	327527002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPU-13-34781	1202892482	DUP	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	CALA-13-33435	327527002	REG	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	LCS	1202891265	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1202891260	MB	1	0	0	0
EPA:900	RAD	CALA-13-33427	327527001	REG	2	0	0	0
EPA:900	RAD	CAPU-13-34775	1202893585	DUP	2	0	0	0
EPA:900	RAD	CAPU-13-34775	1202893586	MS	0	0	2	0
EPA:900	RAD	CAPU-13-34775	1202893587	MSD	0	0	2	0
EPA:900	RAD	LCS	1202893588	LCS	0	0	2	0

Data Validation Report for:

Chain Of Custody No. 2013-947



EPA:900	RAD	MB	1202893584	MB	2	0	0	0
EPA:901.1	RAD	CALA-13-33427	1202892111	DUP	5	0	0	0
EPA:901.1	RAD	CALA-13-33427	327527001	REG	5	0	0	0
EPA:901.1	RAD	LCS	1202892112	LCS	0	0	3	0
EPA:901.1	RAD	MB	1202892110	MB	5	0	0	0
EPA:905.0	RAD	CALA-13-33427	1202891917	DUP	1	0	0	0
EPA:905.0	RAD	CALA-13-33427	1202891918	MS	0	0	1	0
EPA:905.0	RAD	CALA-13-33427	327527001	REG	1	0	0	0
EPA:905.0	RAD	LCS	1202891919	LCS	0	0	1	0
EPA:905.0	RAD	MB	1202891916	MB	1	0	0	0
HASL-300:AM-241	RAD	CALA-13-33427	327527001	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPU-13-34777	1202890848	DUP	1	0	0	0
HASL-300:AM-241	RAD	LCS	1202890849	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1202890847	MB	1	0	0	0
HASL-300:ISOPU	RAD	CALA-13-33427	327527001	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAPU-13-34777	1202890856	DUP	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1202890857	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1202890855	MB	2	0	0	0
HASL-300:ISOU	RAD	CALA-13-33427	327527001	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPU-13-34777	1202890864	DUP	3	0	0	0
HASL-300:ISOU	RAD	LCS	1202890865	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1202890863	MB	3	0	0	0
SM:A2340B	INORGANIC	CALA-13-33435	327527002	REG	1	0	0	0
SW-846:6010B	INORGANIC	CALA-13-33435	1202891769	DUP	17	0	0	0
SW-846:6010B	INORGANIC	CALA-13-33435	1202891770	MS	0	0	17	0
SW-846:6010B	INORGANIC	CALA-13-33435	327527002	REG	17	0	0	0
SW-846:6010B	INORGANIC	LCS	1202891768	LCS	0	0	17	0
SW-846:6010B	INORGANIC	MB	1202891767	MB	17	0	0	0
SW-846:6020	INORGANIC	CALA-13-33435	1202891764	DUP	11	0	0	0
SW-846:6020	INORGANIC	CALA-13-33435	1202891765	MS	0	0	11	0
SW-846:6020	INORGANIC	CALA-13-33435	327527002	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1202891763	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1202891762	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CALA-13-33435	327527002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPU-13-34783	1202893409	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPU-13-34783	1202893410	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1202893408	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1202893407	MB	1	0	0	0
SW-846:8260B	VOC	CALA-13-33419	327527003	FTB	80	3	0	0
SW-846:8260B	VOC	CALA-13-33427	327527001	REG	80	3	0	0
SW-846:8260B	VOC	LCS	1202896540	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1202896541	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1202898196	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1202898197	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1202896531	MB	80	3	0	0
SW-846:8260B	VOC	MB	1202898195	MB	80	3	0	0
SW-846:9060	GENERAL CHEMISTRY	CALA-13-33427	327527001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPU-13-34774	1202889801	DUP	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	1202891260	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.0384	J	mg/L	0.05
MB	1202891767	METHOD BLANK	SW-846:6010B	W	Potassium	63.5	J	ug/L	150
MB	1202892376	METHOD BLANK	EPA:160.1	W	Total Dissolved Solids	7.14	J	mg/L	14.3
MB	1202892527	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0223	J	mg/L	0.05
MB	1202898291	METHOD BLANK	EPA:310.1	W	Alkalinity-CO3+HCO3	1.05		mg/L	1

## 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
CALA-13-33435	MB	1202892527	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	mg/L	0.0223	0.0305	J	0.05	Y

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

No.

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

Field	Matrix	Matrix	Analytical	Parameter	Analysis	Analysis	Sample	MS %	MSD %	Upper	Lower
Sample ID	Spike ID	Spike Dup ID	Method	Name	Lot ID	Date	Matrix	Recvry	Recvry	Limit	Limit
CAPU-13-34775	1202893586	1202893587	EPA:900	Gross alpha	1308529	6/26/2013	W	94.2	109	125	75

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

No.

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

No.

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

No.

## 11. Any required reporting limits exceeded?

No.

## 12. Additional Validator's Comments.

None.

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

Rejection	RPD	
Limit	Limit	
10	14.9	2.13

## 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
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33427	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N
Vine Tree Spring	2013-947	CALA-13-33435	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N

**Reason Code** Description  
 I4 the sample result is <5x the concentration of related analyte in the method blank.

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

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

R5 Analyte is not detected because the amount reported is less than the MDC.

U\_LAB The analytical laboratory qualified the analyte as not detected.

## 14. Useable Result Count.

Field	Location	Sample	Analytical	No. Unuseable	Total No. Of
Sample ID	ID	Purpose	Method	Records	Records
CALA-13-33419	Vine Tree Spring	FTB	SW-846:8260B	0	80
CALA-13-33427	Vine Tree Spring	REG	EPA:351.2	0	1
CALA-13-33427	Vine Tree Spring	REG	EPA:900	0	2
CALA-13-33427	Vine Tree Spring	REG	EPA:901.1	0	5
CALA-13-33427	Vine Tree Spring	REG	EPA:905.0	0	1
CALA-13-33427	Vine Tree Spring	REG	HASL-300:AM-241	0	1
CALA-13-33427	Vine Tree Spring	REG	HASL-300:ISOPU	0	2
CALA-13-33427	Vine Tree Spring	REG	HASL-300:ISOU	0	3
CALA-13-33427	Vine Tree Spring	REG	SW-846:8260B	0	80
CALA-13-33427	Vine Tree Spring	REG	SW-846:9060	0	1
CALA-13-33435	Vine Tree Spring	REG	EPA:120.1	0	1
CALA-13-33435	Vine Tree Spring	REG	EPA:150.1	0	1
CALA-13-33435	Vine Tree Spring	REG	EPA:160.1	0	1
CALA-13-33435	Vine Tree Spring	REG	EPA:245.2	0	1
CALA-13-33435	Vine Tree Spring	REG	EPA:300.0	0	4
CALA-13-33435	Vine Tree Spring	REG	EPA:310.1	0	2
CALA-13-33435	Vine Tree Spring	REG	EPA:350.1	0	1
CALA-13-33435	Vine Tree Spring	REG	EPA:353.2	0	1
CALA-13-33435	Vine Tree Spring	REG	EPA:365.4	0	1
CALA-13-33435	Vine Tree Spring	REG	SM:A2340B	0	1
CALA-13-33435	Vine Tree Spring	REG	SW-846:6010B	0	17
CALA-13-33435	Vine Tree Spring	REG	SW-846:6020	0	11
CALA-13-33435	Vine Tree Spring	REG	SW-846:6850	0	1

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
0.00284	pCi/L	0.00284	pCi/L	0.0432	0.00492	W	6/11/2013		1307462	VAL	Y
0.92	pCi/L	0.92	pCi/L	3.66	0.955	W	6/11/2013		1307967	VAL	Y
-0.381	pCi/L	-0.381	pCi/L	3.3	0.885	W	6/11/2013		1307967	VAL	Y
0.818	pCi/L	0.818	pCi/L	2.97	0.801	W	6/11/2013		1308529	VAL	Y
-2.36	pCi/L	-2.36	pCi/L	6.64	1.97	W	6/11/2013		1307967	VAL	Y
-4.24E-10	pCi/L	-4.24E-10	pCi/L	0.0238	0.00509	W	6/11/2013		1307464	VAL	Y
0.0153	pCi/L	0.0153	pCi/L	0.0501	0.00881	W	6/11/2013		1307464	VAL	Y
3.19	pCi/L	3.19	pCi/L	48.3	14	W	6/11/2013		1307967	VAL	Y
-1.58	pCi/L	-1.58	pCi/L	3.38	1.06	W	6/11/2013		1307967	VAL	Y
0.00638	pCi/L	0.00638	pCi/L	0.472	0.132	W	6/11/2013		1307879	VAL	Y
0.015	pCi/L	0.015	pCi/L	0.0517	0.00916	W	6/11/2013		1307467	VAL	Y
0.0305	mg/L	0.0305	mg/L			W	6/11/2013		1308128	VAL	Y



July 10, 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: 327527  
SDG: 2013-947

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on June 13, 2013, and analyzed for GC/MS Volatile, General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Hope Taylor for  
Valerie Davis  
Project Manager

Purchase Order: 63641-10  
Chain of Custody: 2013-947  
Enclosures



**ARS International (63641-10)**  
**LANL-WQH Water Samples**  
**Work Order #: 327527**  
**SDG: 2013-947**



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# Case Narrative

**Case Narrative for  
ARS International (63641-10)  
LANL-WQH Water Samples  
Workorder #: 327527  
SDG # : 2013-947**

**July 10, 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 13, 2013 for analysis. Please see attached email for discrepancies. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. The containers for Gross A/B were preserved prior to analysis. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
327527001	CALA-13-33427
327527002	CALA-13-33435
327527003	CALA-13-33419

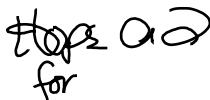
**Case Narrative**

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: GC/MS Volatile, 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 10 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 #:  
2013-947  
Page 1 of 1

327527

## 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 - ☒

Sample Date

Sample Time

Sample Matrix

Field Sample ID

CALA-13-33427

CALA-13-33435

CALA-13-33419

WSP-8260B-VOA  
WSP-CL04  
WSP-GENINORG  
WSP-GrossA/B  
WSP-Me+B+SN+SR+U  
WSP-NH3+NO3/NO2+PO4  
WSP-RAD  
WSP-TKN+TOC

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Rad Screening Info:

Yes, Below Background

Lab Reporting Limit Type:

Special Instructions:

Special Instructions:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

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**SAMPLE RECEIPT & REVIEW FORM**

<b>Client:</b> LANL			<b>SDG/AR/COC/Work Order:</b> 2013-947		
<b>Received By:</b> Patricia Dent			<b>Date Received:</b> JUN 13, 2013		
<b>Suspected Hazard Information</b>	<b>Yes</b>	<b>No</b>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
COC/Samples marked as radioactive?		<b>X</b>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <b>0CPM</b>		
Classified Radioactive II or III by RSO?		<b>X</b>	If yes, Were swipes taken of sample containers < action levels?		
COC/Samples marked containing PCBs?		<b>X</b>			
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<b>X</b>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.		
Shipped as a DOT Hazardous?		<b>X</b>	Hazard Class Shipped: UN#:		
Samples identified as Foreign Soil?		<b>X</b>			

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<b>X</b>			Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<b>X</b>			Preservation Method: Ice bags    Blue ice    Dry ice    None    Other (describe) *all temperatures are recorded in Celsius <b>3C</b>
2a	Daily check performed and passed on IR temperature gun?	<b>X</b>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <b>61524649</b>
3	Chain of custody documents included with shipment?	<b>X</b>			
4	Sample containers intact and sealed?	<b>X</b>			Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
5	Samples requiring chemical preservation at proper pH?			<b>X</b>	Sample ID's, containers affected and observed pH: <b>CAPU-13-33427 for Gross A/B</b> If Preservation added, Lot#: <b>NX 0409-75</b>
6	VOA vials free of headspace (defined as < 6mm bubble)?	<b>X</b>			Sample ID's and containers affected:
7	Are Encore containers present?			<b>X</b>	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<b>X</b>			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<b>X</b>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<b>X</b>			Sample ID's affected:
11	Number of containers received match number indicated on COC?			<b>X</b>	Sample ID's affected: <b>CALA-13-33419 the lab received 1 8260b container, chain indicates 2.</b>
12	Are sample containers identifiable as GEL provided?			<b>X</b>	<b>Clients</b>
13	COC form is properly signed in relinquished/received sections?	<b>X</b>			
14	Carrier and tracking number.				Circle Applicable: FedEx Air    FedEx Ground    UPS    Field Services    Courier    Other  <b>5462 9833 0906 3C</b>

Comments (Use Continuation Form if needed):



**Subject:** Sample receipt issues from 06/13/13

**From:** Pat Dent <Pat.Dent@gel.com>

**Date:** 6/13/2013 4:21 PM

**To:** "Keith R. Greene" <kgreene@lanl.gov>

**CC:** LANL@amrad.com, "team.davis" <team.davis@gel.com>

Good Afternoon all listed below are today's issues

Container received for Gross A/B was preserved prior to analysis

RN#2013-947

CALA-13-33419 the lab received 1 8260b container chain indicates 2.

Thanks!!

--

Patricia Dent

Project Manager Assistant

GEL Laboratories, LLC

2040 Savage Rd.

Charleston, S.C. 29407

Main: 843-556-8171 Ext 4264

Fax: 843-766-1178

Email: [pad@gel.com](mailto:pad@gel.com)

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

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

SHIP DATE: 12JUN13  
ACTWGT: 49.0 LB MAN  
CAD: 0014176/CAFE2511

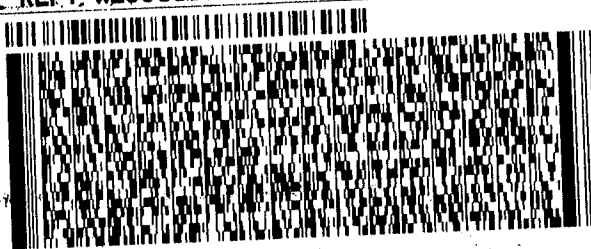
BILL SENDER

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

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

3c

580C1/0777/188C



**FedEx**  
Express



J11131186080125

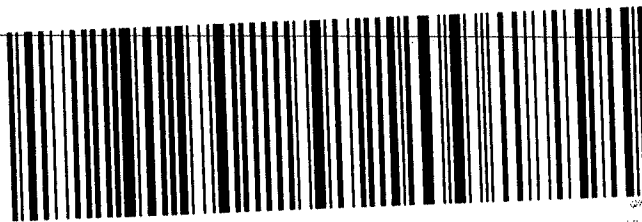
TRK# 5462 9833 0906  
0201

**THU - 13 JUN 10:30A**  
**PRIORITY OVERNIGHT**

**XX CHSA**

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

Post 8 155148-434 R112 0810



# **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.

# **Volatile Analysis**

# Case Narrative

**ChemStation Case Narrative  
ARS International (ARSL)  
SDG 2013-947**

**Method/Analysis Information**

**Procedure:** Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer

Analytical Method: SW846 8260B DOE-AL

Analytical Batch Number: 1309640

**Sample Analysis**

The following client and quality control samples were analyzed to complete this SDG using the methods referenced in the Analysis Information section:

<b>Sample ID</b>	<b>Client ID</b>
327527001	CALA-13-33427
327527003	CALA-13-33419
1202896531	Method Blank (MB)
1202896534	327527001(CALA-13-33427) Post Spike (PS)
1202896535	327527001(CALA-13-33427) Post Spike (PS)
1202896538	327527001(CALA-13-33427) Post Spike Duplicate (PSD)
1202896539	327527001(CALA-13-33427) Post Spike Duplicate (PSD)
1202896540	Laboratory Control Sample (LCS)
1202896541	Laboratory Control Sample (LCS)

NOTE: For volatile organic analyses the matrix spike designations may be indicated as "PS" or "PSD". The "PS" designation (post spike) indicates that the matrix was fortified prior to analysis but after applying any prep factors, such as a dilution. The laboratory considers the MS/MSD and PS/PSD designations interchangeable.

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-038 REV# 19.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP) section 19.1.2. False positive analytes are designated on the quantitation report with a 'd' qualifier.

**Calibration Information**

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package.



The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were added by the auto sampler at a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an industry shortage.

#### **Initial Calibration**

At the request of the client, linear curve fits, for target analytes that did not meet the x-intercept criteria of less than or equal to 3 times the MDL and had %RSDs less than 60%, were set to use the average response factor to quantitate data in this SDG.

#### **Continuing Calibration Verification Requirements**

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

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

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

The blank analyzed with this SDG met the acceptance criteria.

##### **Surrogate Recoveries**

Surrogate recoveries in all client and quality control samples were within the acceptance limits.

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

The LCS spike recoveries met the acceptance limits.

##### **QC Sample Designation**

Sample 327527001 (CALA-13-33427) was designated for spike analysis.

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

The spike recoveries were within the required acceptance limits.

##### **Matrix Spike Duplicate (PSD) Recovery Statement**

The spike duplicate recoveries were within the required acceptance limits.

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

The RPDs between the matrix spike pair met the acceptance limits.

##### **Internal Standard (ISTD) Acceptance**

The internal standard responses in all client and quality control samples met the required acceptance criteria.

#### **Technical Information**

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

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or 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.

##### **Sample Preservation and Integrity**

All samples met the sample preservation and integrity requirements.

##### **Sample Dilutions/Methanol Dilutions**

The samples in this SDG did not require dilutions.

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

Re-analyses were not required for samples in this SDG.

## **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.

### **Manual Integrations**

Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

### **TIC Comment**

Tentatively identified compounds (TIC) may be requested for this sample delivery group/work order. Please note that non-requested target analytes that are reported on the quantitation reports will be present on the Form I. These detected analytes are included in the calibrated method and as a result will be reported on the Sample Data Summary (Form I) or Certificate of Analysis (C of A). TIC data, if requested, are included on the Sample Data Summary (Form I) and are also included with the sample raw data.

### **Additional Comments**

Additional comments were not required for this SDG.

### **Residual Chlorine**

Residual Chlorine was not detected in any of the samples in this SDG.

## **System Configuration**

The Volatile-GC/MS analysis was performed on the following instrument configuration:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>	<b>P &amp; T Trap</b>
VOA9.I	Agilent 6890/5973 GC/MS w/ OI Eclipse/Archon Autosampler	HP6890/HP5973	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

## **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all 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: 2013-947 GEL Work Order: 327527

#### 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
- E Concentration of the target analyte exceeds the instrument calibration range
- 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: Erin Haubert

Date: 10 JUL 2013

Title: Data Validator

# **Sample Data Summary**

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

**SDG Number:** 2013-947  
**Lab Sample ID:** 327527001

**Date Collected:** 06/11/2013 09:47  
**Date Received:** 06/13/2013 08:45

**Matrix:** W

**Client ID:** CALA-13-33427

**Client:** ARSL001

**Project:** ESHL00210

**Batch ID:** 1309640

**Method:** SW846 8260B DOE-AL

**SOP Ref:** GL-OA-E-038

**Run Date:** 06/21/2013 11:36

**Inst:** VOA9.I

**Dilution:** 1

**Prep Date:** 06/21/2013 11:36

**Analyst:** RXY1

**Purge Vol:** 5 mL

**Data File:** 062113V9\9R511.D

**Column:** DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	1.00	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	1.00	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	1.00	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	1.00	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	1.00	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	1.00	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	1.00	ug/L	0.300	1.00
106-93-4	1,2-Dibromoethane	U	1.00	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	1.00	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	1.00	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
78-93-3	2-Butanone	U	5.00	ug/L	2.00	5.00
126-99-8	2-Chloro-1,3-butadiene	U	1.00	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	1.00	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	5.00	ug/L	2.20	5.00
106-43-4	4-Chlorotoluene	U	1.00	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	1.00	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	5.00	ug/L	1.50	5.00
67-64-1	Acetone	U	10.0	ug/L	3.00	10.0
75-05-8	Acetonitrile	U	25.0	ug/L	8.00	25.0
107-02-8	Acrolein	U	5.00	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	5.00	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	5.00	ug/L	1.50	5.00
71-43-2	Benzene	U	1.00	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	1.00	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	1.00	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	1.00	ug/L	0.300	1.00
75-25-2	Bromoform	U	1.00	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2013-947  
**Lab Sample ID:** 327527001

**Date Collected:** 06/11/2013 09:47  
**Date Received:** 06/13/2013 08:45

**Matrix:** W

**Client ID:** CALA-13-33427

**Client:** ARSL001

**Project:** ESHL00210

**Batch ID:** 1309640

**Method:** SW846 8260B DOE-AL

**SOP Ref:** GL-OA-E-038

**Run Date:** 06/21/2013 11:36

**Inst:** VOA9.I

**Dilution:** 1

**Prep Date:** 06/21/2013 11:36

**Analyst:** RXY1

**Purge Vol:** 5 mL

**Data File:** 062113V9\9R511.D

**Column:** DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	1.00	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	5.00	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	1.00	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	1.00	ug/L	0.300	1.00
75-00-3	Chloroethane	U	1.00	ug/L	0.300	1.00
67-66-3	Chloroform	U	1.00	ug/L	0.300	1.00
74-87-3	Chloromethane	U	1.00	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	1.00	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	1.00	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	1.00	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	1.00	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	5.00	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	1.00	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	1.00	ug/L	0.300	1.00
74-88-4	Iodomethane	U	5.00	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	50.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	1.00	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	5.00	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	5.00	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	10.0	ug/L	3.00	10.0
91-20-3	Naphthalene	U	1.00	ug/L	0.400	1.00
107-12-0	Propionitrile	U	5.00	ug/L	1.50	5.00
100-42-5	Styrene	U	1.00	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	1.00	ug/L	0.300	1.00
108-88-3	Toluene	U	1.00	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	1.00	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	1.00	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	5.00	ug/L	1.50	5.00
108-05-4	Vinyl acetate	U	5.00	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	1.00	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	2.00	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	50.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	1.00	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	1.00	ug/L	0.300	1.00
95-47-6	o-Xylene	U	1.00	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	1.00	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

Page 3 of 3

**SDG Number:** 2013-947  
**Lab Sample ID:** 327527001

**Date Collected:** 06/11/2013 09:47  
**Date Received:** 06/13/2013 08:45

**Matrix:** W

**Client ID:** CALA-13-33427

**Client:** ARSL001

**Project:** ESHL00210

**Batch ID:** 1309640

**Method:** SW846 8260B DOE-AL

**SOP Ref:** GL-OA-E-038

**Run Date:** 06/21/2013 11:36

**Inst:** VOA9.I

**Dilution:** 1

**Prep Date:** 06/21/2013 11:36

**Analyst:** RXY1

**Purge Vol:** 5 mL

**Data File:** 062113V9\9R511.D

**Column:** DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	1.00	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	1.00	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.1	50.0	ug/L 106	(78%-124%)
Bromofluorobenzene	51.5	50.0	ug/L 103	(80%-120%)
Toluene-d8	51.8	50.0	ug/L 104	(80%-120%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown hydrocarbon	4.286	19.5	ug/L	0	J

**Volatile  
Certificate of Analysis  
Sample Summary**

SDG Number: 2013-947

Lab Sample ID: 327527003

Date Collected: 06/11/2013 09:47

Date Received: 06/13/2013 08:45

Matrix: W

Client: ARSL001

Project: ESHL00210

Client ID: CALA-13-33419

Method: SW846 8260B DOE-AL

SOP Ref: GL-OA-E-038

Batch ID: 1309640

Inst: VOA9.I

Dilution: 1

Run Date: 06/21/2013 10:15

Analyst: RXY1

Purge Vol: 5 mL

Prep Date: 06/21/2013 10:15

Column: DB-624

Data File: 062113V9\9R508.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	1.00	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	1.00	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	1.00	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	1.00	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	1.00	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	1.00	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	1.00	ug/L	0.300	1.00
106-93-4	1,2-Dibromoethane	U	1.00	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	1.00	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	1.00	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
78-93-3	2-Butanone	U	5.00	ug/L	2.00	5.00
126-99-8	2-Chloro-1,3-butadiene	U	1.00	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	1.00	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	5.00	ug/L	2.20	5.00
106-43-4	4-Chlorotoluene	U	1.00	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	1.00	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	5.00	ug/L	1.50	5.00
67-64-1	Acetone	U	10.0	ug/L	3.00	10.0
75-05-8	Acetonitrile	U	25.0	ug/L	8.00	25.0
107-02-8	Acrolein	U	5.00	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	5.00	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	5.00	ug/L	1.50	5.00
71-43-2	Benzene	U	1.00	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	1.00	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	1.00	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	1.00	ug/L	0.300	1.00
75-25-2	Bromoform	U	1.00	ug/L	0.300	1.00



**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

**SDG Number:** 2013-947  
**Lab Sample ID:** 327527003

**Date Collected:** 06/11/2013 09:47  
**Date Received:** 06/13/2013 08:45

**Matrix:** W

**Client ID:** CALA-13-33419

**Client:** ARSL001

**Project:** ESHL00210

**Batch ID:** 1309640

**Method:** SW846 8260B DOE-AL

**SOP Ref:** GL-OA-E-038

**Run Date:** 06/21/2013 10:15

**Inst:** VOA9.I

**Dilution:** 1

**Prep Date:** 06/21/2013 10:15

**Analyst:** RXY1

**Purge Vol:** 5 mL

**Data File:** 062113V9\9R508.D

**Column:** DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	1.00	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	5.00	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	1.00	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	1.00	ug/L	0.300	1.00
75-00-3	Chloroethane	U	1.00	ug/L	0.300	1.00
67-66-3	Chloroform	U	1.00	ug/L	0.300	1.00
74-87-3	Chloromethane	U	1.00	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	1.00	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	1.00	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	1.00	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	1.00	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	5.00	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	1.00	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	1.00	ug/L	0.300	1.00
74-88-4	Iodomethane	U	5.00	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	50.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	1.00	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	5.00	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	5.00	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	10.0	ug/L	3.00	10.0
91-20-3	Naphthalene	U	1.00	ug/L	0.400	1.00
107-12-0	Propionitrile	U	5.00	ug/L	1.50	5.00
100-42-5	Styrene	U	1.00	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	1.00	ug/L	0.300	1.00
108-88-3	Toluene	U	1.00	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	1.00	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	1.00	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	5.00	ug/L	1.50	5.00
108-05-4	Vinyl acetate	U	5.00	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	1.00	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	2.00	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	50.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	1.00	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	1.00	ug/L	0.300	1.00
95-47-6	o-Xylene	U	1.00	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	1.00	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

SDG Number: 2013-947

Lab Sample ID: 327527003

Date Collected: 06/11/2013 09:47

Date Received: 06/13/2013 08:45

Matrix: W

Client: ARSL001

Project: ESHL00210

Client ID: CALA-13-33419

Method: SW846 8260B DOE-AL

SOP Ref: GL-OA-E-038

Batch ID: 1309640

Inst: VOA9.I

Dilution: 1

Run Date: 06/21/2013 10:15

Analyst: RXY1

Purge Vol: 5 mL

Prep Date: 06/21/2013 10:15

Column: DB-624

Data File: 062113V9\9R508.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	1.00	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	1.00	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.6	50.0	ug/L 101	(78%-124%)
Bromofluorobenzene	51.4	50.0	ug/L 103	(80%-120%)
Toluene-d8	48.9	50.0	ug/L 97.7	(80%-120%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown hydrocarbon	4.286	10.8	ug/L	0	J

# **Quality Control Summary**

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**Volatile**  
**Surrogate Recovery Report**

Page 1 of 1

**SDG Number: 2013-947****Matrix Type: LIQUID**

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Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1202896540	LCS for batch 1309640	100	98	98
1202896541	LCS for batch 1309640	104	100	107
1202896531	MB for batch 1309640	104	97	101
327527003	CALA-13-33419	101	98	103
327527001	CALA-13-33427	106	104	103
1202896534	CALA-13-33427PS	94	97	94
1202896538	CALA-13-33427PSD	95	100	97
1202896535	CALA-13-33427PS	99	100	100
1202896539	CALA-13-33427PSD	96	96	103

**Surrogate****Acceptance Limits**

DCED4 = 1,2-Dichloroethane-d4

(78%-124%)

TOL = Toluene-d8

(80%-120%)

BFB = Bromofluorobenzene

(80%-120%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 8

SDG Number: 2013-947

Sample Type: Post Spike

Client ID: CALA-13-33427PS

Matrix: W

Lab Sample ID: 1202896534

Instrument: VOA9.I

Analysis Date: 06/21/2013 15:14

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	PS m,p-Xylenes	100	0.00 U	95.5	95	56-134
75-05-8	PS Acetonitrile	1250	0.00 U	1060	84	60-133
67-64-1	PS Acetone	250	0.00 U	178	71	30-143
74-88-4	PS Iodomethane	250	0.00 U	244	98	69-147
75-15-0	PS Carbon disulfide	250	0.00 U	258	103	65-153
108-05-4	PS Vinyl acetate	250	0.00 U	253	101	50-143
78-93-3	PS 2-Butanone	250	0.00 U	203	81	30-140
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	221	88	68-136
591-78-6	PS 2-Hexanone	250	0.00 U	209	84	31-132
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	39.7	79	36-123
74-87-3	PS Chloromethane	50.0	0.00 U	41.2	82	47-134
75-01-4	PS Vinyl chloride	50.0	0.00 U	42.0	84	49-129
74-83-9	PS Bromomethane	50.0	0.00 U	40.1	80	56-127
75-00-3	PS Chloroethane	50.0	0.00 U	42.0	84	67-122
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	44.9	90	60-123
60-29-7	PS Ethyl ether	50.0	0.00 U	46.6	93	69-121
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	45.7	91	67-132
75-09-2	PS Methylene chloride	50.0	0.00 U	42.5	85	56-135
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	43.8	88	73-126
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	45.7	91	69-128
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	45.2	90	75-124
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	46.3	93	52-147

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2013-947

Sample Type: Post Spike

Client ID: CALA-13-33427PS

Matrix: W

Lab Sample ID: 1202896534

Instrument: VOA9.I

Analysis Date: 06/21/2013 15:14

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	PS 2,2-Dichloropropane	50.0	0.00 U	48.8	98	67-143
67-66-3	PS Chloroform	50.0	0.00 U	45.9	92	75-125
74-97-5	PS Bromochloromethane	50.0	0.00 U	47.2	94	80-120
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	48.3	97	69-140
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	47.1	94	71-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	50.6	101	69-142
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	44.7	89	72-126
71-43-2	PS Benzene	50.0	0.00 U	45.0	90	73-119
79-01-6	PS Trichloroethylene	50.0	0.00 U	47.1	94	54-147
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	45.8	92	78-123
75-27-4	PS Bromodichloromethane	50.0	0.00 U	48.9	98	76-131
74-95-3	PS Dibromomethane	50.0	0.00 U	46.4	93	79-120
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	48.0	96	72-134
108-88-3	PS Toluene	50.0	0.00 U	45.6	91	62-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	47.7	95	72-133
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	45.5	91	74-120
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	43.7	87	73-121
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	47.8	96	54-139
124-48-1	PS Dibromochloromethane	50.0	0.00 U	51.1	102	74-128
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	46.3	93	80-120
108-90-7	PS Chlorobenzene	50.0	0.00 U	45.2	90	73-119
100-41-4	PS Ethylbenzene	50.0	0.00 U	46.6	93	66-125

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 3 of 8

SDG Number: 2013-947

Sample Type: Post Spike

Client ID: CALA-13-33427PS

Matrix: W

Lab Sample ID: 1202896534

Instrument: VOA9.I

Analysis Date: 06/21/2013 15:14

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	PS o-Xylene	50.0	0.00 U	47.2	94	68-126
100-42-5	PS Styrene	50.0	0.00 U	48.0	96	57-138
75-25-2	PS Bromoform	50.0	0.00 U	52.1	104	66-129
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	46.0	92	44-146
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	44.7	89	68-129
108-86-1	PS Bromobenzene	50.0	0.00 U	44.8	90	70-122
103-65-1	PS n-Propylbenzene	50.0	0.00 U	47.1	94	61-131
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	45.7	91	66-126
98-82-8	PS Isopropylbenzene	50.0	0.00 U	47.6	95	65-130
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	47.8	96	58-134
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	45.2	90	63-125
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	49.1	98	66-129
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	47.6	95	60-131
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	48.8	98	62-130
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	49.7	99	62-132
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	45.9	92	66-121
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	46.1	92	65-119
104-51-8	PS n-Butylbenzene	50.0	0.00 U	48.6	97	55-134
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	54.9	110	58-137
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	48.6	97	49-139
91-20-3	PS Naphthalene	50.0	0.00 U	47.6	95	46-145
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	47.4	95	54-134

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2013-947

Sample Type: Post Spike

Client ID: CALA-13-33427PS

Matrix: W

Lab Sample ID: 1202896534

Instrument: VOA9.I

Analysis Date: 06/21/2013 15:14

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	PS 1,2,4-Trichlorobenzene	50.0	0.00 U	48.1	96	55-128
630-20-6	PS 1,1,1,2-Tetrachloroethane	50.0	0.00 U	50.5	101	79-128
95-50-1	PS 1,2-Dichlorobenzene	50.0	0.00 U	46.0	92	68-121
71-36-3	PS n-Butyl alcohol	5000	0.00 U	4430	89	53-150



Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2013-947

Sample Type: Post Spike Duplicate

Client ID: CALA-13-33427PSD

Matrix: W

Lab Sample ID: 1202896538

Instrument: VOA9.I

Analysis Date: 06/21/2013 15:40

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
179601-23-1	PSD m,p-Xylenes	100	0.00	U 94.3	94	56-134	1	0-20
75-05-8	PSD Acetonitrile	1250	0.00	U 1070	86	60-133	2	0-20
67-64-1	PSD Acetone	250	0.00	U 185	74	30-143	4	0-20
74-88-4	PSD Iodomethane	250	0.00	U 243	97	69-147	0	0-20
75-15-0	PSD Carbon disulfide	250	0.00	U 254	102	65-153	1	0-20
108-05-4	PSD Vinyl acetate	250	0.00	U 257	103	50-143	1	0-20
78-93-3	PSD 2-Butanone	250	0.00	U 209	84	30-140	3	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00	U 230	92	68-136	4	0-20
591-78-6	PSD 2-Hexanone	250	0.00	U 221	88	31-132	5	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00	U 39.7	79	36-123	0	0-20
74-87-3	PSD Chloromethane	50.0	0.00	U 41.4	83	47-134	0	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00	U 41.2	82	49-129	2	0-20
74-83-9	PSD Bromomethane	50.0	0.00	U 38.9	78	56-127	3	0-20
75-00-3	PSD Chloroethane	50.0	0.00	U 41.1	82	67-122	2	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00	U 45.1	90	60-123	1	0-20
60-29-7	PSD Ethyl ether	50.0	0.00	U 47.3	95	69-121	2	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00	U 46.5	93	67-132	2	0-20
75-09-2	PSD Methylene chloride	50.0	0.00	U 42.3	85	56-135	0	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00	U 44.9	90	73-126	2	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00	U 45.7	91	69-128	0	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00	U 45.5	91	75-124	1	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00	U 46.3	93	52-147	0	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2013-947

Sample Type: Post Spike Duplicate

Client ID: CALA-13-33427PSD

Matrix: W

Lab Sample ID: 1202896538

Instrument: VOA9.I

Analysis Date: 06/21/2013 15:40

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
594-20-7	PSD 2,2-Dichloropropane	50.0	0.00 U	48.3	97	67-143	1	0-20
67-66-3	PSD Chloroform	50.0	0.00 U	45.9	92	75-125	0	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00 U	46.1	92	80-120	2	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00 U	48.0	96	69-140	1	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00 U	46.5	93	71-130	1	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00 U	49.3	99	69-142	3	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00 U	45.3	91	72-126	1	0-20
71-43-2	PSD Benzene	50.0	0.00 U	44.6	89	73-119	1	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00 U	47.9	96	54-147	2	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00 U	45.9	92	78-123	0	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00 U	49.9	100	76-131	2	0-20
74-95-3	PSD Dibromomethane	50.0	0.00 U	46.8	94	79-120	1	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00 U	48.7	97	72-134	1	0-20
108-88-3	PSD Toluene	50.0	0.00 U	45.6	91	62-126	0	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00 U	48.4	97	72-133	2	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00 U	45.5	91	74-120	0	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00 U	44.6	89	73-121	2	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00 U	46.7	93	54-139	2	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00 U	52.2	104	74-128	2	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00 U	46.9	94	80-120	1	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00 U	44.6	89	73-119	2	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00 U	46.3	93	66-125	1	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2013-947

Sample Type: Post Spike Duplicate

Client ID: CALA-13-33427PSD

Matrix: W

Lab Sample ID: 1202896538

Instrument: VOA9.I

Analysis Date: 06/21/2013 15:40

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
95-47-6	PSD o-Xylene	50.0	0.00 U	46.5	93	68-126	1	0-20
100-42-5	PSD Styrene	50.0	0.00 U	48.0	96	57-138	0	0-20
75-25-2	PSD Bromoform	50.0	0.00 U	52.5	105	66-129	1	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00 U	45.4	91	44-146	1	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00 U	45.4	91	68-129	2	0-20
108-86-1	PSD Bromobenzene	50.0	0.00 U	44.5	89	70-122	1	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00 U	46.0	92	61-131	2	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00 U	45.1	90	66-126	1	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00 U	46.3	93	65-130	3	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00 U	45.9	92	58-134	4	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00 U	44.9	90	63-125	1	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00 U	47.8	96	66-129	3	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00 U	46.3	93	60-131	3	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00 U	46.9	94	62-130	4	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00 U	48.1	96	62-132	3	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00 U	45.4	91	66-121	1	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00 U	45.0	90	65-119	3	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00 U	47.0	94	55-134	3	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00 U	56.9	114	58-137	4	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00 U	46.4	93	49-139	5	0-20
91-20-3	PSD Naphthalene	50.0	0.00 U	48.5	97	46-145	2	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00 U	47.3	95	54-134	0	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2013-947

Sample Type: Post Spike Duplicate

Client ID: CALA-13-33427PSD

Matrix: W

Lab Sample ID:1202896538

Instrument: VOA9.I

Analysis Date: 06/21/2013 15:40

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
120-82-1	PSD 1,2,4-Trichlorobenzene	50.0	0.00 U	46.4	93	55-128	3	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	50.4	101	79-128	0	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	44.5	89	68-121	3	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	4700	94	53-150	6	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 2

SDG Number: 2013-947

Sample Type: Post Spike

Client ID: CALA-13-33427PS

Matrix: W

Lab Sample ID: 1202896535

Instrument: VOA9.I

Analysis Date: 06/21/2013 17:01

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	PS Acrolein	250	0.00 U	231	92	30-167
76-13-1	PS Trichlorotrifluoroethane	250	0.00 U	275	110	58-169
107-05-1	PS Allyl chloride	250	0.00 U	251	100	61-136
107-13-1	PS Acrylonitrile	250	0.00 U	247	99	65-135
107-12-0	PS Propionitrile	250	0.00 U	249	100	66-141
126-98-7	PS Methacrylonitrile	250	0.00 U	245	98	63-141
80-62-6	PS Methyl methacrylate	250	0.00 U	250	100	70-130
97-63-2	PS Ethyl methacrylate	250	0.00 U	276	110	73-132
78-83-1	PS Isobutyl alcohol	2500	0.00 U	2370	95	59-146
126-99-8	PS 2-Chloro-1,3-butadiene	50.0	0.00 U	45.5	91	39-130

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2013-947

Sample Type: Post Spike Duplicate

Client ID: CALA-13-33427PSD

Matrix: W

Lab Sample ID: 1202896539

Instrument: VOA9.I

Analysis Date: 06/21/2013 17:29

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD Acrolein	250	0.00 U	194	78	30-167	18	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00 U	256	102	58-169	7	0-20
107-05-1	PSD Allyl chloride	250	0.00 U	227	91	61-136	10	0-20
107-13-1	PSD Acrylonitrile	250	0.00 U	207	83	65-135	17	0-20
107-12-0	PSD Propionitrile	250	0.00 U	204	82	66-141	20	0-20
126-98-7	PSD Methacrylonitrile	250	0.00 U	205	82	63-141	18	0-20
80-62-6	PSD Methyl methacrylate	250	0.00 U	218	87	70-130	14	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00 U	229	92	73-132	18	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00 U	2030	81	59-146	16	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00 U	42.0	84	39-130	8	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2013-947

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1309640

Matrix: GROUND WATER

Lab Sample ID: 1202896540

Instrument: VOA9.I

Analysis Date: 06/21/2013 08:00

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	102	102	79-120
75-05-8	LCS Acetonitrile	1250	0.0	1110	89	64-127
67-64-1	LCS Acetone	250	0.0	272	109	36-163
74-88-4	LCS Iodomethane	250	0.0	264	106	80-134
75-15-0	LCS Carbon disulfide	250	0.0	273	109	80-143
108-05-4	LCS Vinyl acetate	250	0.0	288	115	75-144
78-93-3	LCS 2-Butanone	250	0.0	265	106	46-158
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	236	95	76-131
591-78-6	LCS 2-Hexanone	250	0.0	250	100	53-158
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	42.3	85	39-124
74-87-3	LCS Chloromethane	50.0	0.0	43.3	87	57-126
75-01-4	LCS Vinyl chloride	50.0	0.0	45.5	91	62-121
74-83-9	LCS Bromomethane	50.0	0.0	43.5	87	68-120
75-00-3	LCS Chloroethane	50.0	0.0	44.1	88	73-120
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	51.4	103	65-123
60-29-7	LCS Ethyl ether	50.0	0.0	49.6	99	74-120
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	51.5	103	76-127
75-09-2	LCS Methylene chloride	50.0	0.0	44.7	89	72-121
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	50.1	100	76-123
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	50.6	101	77-123
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	50.4	101	79-120
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	51.3	103	80-122

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2013-947

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1309640

Matrix: GROUND WATER

Lab Sample ID: 1202896540

Instrument: VOA9.I

Analysis Date: 06/21/2013 08:00

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	LCS 2,2-Dichloropropane	50.0	0.0	57.0	114	76-145
67-66-3	LCS Chloroform	50.0	0.0	50.6	101	80-120
74-97-5	LCS Bromochloromethane	50.0	0.0	50.1	100	83-120
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	55.4	111	80-133
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	51.8	104	80-127
56-23-5	LCS Carbon tetrachloride	50.0	0.0	57.4	115	77-139
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	50.3	101	75-121
71-43-2	LCS Benzene	50.0	0.0	47.5	95	79-120
79-01-6	LCS Trichloroethylene	50.0	0.0	51.2	102	80-121
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	48.6	97	80-120
75-27-4	LCS Bromodichloromethane	50.0	0.0	54.2	108	80-127
74-95-3	LCS Dibromomethane	50.0	0.0	50.3	101	80-120
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	54.0	108	80-127
108-88-3	LCS Toluene	50.0	0.0	48.8	98	77-120
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	53.2	106	80-128
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	47.6	95	79-120
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	46.7	93	77-120
127-18-4	LCS Tetrachloroethylene	50.0	0.0	51.1	102	77-125
124-48-1	LCS Dibromochloromethane	50.0	0.0	56.1	112	77-126
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	50.0	100	80-120
108-90-7	LCS Chlorobenzene	50.0	0.0	48.7	97	80-120
100-41-4	LCS Ethylbenzene	50.0	0.0	50.2	100	78-120



Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2013-947

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1309640

Matrix: GROUND WATER

Lab Sample ID: 1202896540

Instrument: VOA9.I

Analysis Date: 06/21/2013 08:00

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	49.8	100	80-120
100-42-5	LCS Styrene	50.0	0.0	52.0	104	80-121
75-25-2	LCS Bromoform	50.0	0.0	58.7	117	72-125
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	47.0	94	73-120
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	48.8	98	74-121
108-86-1	LCS Bromobenzene	50.0	0.0	48.0	96	79-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	49.6	99	75-125
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	48.9	98	77-121
98-82-8	LCS Isopropylbenzene	50.0	0.0	50.5	101	76-125
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	50.9	102	77-123
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	48.7	97	75-120
98-06-6	LCS tert-Butylbenzene	50.0	0.0	51.8	104	79-123
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	51.0	102	77-121
135-98-8	LCS sec-Butylbenzene	50.0	0.0	50.8	102	76-124
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	52.6	105	79-125
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	49.5	99	78-120
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	49.7	99	77-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	52.0	104	75-127
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	59.3	119	69-128
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	51.1	102	75-128
91-20-3	LCS Naphthalene	50.0	0.0	49.4	99	71-125
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	50.2	100	73-125

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2013-947

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1309640

Matrix: GROUND WATER

Lab Sample ID:1202896540

Instrument: VOA9.I

Analysis Date: 06/21/2013 08:00

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	51.1	102	75-123
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	55.1	110	80-124
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	48.4	97	79-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4990	100	66-138

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 1

SDG Number: 2013-947

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1309640

Matrix: GROUND WATER

Lab Sample ID: 1202896541

Instrument: VOA9.I

Analysis Date: 06/21/2013 08:54

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1309640

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	LCS Acrolein	250	0.0	236	95	28-152
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	270	108	65-157
107-05-1	LCS Allyl chloride	250	0.0	237	95	60-135
107-13-1	LCS Acrylonitrile	250	0.0	231	93	64-131
107-12-0	LCS Propionitrile	250	0.0	237	95	67-135
126-98-7	LCS Methacrylonitrile	250	0.0	229	91	64-132
80-62-6	LCS Methyl methacrylate	250	0.0	249	100	66-129
97-63-2	LCS Ethyl methacrylate	250	0.0	262	105	66-132
78-83-1	LCS Isobutyl alcohol	2500	0.0	2370	95	60-136
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	46.3	93	45-159

## Method Blank Summary

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SDG Number:	2013-947	Client:	ARSL001	Matrix:	GROUND WATER
Client ID:	MB for batch 1309640	Instrument ID:	VOA9.I	Data File:	062113V9\9R506B1.D
Lab Sample ID:	1202896531	Prep Date:	06/21/2013 09:21	Analyzed:	06/21/13 09:21
Column:	DB-624				

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1309640	1202896540	062113V9\9R503L1.D	06/21/13	0800
02 LCS for batch 1309640	1202896541	062113V9\9R505L1.D	06/21/13	0854
03 CALA-13-33419	327527003	062113V9\9R508.D	06/21/13	1015
04 CALA-13-33427	327527001	062113V9\9R511.D	06/21/13	1136
05 CALA-13-33427PS	1202896534	062113V9\9R519.D	06/21/13	1514
06 CALA-13-33427PSD	1202896538	062113V9\9R520.D	06/21/13	1540
07 CALA-13-33427PS	1202896535	062113V9\9R523.D	06/21/13	1701
08 CALA-13-33427PSD	1202896539	062113V9\9R524.D	06/21/13	1729

# Quality Control Data

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b>	<b>2013-947</b>	<b>Matrix:</b>	<b>GROUND WATER</b>
<b>Lab Sample ID:</b>	<b>1202896531</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>
<b>Client ID:</b>	<b>MB for batch 1309640</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>
<b>Run Date:</b>	<b>06/21/2013 09:21</b>	<b>Analyst:</b>	<b>RXY1</b>
<b>Prep Date:</b>	<b>06/21/2013 09:21</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Data File:</b>	<b>062113V9\9R506B1.D</b>	<b>Column:</b>	<b>DB-624</b>

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	1.00	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	1.00	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	1.00	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	1.00	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	1.00	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	1.00	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	1.00	ug/L	0.300	1.00
106-93-4	1,2-Dibromoethane	U	1.00	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	1.00	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	1.00	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
78-93-3	2-Butanone	U	5.00	ug/L	2.00	5.00
126-99-8	2-Chloro-1,3-butadiene	U	1.00	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	1.00	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	5.00	ug/L	2.20	5.00
106-43-4	4-Chlorotoluene	U	1.00	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	1.00	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	5.00	ug/L	1.50	5.00
67-64-1	Acetone	U	10.0	ug/L	3.00	10.0
75-05-8	Acetonitrile	U	25.0	ug/L	8.00	25.0
107-02-8	Acrolein	U	5.00	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	5.00	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	5.00	ug/L	1.50	5.00
71-43-2	Benzene	U	1.00	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	1.00	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	1.00	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	1.00	ug/L	0.300	1.00
75-25-2	Bromoform	U	1.00	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b>	<b>2013-947</b>	<b>Matrix:</b>	<b>GROUND WATER</b>
<b>Lab Sample ID:</b>	<b>1202896531</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>
<b>Client ID:</b>	<b>MB for batch 1309640</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>
<b>Run Date:</b>	<b>06/21/2013 09:21</b>	<b>Analyst:</b>	<b>RXY1</b>
<b>Prep Date:</b>	<b>06/21/2013 09:21</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Data File:</b>	<b>062113V9\9R506B1.D</b>	<b>Column:</b>	<b>DB-624</b>

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	1.00	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	5.00	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	1.00	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	1.00	ug/L	0.300	1.00
75-00-3	Chloroethane	U	1.00	ug/L	0.300	1.00
67-66-3	Chloroform	U	1.00	ug/L	0.300	1.00
74-87-3	Chloromethane	U	1.00	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	1.00	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	1.00	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	1.00	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	1.00	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	5.00	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	1.00	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	1.00	ug/L	0.300	1.00
74-88-4	Iodomethane	U	5.00	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	50.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	1.00	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	5.00	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	5.00	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	10.0	ug/L	3.00	10.0
91-20-3	Naphthalene	U	1.00	ug/L	0.400	1.00
107-12-0	Propionitrile	U	5.00	ug/L	1.50	5.00
100-42-5	Styrene	U	1.00	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	1.00	ug/L	0.300	1.00
108-88-3	Toluene	U	1.00	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	1.00	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	1.00	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	5.00	ug/L	1.50	5.00
108-05-4	Vinyl acetate	U	5.00	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	1.00	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	2.00	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	50.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	1.00	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	1.00	ug/L	0.300	1.00
95-47-6	o-Xylene	U	1.00	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	1.00	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> 2013-947		<b>Matrix:</b> GROUND WATER
<b>Lab Sample ID:</b> 1202896531		
<b>Client Sample:</b> QC for batch 1309640	<b>Client:</b> ARSL001	<b>Project:</b> QC
<b>Client ID:</b> MB for batch 1309640	<b>Method:</b> SW846 8260B DOE-AL	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1309640	<b>Inst:</b> VOA9.I	<b>Dilution:</b> 1
<b>Run Date:</b> 06/21/2013 09:21	<b>Analyst:</b> RXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 06/21/2013 09:21		
<b>Data File:</b> 062113V9\9R506B1.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	1.00	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	1.00	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.2	50.0	ug/L 104	(78%-124%)
Bromofluorobenzene	50.5	50.0	ug/L 101	(80%-120%)
Toluene-d8	48.7	50.0	ug/L 97.3	(80%-120%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown hydrocarbon	4.197	8.66	ug/L	0	J
	unknown	5.236	5.98	ug/L	0	J



**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> 2013-947	<b>Date Collected:</b> 06/11/2013 09:47	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1202896534	<b>Date Received:</b> 06/13/2013 08:45	
<b>Client Sample:</b> QC for batch 1309640	<b>Client:</b> ARSL001	<b>Project:</b> QC
<b>Client ID:</b> CALA-13-33427PS	<b>Method:</b> SW846 8260B DOE-AL	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1309640	<b>Inst:</b> VOA9.I	<b>Dilution:</b> 1
<b>Run Date:</b> 06/21/2013 15:14	<b>Analyst:</b> RXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 06/21/2013 15:14		
<b>Data File:</b> 062113V9\9R519.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		50.5	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		48.3	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		46.0	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		45.5	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		45.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		45.7	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		47.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		47.4	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		44.7	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		48.1	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		47.6	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		54.9	ug/L	0.300	1.00
106-93-4	1,2-Dibromoethane		46.3	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		46.0	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		44.7	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		45.8	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		47.8	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		45.9	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		43.7	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.1	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		48.8	ug/L	0.300	1.00
78-93-3	2-Butanone		203	ug/L	2.00	5.00
126-99-8	2-Chloro-1,3-butadiene	U	1.00	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		45.7	ug/L	0.300	1.00
591-78-6	2-Hexanone		209	ug/L	2.20	5.00
106-43-4	4-Chlorotoluene		45.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		49.7	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		221	ug/L	1.50	5.00
67-64-1	Acetone		178	ug/L	3.00	10.0
75-05-8	Acetonitrile		1060	ug/L	8.00	25.0
107-02-8	Acrolein	U	5.00	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	5.00	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	5.00	ug/L	1.50	5.00
71-43-2	Benzene		45.0	ug/L	0.300	1.00
108-86-1	Bromobenzene		44.8	ug/L	0.300	1.00
74-97-5	Bromochloromethane		47.2	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		48.9	ug/L	0.300	1.00
75-25-2	Bromoform		52.1	ug/L	0.300	1.00

**Volatile  
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Sample Summary**

<b>SDG Number:</b>	<b>2013-947</b>	<b>Date Collected:</b>	<b>06/11/2013 09:47</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1202896534</b>	<b>Date Received:</b>	<b>06/13/2013 08:45</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CALA-13-33427PS</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>06/21/2013 15:14</b>	<b>Analyst:</b>	<b>RXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>06/21/2013 15:14</b>				
<b>Data File:</b>	<b>062113V9\9R519.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		40.1	ug/L	0.300	1.00
75-15-0	Carbon disulfide		258	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		50.6	ug/L	0.300	1.00
108-90-7	Chlorobenzene		45.2	ug/L	0.300	1.00
75-00-3	Chloroethane		42.0	ug/L	0.300	1.00
67-66-3	Chloroform		45.9	ug/L	0.300	1.00
74-87-3	Chloromethane		41.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		51.1	ug/L	0.300	1.00
74-95-3	Dibromomethane		46.4	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		39.7	ug/L	0.300	1.00
60-29-7	Ethyl ether		46.6	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	5.00	ug/L	1.50	5.00
100-41-4	Ethylbenzene		46.6	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		48.6	ug/L	0.300	1.00
74-88-4	Iodomethane		244	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	50.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		47.6	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	5.00	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	5.00	ug/L	1.50	5.00
75-09-2	Methylene chloride		42.5	ug/L	3.00	10.0
91-20-3	Naphthalene		47.6	ug/L	0.400	1.00
107-12-0	Propionitrile	U	5.00	ug/L	1.50	5.00
100-42-5	Styrene		48.0	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		47.8	ug/L	0.300	1.00
108-88-3	Toluene		45.6	ug/L	0.300	1.00
79-01-6	Trichloroethylene		47.1	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		44.9	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	5.00	ug/L	1.50	5.00
108-05-4	Vinyl acetate		253	ug/L	1.50	5.00
75-01-4	Vinyl chloride		42.0	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		46.3	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		48.0	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		95.5	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4430	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		48.6	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		47.1	ug/L	0.300	1.00
95-47-6	o-Xylene		47.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		48.8	ug/L	0.300	1.00

**Volatile  
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Sample Summary**

<b>SDG Number:</b>	2013-947	<b>Date Collected:</b>	06/11/2013 09:47	<b>Matrix:</b>	W
<b>Lab Sample ID:</b>	1202896534	<b>Date Received:</b>	06/13/2013 08:45		
<b>Client Sample:</b>	QC for batch 1309640	<b>Client:</b>	ARSL001	<b>Project:</b>	QC
<b>Client ID:</b>	CALA-13-33427PS	<b>Method:</b>	SW846 8260B DOE-AL	<b>SOP Ref:</b>	GL-OA-E-038
<b>Batch ID:</b>	1309640	<b>Inst:</b>	VOA9.I	<b>Dilution:</b>	1
<b>Run Date:</b>	06/21/2013 15:14	<b>Analyst:</b>	RXY1	<b>Purge Vol:</b>	5 mL
<b>Prep Date:</b>	06/21/2013 15:14				
<b>Data File:</b>	062113V9\9R519.D	<b>Column:</b>	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		43.8	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		49.1	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		45.7	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		47.7	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	47.0	50.0	94.1	(78%-124%)
Bromofluorobenzene	46.8	50.0	93.6	(80%-120%)
Toluene-d8	48.4	50.0	96.8	(80%-120%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> 2013-947	<b>Date Collected:</b> 06/11/2013 09:47	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1202896535	<b>Date Received:</b> 06/13/2013 08:45	
<b>Client Sample:</b> QC for batch 1309640	<b>Client:</b> ARSL001	<b>Project:</b> QC
<b>Client ID:</b> CALA-13-33427PS	<b>Method:</b> SW846 8260B DOE-AL	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1309640	<b>Inst:</b> VOA9.I	<b>Dilution:</b> 1
<b>Run Date:</b> 06/21/2013 17:01	<b>Analyst:</b> RXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 06/21/2013 17:01		
<b>Data File:</b> 062113V9\9R523.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	1.00	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	1.00	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	1.00	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	1.00	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	1.00	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	1.00	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	1.00	ug/L	0.300	1.00
106-93-4	1,2-Dibromoethane	U	1.00	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	1.00	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	1.00	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
78-93-3	2-Butanone	U	5.00	ug/L	2.00	5.00
126-99-8	2-Chloro-1,3-butadiene		45.5	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	1.00	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	5.00	ug/L	2.20	5.00
106-43-4	4-Chlorotoluene	U	1.00	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	1.00	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	5.00	ug/L	1.50	5.00
67-64-1	Acetone	U	10.0	ug/L	3.00	10.0
75-05-8	Acetonitrile	U	25.0	ug/L	8.00	25.0
107-02-8	Acrolein		231	ug/L	1.50	5.00
107-13-1	Acrylonitrile		247	ug/L	1.50	5.00
107-05-1	Allyl chloride		251	ug/L	1.50	5.00
71-43-2	Benzene	U	1.00	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	1.00	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	1.00	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	1.00	ug/L	0.300	1.00
75-25-2	Bromoform	U	1.00	ug/L	0.300	1.00

**Volatile  
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Sample Summary**

<b>SDG Number:</b>	<b>2013-947</b>	<b>Date Collected:</b>	<b>06/11/2013 09:47</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1202896535</b>	<b>Date Received:</b>	<b>06/13/2013 08:45</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CALA-13-33427PS</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>06/21/2013 17:01</b>	<b>Analyst:</b>	<b>RXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>06/21/2013 17:01</b>				
<b>Data File:</b>	<b>062113V9\9R523.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	1.00	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	5.00	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	1.00	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	1.00	ug/L	0.300	1.00
75-00-3	Chloroethane	U	1.00	ug/L	0.300	1.00
67-66-3	Chloroform	U	1.00	ug/L	0.300	1.00
74-87-3	Chloromethane	U	1.00	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	1.00	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	1.00	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	1.00	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	1.00	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		276	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	1.00	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	1.00	ug/L	0.300	1.00
74-88-4	Iodomethane	U	5.00	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2370	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	1.00	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		245	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		250	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	10.0	ug/L	3.00	10.0
91-20-3	Naphthalene	U	1.00	ug/L	0.400	1.00
107-12-0	Propionitrile		249	ug/L	1.50	5.00
100-42-5	Styrene	U	1.00	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	1.00	ug/L	0.300	1.00
108-88-3	Toluene	U	1.00	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	1.00	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	1.00	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		275	ug/L	1.50	5.00
108-05-4	Vinyl acetate	U	5.00	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	1.00	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	2.00	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	50.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	1.00	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	1.00	ug/L	0.300	1.00
95-47-6	o-Xylene	U	1.00	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	1.00	ug/L	0.300	1.00

**Volatile**  
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**Sample Summary**

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<b>SDG Number:</b>	<b>2013-947</b>	<b>Date Collected:</b>	<b>06/11/2013 09:47</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1202896535</b>	<b>Date Received:</b>	<b>06/13/2013 08:45</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CALA-13-33427PS</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>06/21/2013 17:01</b>	<b>Analyst:</b>	<b>RXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>06/21/2013 17:01</b>				
<b>Data File:</b>	<b>062113V9\9R523.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	1.00	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	1.00	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.4	50.0	ug/L 98.9	(78%-124%)
Bromofluorobenzene	50.1	50.0	ug/L 100	(80%-120%)
Toluene-d8	49.9	50.0	ug/L 99.9	(80%-120%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b>	<b>2013-947</b>	<b>Date Collected:</b>	<b>06/11/2013 09:47</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1202896538</b>	<b>Date Received:</b>	<b>06/13/2013 08:45</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CALA-13-33427PSD</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>06/21/2013 15:40</b>	<b>Analyst:</b>	<b>RXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>06/21/2013 15:40</b>				
<b>Data File:</b>	<b>062113V9\9R520.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		50.4	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		48.0	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		45.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		45.5	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		45.5	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		46.5	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		46.5	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		47.3	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		45.4	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		46.4	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		46.3	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		56.9	ug/L	0.300	1.00
106-93-4	1,2-Dibromoethane		46.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		44.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		45.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		45.9	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		45.9	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		45.4	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		44.6	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		45.0	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		48.3	ug/L	0.300	1.00
78-93-3	2-Butanone		209	ug/L	2.00	5.00
126-99-8	2-Chloro-1,3-butadiene	U	1.00	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		45.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		221	ug/L	2.20	5.00
106-43-4	4-Chlorotoluene		44.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		48.1	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		230	ug/L	1.50	5.00
67-64-1	Acetone		185	ug/L	3.00	10.0
75-05-8	Acetonitrile		1070	ug/L	8.00	25.0
107-02-8	Acrolein	U	5.00	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	5.00	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	5.00	ug/L	1.50	5.00
71-43-2	Benzene		44.6	ug/L	0.300	1.00
108-86-1	Bromobenzene		44.5	ug/L	0.300	1.00
74-97-5	Bromochloromethane		46.1	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		49.9	ug/L	0.300	1.00
75-25-2	Bromoform		52.5	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b>	<b>2013-947</b>	<b>Date Collected:</b>	<b>06/11/2013 09:47</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1202896538</b>	<b>Date Received:</b>	<b>06/13/2013 08:45</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CALA-13-33427PSD</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>06/21/2013 15:40</b>	<b>Analyst:</b>	<b>RXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>06/21/2013 15:40</b>				
<b>Data File:</b>	<b>062113V9\9R520.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		38.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		254	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		49.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		44.6	ug/L	0.300	1.00
75-00-3	Chloroethane		41.1	ug/L	0.300	1.00
67-66-3	Chloroform		45.9	ug/L	0.300	1.00
74-87-3	Chloromethane		41.4	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		52.2	ug/L	0.300	1.00
74-95-3	Dibromomethane		46.8	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		39.7	ug/L	0.300	1.00
60-29-7	Ethyl ether		47.3	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	5.00	ug/L	1.50	5.00
100-41-4	Ethylbenzene		46.3	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		46.4	ug/L	0.300	1.00
74-88-4	Iodomethane		243	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	50.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		46.3	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	5.00	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	5.00	ug/L	1.50	5.00
75-09-2	Methylene chloride		42.3	ug/L	3.00	10.0
91-20-3	Naphthalene		48.5	ug/L	0.400	1.00
107-12-0	Propionitrile	U	5.00	ug/L	1.50	5.00
100-42-5	Styrene		48.0	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.7	ug/L	0.300	1.00
108-88-3	Toluene		45.6	ug/L	0.300	1.00
79-01-6	Trichloroethylene		47.9	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		45.1	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	5.00	ug/L	1.50	5.00
108-05-4	Vinyl acetate		257	ug/L	1.50	5.00
75-01-4	Vinyl chloride		41.2	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		46.3	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		48.7	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		94.3	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4700	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		47.0	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		46.0	ug/L	0.300	1.00
95-47-6	o-Xylene		46.5	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		46.9	ug/L	0.300	1.00



**Volatile  
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Sample Summary**

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<b>SDG Number:</b>	2013-947	<b>Date Collected:</b>	06/11/2013 09:47	<b>Matrix:</b>	W
<b>Lab Sample ID:</b>	1202896538	<b>Date Received:</b>	06/13/2013 08:45		
<b>Client Sample:</b>	QC for batch 1309640	<b>Client:</b>	ARSL001	<b>Project:</b>	QC
<b>Client ID:</b>	CALA-13-33427PSD	<b>Method:</b>	SW846 8260B DOE-AL	<b>SOP Ref:</b>	GL-OA-E-038
<b>Batch ID:</b>	1309640	<b>Inst:</b>	VOA9.I	<b>Dilution:</b>	1
<b>Run Date:</b>	06/21/2013 15:40	<b>Analyst:</b>	RXY1	<b>Purge Vol:</b>	5 mL
<b>Prep Date:</b>	06/21/2013 15:40				
<b>Data File:</b>	062113V9\9R520.D	<b>Column:</b>	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		44.9	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		47.8	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		45.7	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		48.4	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	47.7	50.0	ug/L 95.3	(78%-124%)
Bromofluorobenzene	48.7	50.0	ug/L 97.5	(80%-120%)
Toluene-d8	49.9	50.0	ug/L 99.8	(80%-120%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b>	<b>2013-947</b>	<b>Date Collected:</b>	<b>06/11/2013 09:47</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1202896539</b>	<b>Date Received:</b>	<b>06/13/2013 08:45</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CALA-13-33427PSD</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>06/21/2013 17:29</b>	<b>Analyst:</b>	<b>RXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>06/21/2013 17:29</b>				
<b>Data File:</b>	<b>062113V9\9R524.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	1.00	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	1.00	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	1.00	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	1.00	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	1.00	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	1.00	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	1.00	ug/L	0.300	1.00
106-93-4	1,2-Dibromoethane	U	1.00	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	1.00	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	1.00	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
78-93-3	2-Butanone	U	5.00	ug/L	2.00	5.00
126-99-8	2-Chloro-1,3-butadiene		42.0	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	1.00	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	5.00	ug/L	2.20	5.00
106-43-4	4-Chlorotoluene	U	1.00	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	1.00	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	5.00	ug/L	1.50	5.00
67-64-1	Acetone	U	10.0	ug/L	3.00	10.0
75-05-8	Acetonitrile	U	25.0	ug/L	8.00	25.0
107-02-8	Acrolein		194	ug/L	1.50	5.00
107-13-1	Acrylonitrile		207	ug/L	1.50	5.00
107-05-1	Allyl chloride		227	ug/L	1.50	5.00
71-43-2	Benzene	U	1.00	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	1.00	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	1.00	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	1.00	ug/L	0.300	1.00
75-25-2	Bromoform	U	1.00	ug/L	0.300	1.00

**Volatile  
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Sample Summary**

<b>SDG Number:</b>	<b>2013-947</b>	<b>Date Collected:</b>	<b>06/11/2013 09:47</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1202896539</b>	<b>Date Received:</b>	<b>06/13/2013 08:45</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CALA-13-33427PSD</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>06/21/2013 17:29</b>	<b>Analyst:</b>	<b>RXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>06/21/2013 17:29</b>				
<b>Data File:</b>	<b>062113V9\9R524.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	1.00	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	5.00	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	1.00	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	1.00	ug/L	0.300	1.00
75-00-3	Chloroethane	U	1.00	ug/L	0.300	1.00
67-66-3	Chloroform	U	1.00	ug/L	0.300	1.00
74-87-3	Chloromethane	U	1.00	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	1.00	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	1.00	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	1.00	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	1.00	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		229	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	1.00	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	1.00	ug/L	0.300	1.00
74-88-4	Iodomethane	U	5.00	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2030	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	1.00	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		205	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		218	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	10.0	ug/L	3.00	10.0
91-20-3	Naphthalene	U	1.00	ug/L	0.400	1.00
107-12-0	Propionitrile		204	ug/L	1.50	5.00
100-42-5	Styrene	U	1.00	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	1.00	ug/L	0.300	1.00
108-88-3	Toluene	U	1.00	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	1.00	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	1.00	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		256	ug/L	1.50	5.00
108-05-4	Vinyl acetate	U	5.00	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	1.00	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	2.00	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	50.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	1.00	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	1.00	ug/L	0.300	1.00
95-47-6	o-Xylene	U	1.00	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	1.00	ug/L	0.300	1.00

**Volatile**  
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**Sample Summary**

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<b>SDG Number:</b>	<b>2013-947</b>	<b>Date Collected:</b>	<b>06/11/2013 09:47</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1202896539</b>	<b>Date Received:</b>	<b>06/13/2013 08:45</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CALA-13-33427PSD</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>06/21/2013 17:29</b>	<b>Analyst:</b>	<b>RXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>06/21/2013 17:29</b>				
<b>Data File:</b>	<b>062113V9\9R524.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	1.00	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	1.00	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	47.8	50.0	ug/L 95.6	(78%-124%)
Bromofluorobenzene	51.7	50.0	ug/L 103	(80%-120%)
Toluene-d8	47.8	50.0	ug/L 95.6	(80%-120%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> 2013-947	<b>Matrix:</b> GROUND WATER
<b>Lab Sample ID:</b> 1202896540	
<b>Client Sample:</b> QC for batch 1309640	<b>Client:</b> ARSL001
<b>Client ID:</b> LCS for batch 1309640	<b>Method:</b> SW846 8260B DOE-AL
<b>Batch ID:</b> 1309640	<b>Project:</b> QC
<b>Run Date:</b> 06/21/2013 08:00	<b>SOP Ref:</b> GL-OA-E-038
<b>Prep Date:</b> 06/21/2013 08:00	<b>Dilution:</b> 1
<b>Data File:</b> 062113V9\9R503L1.D	<b>Purge Vol:</b> 5 mL
	<b>Analyst:</b> RXY1
	<b>Column:</b> DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		55.1	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		55.4	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.0	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.6	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		50.4	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		51.5	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		51.8	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		50.2	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		48.8	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		51.1	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		51.0	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		59.3	ug/L	0.300	1.00
106-93-4	1,2-Dibromoethane		50.0	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		48.4	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		50.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		48.6	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		50.9	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		49.5	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		46.7	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		49.7	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		57.0	ug/L	0.300	1.00
78-93-3	2-Butanone		265	ug/L	2.00	5.00
126-99-8	2-Chloro-1,3-butadiene	U	1.00	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		48.9	ug/L	0.300	1.00
591-78-6	2-Hexanone		250	ug/L	2.20	5.00
106-43-4	4-Chlorotoluene		48.7	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		52.6	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		236	ug/L	1.50	5.00
67-64-1	Acetone		272	ug/L	3.00	10.0
75-05-8	Acetonitrile		1110	ug/L	8.00	25.0
107-02-8	Acrolein	U	5.00	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	5.00	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	5.00	ug/L	1.50	5.00
71-43-2	Benzene		47.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.0	ug/L	0.300	1.00
74-97-5	Bromochloromethane		50.1	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		54.2	ug/L	0.300	1.00
75-25-2	Bromoform		58.7	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b>	<b>2013-947</b>	<b>Matrix:</b>	<b>GROUND WATER</b>
<b>Lab Sample ID:</b>	<b>1202896540</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>
<b>Client ID:</b>	<b>LCS for batch 1309640</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>
<b>Run Date:</b>	<b>06/21/2013 08:00</b>	<b>Analyst:</b>	<b>RXY1</b>
<b>Prep Date:</b>	<b>06/21/2013 08:00</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Data File:</b>	<b>062113V9\9R503L1.D</b>	<b>Column:</b>	<b>DB-624</b>

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		43.5	ug/L	0.300	1.00
75-15-0	Carbon disulfide		273	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		57.4	ug/L	0.300	1.00
108-90-7	Chlorobenzene		48.7	ug/L	0.300	1.00
75-00-3	Chloroethane		44.1	ug/L	0.300	1.00
67-66-3	Chloroform		50.6	ug/L	0.300	1.00
74-87-3	Chloromethane		43.3	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		56.1	ug/L	0.300	1.00
74-95-3	Dibromomethane		50.3	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		42.3	ug/L	0.300	1.00
60-29-7	Ethyl ether		49.6	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	5.00	ug/L	1.50	5.00
100-41-4	Ethylbenzene		50.2	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		51.1	ug/L	0.300	1.00
74-88-4	Iodomethane		264	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	50.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		50.5	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	5.00	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	5.00	ug/L	1.50	5.00
75-09-2	Methylene chloride		44.7	ug/L	3.00	10.0
91-20-3	Naphthalene		49.4	ug/L	0.400	1.00
107-12-0	Propionitrile	U	5.00	ug/L	1.50	5.00
100-42-5	Styrene		52.0	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		51.1	ug/L	0.300	1.00
108-88-3	Toluene		48.8	ug/L	0.300	1.00
79-01-6	Trichloroethylene		51.2	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		51.4	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	5.00	ug/L	1.50	5.00
108-05-4	Vinyl acetate		288	ug/L	1.50	5.00
75-01-4	Vinyl chloride		45.5	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		51.3	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		54.0	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		102	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4990	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		52.0	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		49.6	ug/L	0.300	1.00
95-47-6	o-Xylene		49.8	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		50.8	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

Page 3 of 3

<b>SDG Number:</b> 2013-947		<b>Matrix:</b>	GROUND WATER
<b>Lab Sample ID:</b> 1202896540			
<b>Client Sample:</b> QC for batch 1309640	<b>Client:</b> ARSL001	<b>Project:</b>	QC
<b>Client ID:</b> LCS for batch 1309640	<b>Method:</b> SW846 8260B DOE-AL	<b>SOP Ref:</b>	GL-OA-E-038
<b>Batch ID:</b> 1309640	<b>Inst:</b> VOA9.I	<b>Dilution:</b>	1
<b>Run Date:</b> 06/21/2013 08:00	<b>Analyst:</b> RXY1	<b>Purge Vol:</b>	5 mL
<b>Prep Date:</b> 06/21/2013 08:00			
<b>Data File:</b> 062113V9\9R503L1.D	<b>Column:</b> DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		50.1	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		51.8	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		50.6	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		53.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.9	50.0	ug/L	99.7	(78%-124%)
Bromofluorobenzene	49.0	50.0	ug/L	98.1	(80%-120%)
Toluene-d8	49.0	50.0	ug/L	98.0	(80%-120%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> 2013-947	<b>Matrix:</b> GROUND WATER
<b>Lab Sample ID:</b> 1202896541	
<b>Client Sample:</b> QC for batch 1309640	<b>Client:</b> ARSL001
<b>Client ID:</b> LCS for batch 1309640	<b>Method:</b> SW846 8260B DOE-AL
<b>Batch ID:</b> 1309640	<b>Project:</b> QC
<b>Run Date:</b> 06/21/2013 08:54	<b>SOP Ref:</b> GL-OA-E-038
<b>Prep Date:</b> 06/21/2013 08:54	<b>Dilution:</b> 1
<b>Data File:</b> 062113V9\9R505L1.D	<b>Purge Vol:</b> 5 mL
	<b>Analyst:</b> RXY1
	<b>Column:</b> DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	1.00	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	1.00	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	1.00	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	1.00	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	1.00	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	1.00	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	1.00	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	1.00	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	1.00	ug/L	0.300	1.00
106-93-4	1,2-Dibromoethane	U	1.00	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	1.00	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	1.00	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	1.00	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	1.00	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	1.00	ug/L	0.300	1.00
78-93-3	2-Butanone	U	5.00	ug/L	2.00	5.00
126-99-8	2-Chloro-1,3-butadiene		46.3	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	1.00	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	5.00	ug/L	2.20	5.00
106-43-4	4-Chlorotoluene	U	1.00	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	1.00	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	5.00	ug/L	1.50	5.00
67-64-1	Acetone	U	10.0	ug/L	3.00	10.0
75-05-8	Acetonitrile	U	25.0	ug/L	8.00	25.0
107-02-8	Acrolein		236	ug/L	1.50	5.00
107-13-1	Acrylonitrile		231	ug/L	1.50	5.00
107-05-1	Allyl chloride		237	ug/L	1.50	5.00
71-43-2	Benzene	U	1.00	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	1.00	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	1.00	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	1.00	ug/L	0.300	1.00
75-25-2	Bromoform	U	1.00	ug/L	0.300	1.00



**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> 2013-947		<b>Matrix:</b>	<b>GROUND WATER</b>
<b>Lab Sample ID:</b> 1202896541			
<b>Client Sample:</b> QC for batch 1309640	<b>Client:</b> ARSL001	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b> LCS for batch 1309640	<b>Method:</b> SW846 8260B DOE-AL	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b> 1309640	<b>Inst:</b> VOA9.I	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b> 06/21/2013 08:54	<b>Analyst:</b> RXY1	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b> 06/21/2013 08:54			
<b>Data File:</b> 062113V9\9R505L1.D	<b>Column:</b> DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	1.00	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	5.00	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	1.00	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	1.00	ug/L	0.300	1.00
75-00-3	Chloroethane	U	1.00	ug/L	0.300	1.00
67-66-3	Chloroform	U	1.00	ug/L	0.300	1.00
74-87-3	Chloromethane	U	1.00	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	1.00	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	1.00	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	1.00	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	1.00	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		262	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	1.00	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	1.00	ug/L	0.300	1.00
74-88-4	Iodomethane	U	5.00	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2370	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	1.00	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		229	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		249	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	10.0	ug/L	3.00	10.0
91-20-3	Naphthalene	U	1.00	ug/L	0.400	1.00
107-12-0	Propionitrile		237	ug/L	1.50	5.00
100-42-5	Styrene	U	1.00	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	1.00	ug/L	0.300	1.00
108-88-3	Toluene	U	1.00	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	1.00	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	1.00	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		270	ug/L	1.50	5.00
108-05-4	Vinyl acetate	U	5.00	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	1.00	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	2.00	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	50.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	1.00	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	1.00	ug/L	0.300	1.00
95-47-6	o-Xylene	U	1.00	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	1.00	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b>	<b>2013-947</b>	<b>Matrix:</b>	<b>GROUND WATER</b>
<b>Lab Sample ID:</b>	<b>1202896541</b>		
<b>Client Sample:</b>	<b>QC for batch 1309640</b>	<b>Client:</b>	<b>ARSL001</b>
<b>Client ID:</b>	<b>LCS for batch 1309640</b>	<b>Method:</b>	<b>SW846 8260B DOE-AL</b>
<b>Batch ID:</b>	<b>1309640</b>	<b>Inst:</b>	<b>VOA9.I</b>
<b>Run Date:</b>	<b>06/21/2013 08:54</b>	<b>Analyst:</b>	<b>RXY1</b>
<b>Prep Date:</b>	<b>06/21/2013 08:54</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Data File:</b>	<b>062113V9\9R505L1.D</b>	<b>Column:</b>	<b>DB-624</b>

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	1.00	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	1.00	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	1.00	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	1.00	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.1	50.0	ug/L 104	(78%-124%)
Bromofluorobenzene	53.5	50.0	ug/L 107	(80%-120%)
Toluene-d8	50.2	50.0	ug/L 100	(80%-120%)

# **Perchlorates by LCMSMS Analysis**

# Case Narrative

**Perchlorate by LC-MS/MS  
ARS International (ARSL)  
SDG 2013-947**

**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: 1308476

Prep Batch Number: 1308475

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
327527002	CALA-13-33435
1202893411	Interference Check Sample (ICS)
1202893407	Method Blank (MB)
1202893408	Laboratory Control Sample (LCS)
1202893409	327623002(CAPU-13-34783) Matrix Spike (MS)
1202893410	327623002(CAPU-13-34783) Matrix Spike Duplicate (MSD)

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

**Preparation/Analytical Method Verification**

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP).

The data discussed in this narrative has been analyzed in accordance with GL-OA-E-067 REV# 10.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

Due to software constraints, all Initial Calibration Blanks must be designated as IPB001.

**ICV Requirements**

The initial calibration verification standard (ICV) met the acceptance criteria.

**CCB Requirements**

All continuing calibration blanks (CCB) bracketing the analyses associated with this batch were within acceptance criteria.

**CCV Requirements**

All continuing calibration checks (CCV) requirements were met by all bracketing CCV standards.

**Low Level Standard (CRI) Requirements**

All low level calibration verification (CRI) requirements were met by all bracketing CRI standards.

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

The MB analyzed with this SDG met the acceptance criteria.

**Interference Check Sample (ICS)**

The ICS met all recovery acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**QC Sample Designation**

Client sample 327623002 (CAPU-13-34783) from SDG 2013-952 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**

Sample 327527002 (CALA-13-33435) was diluted to bring the over range concentration within the calibration range.

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

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

## **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: 2013-947 GEL Work Order: 327527

#### 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: 01 JUL 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: 1308475Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CALA-13-33435Date Received: 13-JUN-13GEL Job No (SDG): 2013-947GEL Sample ID: 327527002Date Filtered: 19-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	.5	2	5.48	ug/L		10	19-JUN-13 15:49	per0619028a
	Perchlorate Isotope Ratio			3.12			10	19-JUN-13 15:49	per0619028a
14797-73-0	Perchlorate-101	.5	2	5.42	ug/L		10	19-JUN-13 15:49	per0619028a
	Perchlorate-O(18)			4.96	ug/L		10	19-JUN-13 15:49	per0619028a

^ 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): 2013-947

Extract Batch Code: 1308475

Date Filtered: 19-JUN-13

Matrix: WATER

Sample ID: 1202893408

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.188	ug/L	94.1		85 - 115
Perchlorate Isotope Ratio		3.08				-
Perchlorate-101	0.200	.188	ug/L	94.2		85 - 115
Perchlorate-O(18)		.494	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):** 2013-947

**Extract Batch Code:** 1308475

**Date Extracted:** 19-JUN-13

**GEL MS/PS ID:** 1202893409

**Client ID:** CAPU-13-34783

**GEL MSD/PSD ID:** 1202893410

**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	0.338	ug/L	0.516	89.3	.528	95.4	2.33	30	75 - 125
Perchlorate Isotope Ratio	0	3.10		3.14		3.1		.995		-
Perchlorate-101	0.200	0.336	ug/L	0.508	85.8	.525	94.4	3.32	30	75 - 125
Perchlorate-O(18)	0	0.475	ug/L	0.471		.479		1.7		-

^ 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: 1308475Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 19-JUN-13GEL Job No (SDG): 2013-947GEL Sample ID: 1202893407Date Filtered: 19-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	19-JUN-13 13:41	per0619012a
	Perchlorate Isotope Ratio						1	19-JUN-13 13:41	per0619012a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	19-JUN-13 13:41	per0619012a
	Perchlorate-O(18)			0.484	ug/L		1	19-JUN-13 13:41	per0619012a

^ 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: 1308475Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 19-JUN-13GEL Job No (SDG): 2013-947GEL Sample ID: 1202893408Date Filtered: 19-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	0.188	ug/L	J	1	19-JUN-13 13:49	per0619013a
	Perchlorate Isotope Ratio			3.08			1	19-JUN-13 13:49	per0619013a
14797-73-0	Perchlorate-101	.05	.2	0.188	ug/L	J	1	19-JUN-13 13:49	per0619013a
	Perchlorate-O(18)			0.494	ug/L		1	19-JUN-13 13:49	per0619013a

^ 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: 1308475Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2013-947GEL Sample ID: 1202893411Date Filtered: 19-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		1	19-JUN-13 13:57	per0619014a
	Perchlorate Isotope Ratio			3.04			1	19-JUN-13 13:57	per0619014a
14797-73-0	Perchlorate-101	.05	.2	0.203	ug/L		1	19-JUN-13 13:57	per0619014a
	Perchlorate-O(18)			0.515	ug/L		1	19-JUN-13 13:57	per0619014a

^ 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: 1308475Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPU-13-34783MSDate Received: 14-JUN-13GEL Job No (SDG): 2013-947GEL Sample ID: 1202893409Date Filtered: 19-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	0.516	ug/L		1	19-JUN-13 14:29	per0619018a
	Perchlorate Isotope Ratio			3.14			1	19-JUN-13 14:29	per0619018a
14797-73-0	Perchlorate-101	.05	.2	0.508	ug/L		1	19-JUN-13 14:29	per0619018a
	Perchlorate-O(18)			0.471	ug/L		1	19-JUN-13 14:29	per0619018a

^ 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: 1308475Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPU-13-34783MSDDate Received: 14-JUN-13GEL Job No (SDG): 2013-947GEL Sample ID: 1202893410Date Filtered: 19-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	0.528	ug/L		1	19-JUN-13 14:37	per0619019a
	Perchlorate Isotope Ratio			3.1			1	19-JUN-13 14:37	per0619019a
14797-73-0	Perchlorate-101	.05	.2	0.525	ug/L		1	19-JUN-13 14:37	per0619019a
	Perchlorate-O(18)			0.479	ug/L		1	19-JUN-13 14:37	per0619019a

^ 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 2013-947**

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
327527002	CALA-13-33435
1202891767	Method Blank (MB) <b>ICP</b>
1202891768	Laboratory Control Sample (LCS)
1202891771	327527002(CALA-13-33435L) Serial Dilution (SD)
1202891769	327527002(CALA-13-33435D) Sample Duplicate (DUP)
1202891770	327527002(CALA-13-33435S) Matrix Spike (MS)
1202891762	Method Blank (MB) <b>ICP-MS</b>
1202891763	Laboratory Control Sample (LCS)
1202891766	327527002(CALA-13-33435L) Serial Dilution (SD)
1202891764	327527002(CALA-13-33435D) Sample Duplicate (DUP)
1202891765	327527002(CALA-13-33435S) Matrix Spike (MS)
1202891612	Method Blank (MB) <b>CVAA</b>
1202891613	Laboratory Control Sample (LCS)
1202891616	327527002(CALA-13-33435L) Serial Dilution (SD)
1202891614	327527002(CALA-13-33435D) Sample Duplicate (DUP)
1202891615	327527002(CALA-13-33435S) Matrix Spike (MS)

**Method/Analysis Information**

<b>Analytical Batch:</b>	1307832, 1307830, 1307771 and 1312560
<b>Prep Batch :</b>	1307831, 1307829 and 1307769
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 22, GL-MA-E-006 REV# 9, GL-MA-E-014 REV# 25, GL-MA-E-010 REV# 26 and GL-GC-E-107 REV# 8
<b>Analytical Method:</b>	SW846 3005/6010B, SW846 3005/6020 DOE-AL, EPA 245.1/245.2 and SM 2340 B
<b>Prep Method :</b>	SW846 3005A and EPA 245.1/245.2 Prep

## **Preparation/Analytical Method Verification**

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

### **System Configuration**

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

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

The Metals analysis-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

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

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

### **Calibration Information**

#### **Instrument Calibration**

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



**CRDL Requirements**

All CRDL standards met the advisory control limits with the exception of zinc, which recovered outside of the advisory control limits of 70%-130%.

**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: 327527002 (CALA-13-33435).

**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: 07/08/13

# **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: 2013-947 GEL Work Order: 327527

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

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

J Value is estimated

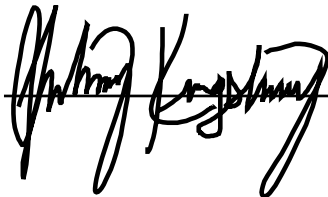
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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



07/08/13

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

**SDG No:** 2013-947**CONTRACT:** ESHL00210**METHOD TYPE:** EPA**SAMPLE ID:** 327527002**BASIS:** As Received**DATE COLLECTED** 11-JUN-13**CLIENT ID:** CALA-13-33435**LEVEL:** Low**DATE RECEIVED** 13-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	06/18/13 10:31	061813W1-5	1307771

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

SDG No: 2013-947

CONTRACT: ESHL00210

METHOD TYPE: SW846

SAMPLE ID: 327527002

BASIS: As Received

DATE COLLECTED 11-JUN-13

CLIENT ID: CALA-13-33435

LEVEL: Low

DATE RECEIVED 13-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	06/20/13 11:16	062013C-1	1307832
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	06/25/13 03:27	130624-3	1307830
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	BAJ	06/25/13 03:27	130624-3	1307830
7440-39-3	Barium	47.8	ug/L		1	5	5	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7440-42-8	Boron	26.7	ug/L	J	15	50	50	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	BAJ	06/25/13 03:27	130624-3	1307830
7440-70-2	Calcium	27900	ug/L		50	200	200	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7440-47-3	Chromium	2	ug/L	J	2	10	10	1	MS	BAJ	06/25/13 03:27	130624-3	1307830
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	06/25/13 03:27	130624-3	1307830
7439-95-4	Magnesium	7760	ug/L		110	300	300	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7439-98-7	Molybdenum	2.3	ug/L		0.165	0.5	0.5	1	MS	BAJ	06/25/13 03:27	130624-3	1307830
7440-02-0	Nickel	1.31	ug/L	J	0.5	2	2	1	MS	BAJ	06/25/13 03:27	130624-3	1307830
7440-09-7	Potassium	4660	ug/L		50	150	150	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7782-49-2	Selenium	1.68	ug/L	J	1.5	5	5	1	MS	BAJ	06/25/13 03:27	130624-3	1307830
7631-86-9	Silica	42400	ug/L		53	213	213	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	BAJ	06/25/13 03:27	130624-3	1307830
7440-23-5	Sodium	16000	ug/L		100	300	300	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7440-24-6	Strontium	135	ug/L		1	5	5	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	BAJ	06/25/13 03:27	130624-3	1307830
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	06/20/13 12:37	062013C-2	1307832
7440-61-1	Uranium	2.06	ug/L		0.067	0.2	0.2	1	MS	BAJ	06/25/13 14:48	130625-4	1307830
7440-62-2	Vanadium	6.63	ug/L		1	5	5	1	P	HSC	06/20/13 11:16	062013C-1	1307832
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	06/20/13 11:16	062013C-1	1307832

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

**SDG No:** 2013-947**CONTRACT:** ESHL00210**METHOD TYPE:****SAMPLE ID:** 327527002      **BASIS:** As Received      **DATE COLLECTED** 11-JUN-13**CLIENT ID:** CALA-13-33435      **LEVEL:** Low      **DATE RECEIVED** 13-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	102	mg/L		0.453	1.24	1.24	1		JJ2	07/04/13 16:37		1312560

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1307771	1307769	EPA 245.1/245.2 Prep	20	mL	20	mL	06/17/13	AXS5
1307830	1307829	SW846 3005A	50	mL	50	mL	06/19/13	AXG2
1307832	1307831	SW846 3005A	50	mL	50	mL	06/19/13	AXG2

**\*Analytical Methods:**

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



# **Quality Control Summary**

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

**SDG NO.** 2013-947  
**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>
1202891612	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2
1202891762	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	0.165	ug/L	+/-0.5	U	MS	0.165	0.5
	Selenium	1.5	ug/L	+/-5	U	MS	1.5	5
	Silver	0.2	ug/L	+/-1	U	MS	0.2	1
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Thallium	0.45	ug/L	+/-2	U	MS	0.45	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1202891767	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	63.5	ug/L	+/-150	J	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10

**\*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. 2013-947

Client ID: CALA-13-33435S

Contract: ESHL00210

Level: Low

Matrix: WATER

% Solids:

Sample ID: 327527002

Spike ID: 1202891615

<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	2.01		0.067	U	2	100		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2013-947 Client ID: CALA-13-33435S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 327527002 Spike ID: 1202891765

<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	51		1	U	50	102		MS
Arsenic	ug/L	75-125	52.4		1.7	U	50	102		MS
Cadmium	ug/L	75-125	51		0.11	U	50	102		MS
Chromium	ug/L	75-125	50.7		2	J	50	97.4		MS
Lead	ug/L	75-125	49.9		0.5	U	50	99		MS
Molybdenum	ug/L	75-125	50.4		2.3		50	96.2		MS
Nickel	ug/L	75-125	50.3		1.31	J	50	98		MS
Selenium	ug/L	75-125	52.5		1.68	J	50	102		MS
Silver	ug/L	75-125	51.3		0.2	U	50	103		MS
Thallium	ug/L	75-125	47.4		0.45	U	50	94.8		MS
Uranium	ug/L	75-125	53.7		2.06		50	103		MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2013-947

Client ID: CALA-13-33435S

Contract: ESHL00210

Level: Low

Matrix: WATER

% Solids:

Sample ID: 327527002

Spike ID: 1202891770

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	4980		68	U	5000	99.1		P
Barium	ug/L	75-125	543		47.8		500	99.1		P
Beryllium	ug/L	75-125	499		1	U	500	99.7		P
Boron	ug/L	75-125	524		26.7	J	500	99.5		P
Calcium	ug/L		33600		27900		5000	114	N/A	P
Cobalt	ug/L	75-125	481		1	U	500	96.3		P
Copper	ug/L	75-125	519		3	U	500	104		P
Iron	ug/L	75-125	5040		30	U	5000	101		P
Magnesium	ug/L	75-125	13000		7760		5000	106		P
Manganese	ug/L	75-125	495		2	U	500	99.1		P
Potassium	ug/L	75-125	9710		4660		5000	101		P
Silica	ug/L	75-125	54500		42400		10700	113		P
Sodium	ug/L	75-125	21700		16000		5000	114		P
Strontium	ug/L	75-125	641		135		500	101		P
Tin	ug/L	75-125	503		2.5	U	500	101		P
Vanadium	ug/L	75-125	520		6.63		500	103		P
Zinc	ug/L	75-125	493		3.3	U	500	98.5		P

## \*Analytical Methods:

P SW846 3005/6010B

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

**SDG No.:** 2013–947**Lab Code:** GEL**Contract:** ESHL00210**Client ID:** CALA–13–33435D**Matrix:** LIQUID**Level:** Low**Sample ID:** 327527002**Duplicate ID:** 1202891614**Percent Solids for Dup:** N/A

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

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**\*Analytical Methods:**

AV EPA 245.1/245.2

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

SDG No.: 2013-947

Lab Code: GEL

Contract: ESHL00210

Client ID: CALA-13-33435D

Matrix: LIQUID

Level: Low

Sample ID: 327527002

Duplicate ID: 1202891764

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		1.98 J		200		MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L		2 J		2 U		200		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	2.3		2.24		2.6		MS
Nickel	ug/L	+/- 2	1.31 J		1.2 J		8.69		MS
Selenium	ug/L	+/- 5	1.68 J		1.77 J		4.81		MS
Silver	ug/L		0.2 U		0.2 U				MS
Thallium	ug/L		0.45 U		0.45 U				MS
Uranium	ug/L	+/- 20%	2.06		2.03		1.17		MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

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

SDG No.: 2013–947

Lab Code: GEL

Contract: ESHL00210

Client ID: CALA–13–33435D

Matrix: LIQUID

Level: Low

Sample ID: 327527002

Duplicate ID: 1202891769

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%	47.8		49		2.41		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	26.7 J		29.1 J		8.78		P
Calcium	ug/L	+/-20%	27900		29100		4.09		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	7760		8130		4.67		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	4660		4830		3.43		P
Silica	ug/L	+/-20%	42400		44000		3.72		P
Sodium	ug/L	+/-20%	16000		16600		3.82		P
Strontium	ug/L	+/-20%	135		141		4.32		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	6.63		7.64		14.2		P
Zinc	ug/L		3.3 U		3.3 U				P

\*Analytical Methods:

P SW846 3005/6010B



## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2013-947

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>
1202891613	Mercury	ug/L	2	2.04		102	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2013-947

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>
1202891763								
	Antimony	ug/L	50	50.8		102	80-120	MS
	Arsenic	ug/L	50	49.8		99.7	80-120	MS
	Cadmium	ug/L	50	51.7		103	80-120	MS
	Chromium	ug/L	50	50.1		100	80-120	MS
	Lead	ug/L	50	49.7		99.4	80-120	MS
	Molybdenum	ug/L	50	49.9		99.9	80-120	MS
	Nickel	ug/L	50	51.8		104	80-120	MS
	Selenium	ug/L	50	51.8		104	80-120	MS
	Silver	ug/L	50	54.1		108	80-120	MS
	Thallium	ug/L	50	47.3		94.5	80-120	MS
	Uranium	ug/L	50	51.1		102	80-120	MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2013-947

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>
1202891768								
	Aluminum	ug/L	5000	5210		104	80-120	P
	Barium	ug/L	500	514		103	80-120	P
	Beryllium	ug/L	500	510		102	80-120	P
	Boron	ug/L	500	501		100	80-120	P
	Calcium	ug/L	5000	5200		104	80-120	P
	Cobalt	ug/L	500	503		101	80-120	P
	Copper	ug/L	500	528		106	80-120	P
	Iron	ug/L	5000	5210		104	80-120	P
	Magnesium	ug/L	5000	5310		106	80-120	P
	Manganese	ug/L	500	522		104	80-120	P
	Potassium	ug/L	5000	5310		106	80-120	P
	Silica	ug/L	10700	10800		101	80-120	P
	Sodium	ug/L	5000	5290		106	80-120	P
	Strontium	ug/L	500	521		104	80-120	P
	Tin	ug/L	500	514		103	80-120	P
	Vanadium	ug/L	500	524		105	80-120	P
	Zinc	ug/L	500	514		103	80-120	P

## \*Analytical Methods:

P SW846 3005/6010B

## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 2013-947 **Client ID:** CALA-13-33435L**Contract:** ESHL00210**Matrix:** LIQUID **Level:** Low**Sample ID:** 327527002 **Serial Dilution ID:** 1202891616

<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

-9-

## Serial Dilution Sample Summary

SDG NO. 2013-947

Client ID: CALA-13-33435L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 327527002

Serial Dilution ID: 1202891766

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	1.7	U	8.5	U				MS
Cadmium	.11	U	.55	U				MS
Chromium	2	U	10	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	2.3		2.89		25.4			MS
Nickel	1.31	J	2.5	U	100			MS
Selenium	1.68	J	7.5	U	100			MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.25	U				MS
Uranium	2.06		2.37		15.2			MS

## \*Analytical Methods:

MS SW846 3005/6020 DOE-AL

## METALS

-9-

## Serial Dilution Sample Summary

SDG NO. 2013-947

Client ID: CALA-13-33435L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 327527002

Serial Dilution ID: 1202891771

<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	47.8		48.9		2.35			P
Beryllium	1	U	5	U				P
Boron	26.7	J	75	U	100			P
Calcium	27900		27000		3.49		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	7760		7840		.994		10	P
Manganese	2	U	10	U				P
Potassium	4660		4650		.372		10	P
Silica	42400		41200		2.89		10	P
Sodium	16000		16500		3.24		10	P
Strontium	135		138		1.97		10	P
Tin	2.5	U	12.5	U				P
Vanadium	6.63		8.43	J	27.1			P
Zinc	3.3	U	16.5	U				P

## \*Analytical Methods:

P SW846 3005/6010B

# **General Chem Analysis**

# Case Narrative



**General Chemistry Narrative  
ARS International (ARSL)  
SDG 2013-947**

**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>
327527001	CALA-13-33427
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>
327527002	CALA-13-33435
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>
327527002	CALA-13-33435
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 sample from this sample group was received by the lab outside of the method specified holding time: 327527002 (CALA-13-33435).

**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 327527002 (CALA-13-33435).

**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:** 1307985

**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>
327527002	CALA-13-33435
1202892153	Method Blank (MB)
1202892154	327396001(CAPU-13-34785) Sample Duplicate (DUP)
1202892155	327396001(CAPU-13-34785) Post Spike (PS)
1202892156	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 MBs analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Quality Control (QC) Designation**

The following sample was selected for QC analysis: 327396001 (CAPU-13-34785).

**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 values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1202892154 (CAPU-13-34785).

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The following sample in this sample group was diluted due to high concentration: 327527002 (CALA-13-33435).

**Sample Re-analysis**

The following samples were re-analyzed due to CCV failure: 1202892153 (MB), 1202892154 (CAPU-13-34785), 1202892155 (CAPU-13-34785), 1202892156 (LCS) and 327527002 (CALA-13-33435).

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

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

**Manual Integrations**

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202892154 (CAPU-13-34785), 1202892155 (CAPU-13-34785) and 327527002 (CALA-13-33435).

**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>
327527002	CALA-13-33435
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 following sample was re-analyzed due to CCV failure: 327527002 (CALA-13-33435).

**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>
327527001	CALA-13-33427
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>
327527002	CALA-13-33435
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) and 327527002 (CALA-13-33435).

**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>
327527002	CALA-13-33435
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:** 1308070

**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>
327527002	CALA-13-33435
1202892376	Method Blank (MB)
1202892380	Laboratory Control Sample (LCS)
1202892385	327527002(CALA-13-33435) Sample Duplicate (DUP)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-001 REV# 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: 327527002 (CALA-13-33435).

**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:** 1310345      **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>
327527002	CALA-13-33435
1202898292	Laboratory Control Sample (LCS)
1202898295	327622002(CALA-13-33431) Sample Duplicate (DUP)
1202898296	327622002(CALA-13-33431) Matrix Spike (MS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 10.

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

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

### **Calibration Information**

The Titration analysis was performed on a Manually operated buret.

### **Initial Standardization**

The titrant was properly standardized

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

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

The LCS spike recovery met the acceptance limits.

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

The following sample was selected for QC analysis: 327622002 (CALA-13-33431).

#### **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:**\_\_\_\_\_

# **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: 2013-947 GEL Work Order: 327527

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

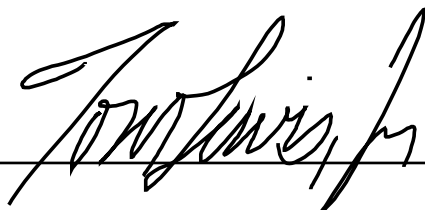
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- E Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J Value is estimated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

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

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

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

Reviewed by

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

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: July 9, 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: 2013-947

Client Sample ID: CALA-13-33427

Sample ID: 327527001

Matrix: W

Collect Date: 11-JUN-13 09:47

Receive Date: 13-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	J	0.959	0.330	1.00	mg/L	1	TSM	06/15/13	0129	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	1119	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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## Certificate of Analysis

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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: 2013-947

Client Sample ID: CALA-13-33435  
Sample ID: 327527002  
Matrix: W  
Collect Date: 11-JUN-13 09:47  
Receive Date: 13-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		309	1.00	1.00	umhos/cm	1	LXA1	06/14/13	1543	1308081	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 19.5C	H	7.70	0.010	0.100	SU	1	LXA1	06/14/13	1502	1308135	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	J	0.142	0.067	0.200	mg/L	1	MAR1	06/26/13	1408	1307985	3
Fluoride		0.485	0.033	0.100	mg/L	1					
Chloride		16.0	0.335	1.00	mg/L	5	MAR1	06/26/13	1438	1307985	4
Sulfate		21.3	0.665	2.00	mg/L	5					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia	J	0.0305	0.017	0.050	mg/L	1	KLP1	06/19/13	1344	1308128	5
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		3.60	0.085	0.250	mg/L	5	KLP1	06/24/13	1140	1308114	6
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P		0.317	0.017	0.050	mg/L	1	KLP1	06/17/13	1558	1307629	7
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		194	3.40	14.3	mg/L		LYG1	06/14/13	1323	1308070	8
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		84.3	0.725	1.00	mg/L		LXA1	06/25/13	1209	1310345	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 9, 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: 2013-947

Client Sample ID: CALA-13-33435  
Sample ID: 327527002

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

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

## QC Summary

Report Date: July 9, 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: 327527

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	1307985										
QC1202892154	327396001	DUP									
Bromide		J	0.0689	U	ND	mg/L	N/A	^		MAR1	06/26/13 12:38
Chloride			3.02		3.03	mg/L	0.522		(0%-20%)		
Fluoride			0.247		0.259	mg/L	4.79	^	(+/-0.100)		
Sulfate			3.99		3.91	mg/L	1.90		(0%-20%)		
QC1202892156	LCS										
Bromide	1.25			1.27	mg/L			(90%-110%)		06/26/13	11:38

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## QC Summary

Workorder: 327527

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1307985										
Chloride	5.00			4.79	mg/L		95.8	(90%-110%)	MAR1	06/26/13	11:38
Fluoride	2.50			2.57	mg/L		103	(90%-110%)			
Sulfate	10.0			10.1	mg/L		101	(90%-110%)			
QC1202892153	MB										
Bromide			U	ND	mg/L					06/26/13	11:08
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1202892155	327396001	PS									
Bromide	1.25	J	0.0689	1.30	mg/L		98.6	(90%-110%)		06/26/13	13:08
Chloride	5.00		3.02	8.11	mg/L		102	(90%-110%)			
Fluoride	2.50		0.247	2.76	mg/L		101	(90%-110%)			
Sulfate	10.0		3.99	14.1	mg/L		101	(90%-110%)			
<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: 327527

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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	1308070										
QC1202892385 327527002 DUP											
Total Dissolved Solids		194		199	mg/L	2.18		(0%-10%)	LYG1	06/14/13	13:23
QC1202892380 LCS											
Total Dissolved Solids	300			304	mg/L		101	(95%-105%)		06/14/13	13:23

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## QC Summary

Workorder: 327527

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Solids Analysis</b>											
Batch	1308070										
QC1202892376	MB										
Total Dissolved Solids			J	7.14	mg/L				LYG1	06/14/13	13:23
<b>Titration Analysis</b>											
Batch	1310345										
QC1202898295	327622002	DUP									
Alkalinity, Total as CaCO3			157	157	mg/L	0.334		(0%-20%)	LXA1	06/25/13	14:21
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1202898292	LCS										
Alkalinity, Total as CaCO3	50.0			52.4	mg/L		105	(90%-110%)		06/25/13	11:36
QC1202898296	327622002	MS									
Alkalinity, Total as CaCO3	50.0		157	207	mg/L		99.5	(80%-120%)		06/25/13	14:23

### 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
- 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

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 327527

Page 5 of 5

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

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> 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.		
<p><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)</p> <p><b>Application Issues:</b></p> <p>Failed RPD for DUP</p>			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Failed RPD for DUP:</p> <p>QC 1202892934DUP</p>		<p>1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample.</p>	

**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 2013-947  
Work Order 327527**

**Method/Analysis Information**

**Product:** Alphaspec Am241 Liquid  
**Analytical Method:** DOE EML HASL-300, Am-05-RC Modified  
**Analytical Batch Number:** 1307462

<b>Sample ID</b>	<b>Client ID</b>
327527001	CALA-13-33427
1202890847	Method Blank (MB)
1202890848	327396002(CAPU-13-34777) Sample Duplicate (DUP)
1202890849	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 1202890847 (MB) and 1202890849 (LCS) were changed to 1.0 per client request.

**Designated QC**

The following sample was used for QC: 327396002 (CAPU-13-34777). The QC was from ARSL work order 327396.

**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**

<b>Product:</b>	<b>Alphaspec Pu, Liquid</b>
Analytical Method:	DOE EML HASL-300, Pu-11-RC Modified
Analytical Batch Number:	1307464

<b>Sample ID</b>	<b>Client ID</b>
327527001	CALA-13-33427
1202890855	Method Blank (MB)
1202890856	327396002(CAPU-13-34777) Sample Duplicate (DUP)
1202890857	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 1202890855 (MB) and 1202890857 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 327396002 (CAPU-13-34777). The QC was from ARSL work order 327396.

#### **QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: Refer to Data Exception Report (DER).

#### **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 1202890855 (MB), 1202890856 (CAPU-13-34777) and 327527001 (CALA-13-33427) were recounted due to high MDCs. The recounts are reported.

### **Miscellaneous Information:**

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

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: DER 1196391 was generated due to RDL less than MDA. 1. The duplicate, 1202890856, did not meet the Pu-239/240 detection limit. 1. When a blank population is performed the MDC may be greater than the RDL due to the high standard deviation. The duplicate does meet the tracer yield requirement and has greater than 400 tracer counts. 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 U, Liquid  
**Analytical Method:** DOE EML HASL-300, U-02-RC Modified  
**Analytical Batch Number:** 1307467

<b>Sample ID</b>	<b>Client ID</b>
327527001	CALA-13-33427
1202890863	Method Blank (MB)
1202890864	327396002(CAPU-13-34777) Sample Duplicate (DUP)
1202890865	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 1202890863 (MB) and 1202890865 (LCS) were changed to 1.0 per client request.

**Designated QC**

The following sample was used for QC: 327396002 (CAPU-13-34777). The QC was from ARSL work order 327396.

**QC Information**

All of the QC samples met the required acceptance limits.

**CSU**

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

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:**                      **Gammasec**

Analytical Method:              EPA 901.1

Analytical Batch Number:      1307967

<b>Sample ID</b>	<b>Client ID</b>
327527001	CALA-13-33427
1202892110	Method Blank (MB)
1202892111	327527001(CALA-13-33427) Sample Duplicate (DUP)
1202892112	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 and 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: 327527001 (CALA-13-33427). The QC was from ARSL work order 327527.

##### **QC Information**

All of the QC samples met the required acceptance limits.

##### **CSU**

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

##### **Holding Time**

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

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

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

#### **Miscellaneous Information:**

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

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

##### **Additional Comments**

Additional comments were not required for this sample set.

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

The blank result is less than the decision level.

#### **Qualifier Information**

Manual qualifiers were not required.



### Method/Analysis Information

**Product:** GFPC, Sr90, liquid

Analytical Method: EPA 905.0 Modified

Analytical Batch Number: 1307879

<b>Sample ID</b>	<b>Client ID</b>
327527001	CALA-13-33427
1202891916	Method Blank (MB)
1202891917	327527001(CALA-13-33427) Sample Duplicate (DUP)
1202891918	327527001(CALA-13-33427) Matrix Spike (MS)
1202891919	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 1202891916 (MB) and 1202891919 (LCS) were changed to 1.0 per client request.

#### **Designated QC**

The following sample was used for QC: 327527001 (CALA-13-33427). The QC was from ARSL work order 327527.

#### **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, 1202891918 (CALA-13-33427), 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>
327527001	CALA-13-33427
1202893584	Method Blank (MB)
1202893585	327623001(CAPU-13-34775) Sample Duplicate (DUP)
1202893586	327623001(CAPU-13-34775) Matrix Spike (MS)
1202893587	327623001(CAPU-13-34775) Matrix Spike Duplicate (MSD)
1202893588	Laboratory Control Sample (LCS)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 REV# 16.

### **Calibration Information:**

#### **Calibration Information**

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

#### **Standards Information**

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

#### **Sample Geometry**

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

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

#### **Blank Information**

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

#### **Designated QC**

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

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The blank result is less than 1.65 times the CSU.

### **Technical Information:**

#### **Holding Time**

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

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

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

#### **Chemical Recoveries**

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

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

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

### **Miscellaneous Information:**

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

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

**Additional Comments**

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

**Blank Decision Level**

The blank result is less than the decision level.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

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

## **GEL LABORATORIES LLC**

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### **Qualifier Definition Report for**

ARSL001 ARS International (63641-10)

Client SDG: 2013-947 GEL Work Order: 327527

#### **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:** Kate Gellatly

**Date:** 03 JUL 2013

**Title:** Analyst I

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 21-JUN-13	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ALPHA SPECTROMETER	<b>Test / Method:</b> DOE EML HASL-300, Pu-11-RC Modified	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1307464	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 327396(2013-940),327527(2013-947),327622(2013-951),327623(2013-952)</b> <b>Application Issues:</b> RDL less than MDA			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. The duplicate, 1202890856, did not meet the Pu-239/240 detection limit.		1. When a blank population is performed the MDC may be greater than the RDL due to the high standard deviation. The duplicate does meet the tracer yield requirement and has greater than 400 tracer counts. Reporting results.	

**Originator's Name:**  
Melanie Aycock      21-JUN-13

**Data Validator/Group Leader:**  
Jessica Davis      27-JUN-13

# **Sample Data Summary**

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## Certificate of Analysis

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

Report Date: July 3, 2013

Client Sample ID: CALA-13-33427  
Sample ID: 327527001  
Matrix: W  
Collect Date: 11-JUN-13  
Receive Date: 13-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	0.00284	+/-0.00492	0.0432	0.0177	+/-0.00492	0.050	pCi/L		NXP2	06/19/13	1013	1307462	1
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#### *Alphaspec Pu, Liquid "As Received"*

Plutonium-238	U	-4.24E-10	+/-0.00509	0.0238	0.00846	+/-0.00509	0.050	pCi/L		NXP2	06/20/13	1338	1307464	2
Plutonium-239/240	U	0.0153	+/-0.00881	0.0501	0.0216	+/-0.00884	0.050	pCi/L						

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

Uranium-234		0.977	+/-0.0552	0.0665	0.0291	+/-0.0846	1.00	pCi/L		NXP2	06/19/13	1013	1307467	3
Uranium-235/236	U	0.015	+/-0.00916	0.0517	0.0208	+/-0.00921	1.00	pCi/L						
Uranium-238		0.669	+/-0.0454	0.0425	0.0171	+/-0.0631	0.500	pCi/L						

### Rad Gamma Spec Analysis

#### *Gammasesc "As Received"*

Cesium-137	U	0.920	+/-0.955	3.66	1.69	+/-0.979	8.00	pCi/L		MXR1	06/21/13	1208	1307967	4
Cobalt-60	U	-0.381	+/-0.885	3.30	1.43	+/-0.889	8.00	pCi/L						
Neptunium-237	U	-2.36	+/-1.97	6.64	3.12	+/-2.04	10.0	pCi/L						
Potassium-40	U	3.19	+/-14.0	48.3	21.9	+/-14.0	10.0	pCi/L						
Sodium-22	U	-1.58	+/-1.06	3.38	1.48	+/-1.12	10.0	pCi/L						

### Rad Gas Flow Proportional Counting

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

Strontium-90	U	0.00638	+/-0.132	0.472	0.217	+/-0.132	0.500	pCi/L		JXR1	06/26/13	1933	1307879	5
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#### *WSP-GrossA/B "As Received"*

Beta		7.04	+/-0.504	1.32	0.638	+/-0.775	3.00	pCi/L		DYT1	06/24/13	1848	1308529	6
Alpha	U	0.818	+/-0.801	2.97	1.04	+/-0.805	3.00	pCi/L		DYT1	06/26/13	1619	1308529	7

### The following Analytical Methods were performed

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

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1307462	75.9	(50%-105%)
Plutonium-242 Tracer	Alphaspec Pu, Liquid "As Received"	1307464	62.1	(50%-105%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1307467	70.0	(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: July 3, 2013

Contact: Mr. Keith Greene

Project: LANL-WQH Water Samples

Client Sample ID: CALA-13-33427

Sample ID: 327527001

Project: ESHL00210

Client ID: ARSL001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Strontium Carrier		GFPC, Sr90, liquid "As Received"						1307879	94.7	(50%-105%)				

### Notes:

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

# Quality Control Data

# GEL LABORATORIES LLC

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## QC Summary

Report Date: July 3, 2013

Page 1 of 6

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

**Contact:** Mr. Keith Greene

**Workorder:** 327527

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1307462										
QC1202890848	327396002	DUP									
Americium-241	U	0.0117	U	0.00265	pCi/L	0.351		(0-1)	NXP2	06/19/13	10:13
	Uncert:	+/-0.00826		+/-0.00458							
	TPU:	+/-0.00827		+/-0.00458							
**Americium-243 Tracer	2.62	1.98		2.19	pCi/L		83.5	(50%-105%)			
	Uncert:	+/-0.0869		+/-0.0829							
	TPU:	+/-0.143		+/-0.139							
QC1202890849	LCS										
Americium-241	1.41			1.27	pCi/L		89.9	(80%-120%)	NXP2	06/19/13	10:13
	Uncert:			+/-0.0532							
	TPU:			+/-0.0762							
**Americium-243 Tracer	2.09			1.70	pCi/L		81.3	(50%-105%)			
	Uncert:			+/-0.0676							
	TPU:			+/-0.113							
QC1202890847	MB										
Americium-241			U	0.00	pCi/L				NXP2	06/19/13	10:13
	Uncert:			+/-0.00594							
	TPU:			+/-0.00594							
**Americium-243 Tracer	2.09			1.75	pCi/L		83.5	(50%-105%)			
	Uncert:			+/-0.0659							
	TPU:			+/-0.110							
Batch	1307464										
QC1202890856	327396002	DUP									
Plutonium-238	U	-0.00222	U	-0.00932	pCi/L	0.329		(0-1)	NXP2	06/20/13	13:38
	Uncert:	+/-0.00384		+/-0.00695							
	TPU:	+/-0.00384		+/-0.00695							
Plutonium-239/240	U	0.00222	U	0.0528	pCi/L	1.16		(0-1)			
	Uncert:	+/-0.00665		+/-0.0149							
	TPU:	+/-0.00666		+/-0.0151							
**Plutonium-242 Tracer	2.44	1.79		1.22	pCi/L		50	(50%-105%)			
	Uncert:	+/-0.0737		+/-0.0877							
	TPU:	+/-0.125		+/-0.142							
QC1202890857	LCS										
Plutonium-238			U	0.00818	pCi/L			(80%-120%)	NXP2	06/19/13	10:13
	Uncert:			+/-0.00721							
	TPU:			+/-0.00722							
Plutonium-239/240	1.97			1.93	pCi/L		98.1	(80%-120%)			
	Uncert:			+/-0.0727							
	TPU:			+/-0.116							
**Plutonium-242 Tracer	1.95			1.25	pCi/L		64.2	(50%-105%)			
	Uncert:			+/-0.0731							
	TPU:			+/-0.117							
QC1202890855	MB										

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## QC Summary

Workorder: 327527

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1307464										
Plutonium-238			U	-0.00818	pCi/L				NXP2	06/20/13	13:38
	Uncert:			+/-0.00646							
	TPU:			+/-0.00646							
Plutonium-239/240			U	0.00613	pCi/L						
	Uncert:			+/-0.00541							
	TPU:			+/-0.00541							
**Plutonium-242 Tracer	1.95			1.21	pCi/L		62.1	(50%-105%)			
	Uncert:			+/-0.0634							
	TPU:			+/-0.105							
Batch	1307467										
QC1202890864	327396002	DUP									
Uranium-234		0.570		0.560	pCi/L	0.041		(0-1)	NXP2	06/19/13	10:13
	Uncert:	+/-0.0419		+/-0.0425							
	TPU:	+/-0.0561		+/-0.0563							
Uranium-235/236	U	0.0221	U	0.015	pCi/L	0.169		(0-1)			
	Uncert:	+/-0.0104		+/-0.0106							
	TPU:	+/-0.0105		+/-0.0106							
Uranium-238		0.301		0.360	pCi/L	0.385		(0-1)			
	Uncert:	+/-0.0303		+/-0.0333							
	TPU:	+/-0.0361		+/-0.0409							
**Uranium-232 Tracer	2.69	1.95		1.94	pCi/L		72.1	(50%-105%)			
	Uncert:	+/-0.0898		+/-0.0909							
	TPU:	+/-0.198		+/-0.199							
QC1202890865	LCS										
Uranium-234				2.74	pCi/L				NXP2	06/19/13	10:13
	Uncert:			+/-0.0787							
	TPU:			+/-0.195							
Uranium-235/236				0.136	pCi/L						
	Uncert:			+/-0.0198							
	TPU:			+/-0.0217							
Uranium-238	2.70			2.87	pCi/L		106	(80%-120%)			
	Uncert:			+/-0.0804							
	TPU:			+/-0.203							
**Uranium-232 Tracer	2.15			1.66	pCi/L		76.8	(50%-105%)			
	Uncert:			+/-0.0701							
	TPU:			+/-0.157							
QC1202890863	MB										
Uranium-234			U	0.00	pCi/L				NXP2	06/19/13	10:13
	Uncert:			+/-0.00567							
	TPU:			+/-0.00567							
Uranium-235/236			U	0.00	pCi/L						
	Uncert:			+/-0.00496							
	TPU:			+/-0.00496							
Uranium-238			U	0.016	pCi/L						
	Uncert:			+/-0.00802							
	TPU:			+/-0.00809							
**Uranium-232 Tracer	2.15			1.83	pCi/L		84.7	(50%-105%)			
	Uncert:			+/-0.0659							
				+/-0.153							

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## QC Summary

Workorder: 327527

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1307467	TPU:									
Rad Gamma Spec											
Batch	1307967										
QC1202892111	327527001	DUP									
Cesium-137	U	0.920	U	1.42	pCi/L	0.113		(0-1)	MXR1	06/23/13	11:40
	Uncert:	+/-0.955		+/-1.25							
	TPU:	+/-0.979		+/-1.25							
Cobalt-60	U	-0.381	U	2.96	pCi/L	0.711		(0-1)			
	Uncert:	+/-0.885		+/-1.29							
	TPU:	+/-0.889		+/-1.46							
Neptunium-237	U	-2.36	U	1.66	pCi/L	0.452		(0-1)			
	Uncert:	+/-1.97		+/-2.37							
	TPU:	+/-2.04		+/-2.40							
Potassium-40	U	3.19	U	-11.3	pCi/L	0.212		(0-1)			
	Uncert:	+/-14.0		+/-19.9							
	TPU:	+/-14.0		+/-20.0							
Sodium-22	U	-1.58	U	2.06	pCi/L	0.867		(0-1)			
	Uncert:	+/-1.06		+/-0.977							
	TPU:	+/-1.12		+/-0.981							
QC1202892112	LCS										
Americium-241	2780			2720	pCi/L		97.7	(80%-120%)	MXR1	06/24/13	12:10
	Uncert:			+/-104							
	TPU:			+/-189							
Cesium-137	6010			6020	pCi/L		100	(80%-120%)			
	Uncert:			+/-52.9							
	TPU:			+/-260							
Cobalt-60	5230			5310	pCi/L		102	(80%-120%)			
	Uncert:			+/-56.4							
	TPU:			+/-223							
Neptunium-237			U	21.2	pCi/L						
	Uncert:			+/-23.5							
	TPU:			+/-24.0							
Potassium-40			U	53.8	pCi/L						
	Uncert:			+/-40.2							
	TPU:			+/-42.2							
Sodium-22			U	-2.46	pCi/L						
	Uncert:			+/-6.50							
	TPU:			+/-6.52							
QC1202892110	MB										
Cesium-137			U	-1.84	pCi/L				MXR1	06/21/13	12:18
	Uncert:			+/-1.54							
	TPU:			+/-1.60							
Cobalt-60			U	1.29	pCi/L						
	Uncert:			+/-1.02							
	TPU:			+/-1.06							
Neptunium-237			U	-0.00884	pCi/L						
	Uncert:			+/-1.91							
	TPU:			+/-1.91							

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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	1307967										
Potassium-40			U	-2.39	pCi/L						
				Uncert:							
				TPU:							
Sodium-22			U	-0.712	pCi/L						
				Uncert:							
				TPU:							
<b>Rad Gas Flow</b>											
Batch	1307879										
QC1202891917	327527001	DUP									
Strontium-90		U	0.00638	U	0.328	pCi/L	0.570	(0-1)	JXR1	06/26/1319:32	
				Uncert:	+/-0.132						
				TPU:	+/-0.132						
**Strontium Carrier		8.55	8.10		8.00	mg		93.6	(50%-105%)		
QC1202891919	LCS										
Strontium-90		24.2			25.9	pCi/L		107	(80%-120%)	JXR1	06/26/1320:24
				Uncert:	+/-0.697						
				TPU:	+/-2.17						
**Strontium Carrier		8.55			7.60	mg		88.9	(50%-105%)		
QC1202891916	MB										
Strontium-90				U	-0.115	pCi/L			JXR1	06/26/1319:33	
				Uncert:	+/-0.0644						
				TPU:	+/-0.0644						
**Strontium Carrier		8.55			6.40	mg		74.9	(50%-105%)		
QC1202891918	327527001	MS									
Strontium-90		243	U	0.00638	267	pCi/L		110	(75%-125%)	JXR1	06/26/1320:24
				Uncert:	+/-0.132						
				TPU:	+/-0.132						
**Strontium Carrier		8.55			8.10	mg		94.7	(50%-105%)		
Batch	1308529										
QC1202893585	327623001	DUP									
Alpha		U	-0.0322	U	0.431	pCi/L	0.231	(0-1)	DYT1	06/26/1317:21	
				Uncert:	+/-0.464						
				TPU:	+/-0.464						
Beta		U	0.373	U	1.05	pCi/L	0.206	(0-1)		06/25/1317:45	
				Uncert:	+/-0.753						
				TPU:	+/-0.754						
QC1202893588	LCS										
Alpha		12.3			13.7	pCi/L		111	(80%-120%)	DYT1	06/26/1317:41
				Uncert:	+/-0.643						
				TPU:	+/-1.43						
Beta		48.5			54.5	pCi/L		112	(80%-120%)		06/24/1316:29
				Uncert:	+/-0.952						
				TPU:	+/-4.60						
QC1202893584	MB										
Alpha				U	-0.0731	pCi/L			DYT1	06/26/1317:21	
				Uncert:	+/-0.0167						
				TPU:	+/-0.017						
Beta			U	-0.104	pCi/L					06/24/1318:48	

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gas Flow</b>										
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	06/27/1312:54	
		Uncert:	+/-0.464	+/-4.18						
		TPU:	+/-0.464	+/-8.01						
Beta	1940	U	0.373	2190	pCi/L	113	(75%-125%)		06/24/1316:29	
		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	06/26/1317:21
		Uncert:	+/-0.464	+/-4.76						
		TPU:	+/-0.464	+/-8.88						
Beta	1940	U	0.373	2290	pCi/L	0.129	118	(0-1)		06/24/1316:29
		Uncert:	+/-0.753	+/-39.3						
		TPU:	+/-0.754	+/-194						

### Notes:

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

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < 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.
- 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.

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