

2040 Savage Rd
Charleston SC 29407

COC/Lab Request #:
12-1495

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[illegible]

Special Instructions:

Relinquished by:

Relinquished by:

Relinquished by:

Date/Time:

Date/Time:

Date/Time:

Received by:

Received by:

Received by:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3953 EVENT NAME: Sandia (Chromium Monitoring)
Q4 Watershed Sampling
SAMPLE ID: CASA-12-21649 WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		08/13/2012	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1206	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: R-43 S2		↓	FIELD PREP:	F	OK
LOCATION TYPE: MON		↓	FIELD QC TYPE:	REG	↓
PORT: P2A		↓	SAMPLE USAGE:	INV	↓

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

SAMPLE COMMENTS:

Sampled within 50' of running diesel generator.

LOCATION COMMENTS:

NA

FIELD PARAMETERS:

Dissolved Oxygen 2.95 mg/L Oxidation-Reduction Potential 161.5 MV pH 8.71 SU
Specific Conductance 191 uS/cm Temperature 19.96 deg C Turbidity 0.19 NTU

COLLECTED BY (PRINT) A. Vigil

RELINQUISHED BY (Printed Name) David Fellers (Signature) <i>[Signature]</i>	Date/Time 8/13/12 1320	RECEIVED BY (Printed Name) K. G. McCoy (Signature) <i>[Signature]</i>	Date/Time 8/13/12 1120
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/30/2012

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3953 EVENT NAME: Sandia (Chromium Monitoring)
 Q4 Watershed Sampling
 SAMPLE ID: CASA-12-21645 WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		08/13/2012	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1206	MEDIA:	UA	↓
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: R-43 S2		↓	FIELD PREP:	UF	OK
LOCATION TYPE: MON		↓	FIELD QC TYPE: REG		↓
PORT: P2A			SAMPLE USAGE: INV		↓

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

SAMPLE COMMENTS:

Sampled within 50' of running diesel generator.

LOCATION COMMENTS:

NA

FIELD PARAMETERS:

Dissolved Oxygen 2.95 mg/L Oxidation-Reduction Potential 161.5 MV pH 8.71 SU
 Specific Conductance 191 uS/cm Temperature 19.96 deg C Turbidity 0.19 NTU

COLLECTED BY (PRINT) A. Vigil

RELINQUISHED BY (Printed Name) David Fellenz (Signature) <i>[Signature]</i>	Date/Time 8/13/12 1320	RECEIVED BY (Printed Name) K. Greave (Signature) <i>[Signature]</i>	Date/Time 8/13/12 1120
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/30/2012

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3953 EVENT NAME: Sandia (Chromium Monitoring)
 Q4 Watershed Sampling
 SAMPLE ID: CASA-12-22310 WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		08/13/2012	FIELD MATRIX:	WG	↓
TIME COLLECTED (HH:MM):		1042	MEDIA:	UA	↓
PRS ID:		ok	SAMPLE TECH CODE:	UA	RSP
LOCATION ID: SC1-2		↓	FIELD PREP:	F	ok
LOCATION TYPE:		↓	FIELD QC TYPE:	FD	↓
PORT: SINGLE COMPLETION		↓	SAMPLE USAGE:	QC	↓

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

refer to CASA-12-21646

FIELD PARAMETERS:

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

COLLECTED BY (PRINT) M. Green

RELINQUISHED BY (Printed Name) <i>M. Green</i> (Signature) <i>M. Green</i>	Date/Time 8/13/12 1148	RECEIVED BY (Printed Name) <i>S. Siegenwood</i> (Signature) <i>S. Siegenwood</i>	Date/Time 8/13/12 1148
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/30/2012

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3953 EVENT NAME: Sandia (Chromium Monitoring)
 Q4 Watershed Sampling
 SAMPLE ID: CASA-12-21650 WORK ORDER: NA

	<u>AS</u> <u>PLANNED</u>	<u>AS COLLECTED</u>		<u>AS</u> <u>PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		08/13/2012	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):		1042	MEDIA:	UA	↓
PRS ID:		ok	SAMPLE TECH CODE:	UA	WSP
LOCATION ID: SCI-2		↓	FIELD PREP:	F	↓
LOCATION TYPE: MON		↓	FIELD QC TYPE: REG		↓
PORT: SINGLE COMPLETION		↓	SAMPLE USAGE: INV		↓

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

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) M. Green

RELINQUISHED BY (Printed Name) <i>John Stoker</i> (Signature) <i>John Stoker</i>	Date/Time 8/13/12 1148	RECEIVED BY (Printed Name) <i>John Stoker</i> (Signature) <i>John Stoker</i>	Date/Time 8/13/12 1148
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/30/2012

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3953 EVENT NAME: Sandia (Chromium Monitoring)
Q4 Watershed Sampling
SAMPLE ID: CASA-12-22309 WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		08/13/2012	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):		1042	MEDIA:	UA	↓
PRS ID:		ok	SAMPLE TECH CODE:	UA	RSP
LOCATION ID: SCI-2		↓	FIELD PREP:	UF	ok
LOCATION TYPE:		↓	FIELD QC TYPE:	FD	↓
PORT: SINGLE COMPLETION		↓	SAMPLE USAGE:	QC	↓

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

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) M. Green

RELINQUISHED BY (Printed Name) Andrew Stokes (Signature) <i>[Signature]</i>	Date/Time 8/13/12 1148	RECEIVED BY (Printed Name) B. S. Thompson (Signature) <i>[Signature]</i>	Date/Time 8/13/12 1148
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/30/2012

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3953 EVENT NAME: Sandia (Chromium Monitoring)
Q4 Watershed Sampling
SAMPLE ID: CASA-12-21646 WORK ORDER: NA

AS PLANNED		AS COLLECTED	AS PLANNED		AS COLLECTED
DATE COLLECTED (MM/DD/YYYY):		08/13/2012	FIELD MATRIX:		WG
TIME COLLECTED (HH:MM):		1042	MEDIA:		UA
PRS ID:		ok	SAMPLE TECH CODE:		UA
LOCATION ID: SCI-2		ok	FIELD PREP:		UF
LOCATION TYPE: MON		ok	FIELD QC TYPE:		REG
PORT: SINGLE COMPLETION		ok	SAMPLE USAGE:		INV

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

SAMPLE COMMENTS:

N/A

LOCATION COMMENTS:

N/A

FIELD PARAMETERS:

Dissolved Oxygen 8.23 mg/L Oxidation-Reduction Potential 170.4 MV pH 8.15 SU
Specific Conductance 592 uS/cm Temperature 16.08 deg C Turbidity 2.22 NTU

COLLECTED BY (PRINT) M. Green

RELINQUISHED BY (Printed Name) Andrew Stodke (Signature) <i>[Signature]</i>	Date/Time 8/13/12 1048	RECEIVED BY (Printed Name) Steve Wood (Signature) <i>[Signature]</i>	Date/Time 8/13/12 1048
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/30/2012

Data Validation Report

Chain Of Custody No. 12-1495

1. Distribution Of Samples In EDD.

	Analytical	Regular	Field	Trip	Field	Equipment
SDG	Method	Samples	Duplicates	Blanks	Blanks	Blanks
309669	EPA:120.1	2	1			
309669	EPA:150.1	2	1			
309669	EPA:160.1	2	1			
309669	EPA:245.2	2	1			
309669	EPA:300.0	2	1			
309669	EPA:310.1	2	1			
309669	EPA:350.1	2	1			
309669	EPA:351.2	2	1			
309669	EPA:353.2	2	1			
309669	EPA:365.4	2	1			
309669	EPA:900	1				
309669	EPA:901.1	1				
309669	EPA:905.0	1				
309669	HASL-300:AM-241	1				
309669	HASL-300:ISOPU	1				
309669	HASL-300:ISOU	1				
309669	SM:A2340B	2	1			
309669	SW-846:6010B	2	1			
309669	SW-846:6020	2	1			
309669	SW-846:6850	2	1			
309669	SW-846:9060	2	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
309669	EPA:120.1	1241565	1241565	2	1						
309669	EPA:150.1	1239874	1239874	2	1						
309669	EPA:160.1	1238748	1238748	2	1					1	
309669	EPA:245.2	1242339	1242337	2	1					1	2
309669	EPA:300.0	1238086	1238086	2	1					1	
309669	EPA:310.1	1239566	1239566	2	1					2	1
309669	EPA:350.1	1237606	1237605	2	1					1	2
309669	EPA:351.2	1237603	1237601	2	1					1	1
309669	EPA:353.2	1239601	1239601	2	1					1	
309669	EPA:365.4	1239580	1239579	2	1					1	1
309669	EPA:900	1239941	1239941	1						1	1
309669	EPA:901.1	1238310	1238310	1						1	
309669	EPA:905.0	1239939	1239939	1						1	1
309669	HASL-300:AM-241	1238473	1238473	1						1	
309669	HASL-300:ISOPU	1238475	1238475	1						1	
309669	HASL-300:ISOU	1238477	1238477	1						1	
309669	SM:A2340B	1244992	1244992	2	1						
309669	SW-846:6010B	1238931	1238929	2	1					1	1
309669	SW-846:6020	1238926	1238925	2	1					1	1
309669	SW-846:6850	1238723	1238722	2	1					1	1
309669	SW-846:9060	1238959	1238959	2	1					1	

2. Distribution Of Analytes In EDD.

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

Analytical Method	Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spikes	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-12-21796	1202727789	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-12-21649	1202727788	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-12-21649	309669002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-12-21650	309669004	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-12-22310	309669006	FD	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1202727790	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-12-21743	1202723542	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-12-21649	1202723543	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-12-21649	309669002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-12-21650	309669004	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-12-22310	309669006	FD	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1202723544	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CASA-12-21649	309669002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-12-21650	309669004	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-12-22310	1202720891	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-12-22310	309669006	FD	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1202720892	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1202720890	MB	1	0	0	0
EPA:245.2	INORGANIC	CASA-12-21649	309669002	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-12-21650	309669004	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-12-22310	309669006	FD	1	0	0	0
EPA:245.2	INORGANIC	LCS	1202729831	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1202729830	MB	1	0	0	0
EPA:245.2	INORGANIC	SWWS46-12-22930	1202729832	DUP	1	0	0	0
EPA:245.2	INORGANIC	SWWS46-12-22930	1202729833	MS	0	0	1	0
EPA:245.2	INORGANIC	WTRO-12-22560	1202729834	DUP	1	0	0	0
EPA:245.2	INORGANIC	WTRO-12-22560	1202729835	MS	0	0	1	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-12-21794	1202719113	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-12-21649	309669002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-12-21650	309669004	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-12-22310	309669006	FD	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1202719115	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1202719109	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-12-21649	1202722740	DUP	3	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-12-21649	1202722741	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CASA-12-21649	309669002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-12-21650	309669004	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-12-22310	309669006	FD	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202722739	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202722746	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202722742	MB	3	0	0	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202722745	MB	3	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-12-21743	1202717811	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-12-21743	1202717812	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-12-21743	1202717813	MSD	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-12-21794	1202720910	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-12-21794	1202720911	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-12-21794	1202720912	MSD	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CASA-12-21649	309669002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-12-21650	309669004	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-12-22310	309669006	FD	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1202717814	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1202717810	MB	1	0	0	0

EPA:351.2	GENERAL CHEMISTRY	CAMO-12-21735	1202717800	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-12-21735	1202717801	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-12-21735	1202717802	MSD	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CASA-12-21645	309669001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-12-21646	309669003	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-12-22309	309669005	FD	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1202717803	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1202717799	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-12-21794	1202722833	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-12-21649	309669002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-12-21650	309669004	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-12-22310	309669006	FD	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1202722837	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1202722832	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	SWWS46-12-22928	1202722834	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-12-21794	1202722777	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-12-21794	1202722779	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-12-21794	1202722781	MSD	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CASA-12-21649	309669002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-12-21650	309669004	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-12-22310	309669006	FD	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1202722783	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1202722776	MB	1	0	0	0
EPA:900	RAD	CAMO-12-21736	1202723793	DUP	2	0	0	0
EPA:900	RAD	CAMO-12-21736	1202723796	MS	0	0	2	0
EPA:900	RAD	CAMO-12-21736	1202723797	MSD	0	0	2	0
EPA:900	RAD	CASA-12-21645	309669001	REG	2	0	0	0
EPA:900	RAD	LCS	1202723798	LCS	0	0	2	0
EPA:900	RAD	MB	1202723792	MB	2	0	0	0
EPA:901.1	RAD	CAMO-12-21785	1202719792	DUP	6	0	0	0
EPA:901.1	RAD	CASA-12-21645	309669001	REG	5	0	0	0
EPA:901.1	RAD	LCS	1202719793	LCS	0	0	3	0
EPA:901.1	RAD	MB	1202719791	MB	6	0	0	0
EPA:905.0	RAD	CASA-12-21643	1202723780	DUP	1	0	0	0
EPA:905.0	RAD	CASA-12-21643	1202723781	MS	0	0	1	0
EPA:905.0	RAD	CASA-12-21645	309669001	REG	1	0	0	0
EPA:905.0	RAD	LCS	1202723782	LCS	0	0	1	0
EPA:905.0	RAD	MB	1202723779	MB	1	0	0	0
HASL-300:AM-241	RAD	CAMO-12-21787	1202720213	DUP	1	0	0	0
HASL-300:AM-241	RAD	CASA-12-21645	309669001	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1202720214	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1202720212	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAMO-12-21785	1202720220	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CASA-12-21645	309669001	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1202720221	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1202720219	MB	2	0	0	0
HASL-300:ISOU	RAD	CAMO-12-21785	1202720223	DUP	3	0	0	0
HASL-300:ISOU	RAD	CASA-12-21645	309669001	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1202720224	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1202720222	MB	3	0	0	0
SM:A2340B	INORGANIC	CASA-12-21649	309669002	REG	1	0	0	0
SM:A2340B	INORGANIC	CASA-12-21650	309669004	REG	1	0	0	0
SM:A2340B	INORGANIC	CASA-12-22310	309669006	FD	1	0	0	0
SW-846:6010B	INORGANIC	CAMO-12-21793	1202721243	DUP	17	0	0	0
SW-846:6010B	INORGANIC	CAMO-12-21793	1202721244	MS	0	0	17	0
SW-846:6010B	INORGANIC	CASA-12-21649	309669002	REG	17	0	0	0

SW-846:6010B	INORGANIC	CASA-12-21650	309669004	REG	17	0	0	0
SW-846:6010B	INORGANIC	CASA-12-22310	309669006	FD	17	0	0	0
SW-846:6010B	INORGANIC	LCS	1202721242	LCS	0	0	17	0
SW-846:6010B	INORGANIC	MB	1202721241	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-12-21793	1202721233	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-12-21793	1202721234	MS	0	0	11	0
SW-846:6020	INORGANIC	CASA-12-21649	309669002	REG	11	0	0	0
SW-846:6020	INORGANIC	CASA-12-21650	309669004	REG	11	0	0	0
SW-846:6020	INORGANIC	CASA-12-22310	309669006	FD	11	0	0	0
SW-846:6020	INORGANIC	LCS	1202721232	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1202721231	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-12-21649	1202720854	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-12-21649	1202720855	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-12-21649	309669002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-12-21650	309669004	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-12-22310	309669006	FD	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1202720853	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1202720852	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-12-21738	1202722598	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-12-21786	1202721307	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-12-21645	309669001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-12-21646	309669003	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-12-22309	309669005	FD	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1202721309	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1202721306	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	1202720222	METHOD BLANK	HASL-300:ISOU	W	Uranium-238	0.03		pCi/L	0.0271
MB	1202721231	METHOD BLANK	SW-846:6020	W	Uranium	0.074	J	ug/L	0.2

Any samples affected by the presence of contaminants in blanks?

No.

6. Any surrogate recoveries outside the control limits?

No.

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

Field	Matrix	Matrix	Analytical	Parameter	Analysis	Analysis	Sample	MS %	MSD %	Upper	Lower
Sample ID	Spike ID	Spike Dup ID	Method	Name	Lot ID	Date	Matrix	Recvry	Recvry	Limit	Limit
CAMO-12-21794	1202720911	1202720912	EPA:350.1	Ammonia as Nitrogen	1237605	8/21/2012	W	105	114	110	90

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

None.

13. Display Flagged Data.

Location ID	Chain Of Custody No	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detected
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N
R-43 S2	12-1495	CASA-12-21645	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N

Reason Code

Description

J_LAB

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

NQ

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

R5

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

U_LAB

The analytical laboratory qualified the analyte as not detected.

14. Useable Result Count.

Field	Location	Sample	Analytical	No. Unuseable	Total No. Of
Sample ID	ID	Purpose	Method	Records	Records

Rejection		
Limit	RPD	RPD Limit
10	8	15

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
0.00384	pCi/L	0.00384	pCi/L	0.0263	0.00719	W	8/13/2012		1238473	VAL	Y
-0.416	pCi/L	-0.416	pCi/L	4.47	1.23	W	8/13/2012		1238310	VAL	Y
-0.423	pCi/L	-0.423	pCi/L	4.5	1.19	W	8/13/2012		1238310	VAL	Y
0.69	pCi/L	0.69	pCi/L	2.26	0.617	W	8/13/2012		1239941	VAL	Y
1.81	pCi/L	1.81	pCi/L	2.34	0.738	W	8/13/2012		1239941	VAL	Y
2.84	pCi/L	2.84	pCi/L	8.48	2.27	W	8/13/2012		1238310	VAL	Y
0	pCi/L	0	pCi/L	0.0179	0.00653	W	8/13/2012		1238475	VAL	Y
0.00799	pCi/L	0.00799	pCi/L	0.0321	0.00596	W	8/13/2012		1238475	VAL	Y
35.6	pCi/L	35.6	pCi/L	46.7	13.7	W	8/13/2012		1238310	VAL	Y
0.0861	pCi/L	0.0861	pCi/L	4.53	1.15	W	8/13/2012		1238310	VAL	Y
-0.27	pCi/L	-0.27	pCi/L	0.495	0.131	W	8/13/2012		1239939	VAL	Y
0.0123	pCi/L	0.0123	pCi/L	0.0574	0.0136	W	8/13/2012		1238477	VAL	Y

CASA-12-21645	R-43 S2	REG	EPA:351.2	0	1
CASA-12-21645	R-43 S2	REG	EPA:900	0	2
CASA-12-21645	R-43 S2	REG	EPA:901.1	0	5
CASA-12-21645	R-43 S2	REG	EPA:905.0	0	1
CASA-12-21645	R-43 S2	REG	HASL-300:AM-241	0	1
CASA-12-21645	R-43 S2	REG	HASL-300:ISOPU	0	2
CASA-12-21645	R-43 S2	REG	HASL-300:ISOU	0	3
CASA-12-21645	R-43 S2	REG	SW-846:9060	0	1
CASA-12-21646	SCI-2	REG	EPA:351.2	0	1
CASA-12-21646	SCI-2	REG	SW-846:9060	0	1
CASA-12-21649	R-43 S2	REG	EPA:120.1	0	1
CASA-12-21649	R-43 S2	REG	EPA:150.1	0	1
CASA-12-21649	R-43 S2	REG	EPA:160.1	0	1
CASA-12-21649	R-43 S2	REG	EPA:245.2	0	1
CASA-12-21649	R-43 S2	REG	EPA:300.0	0	4
CASA-12-21649	R-43 S2	REG	EPA:310.1	0	2
CASA-12-21649	R-43 S2	REG	EPA:350.1	0	1
CASA-12-21649	R-43 S2	REG	EPA:353.2	0	1
CASA-12-21649	R-43 S2	REG	EPA:365.4	0	1
CASA-12-21649	R-43 S2	REG	SM:A2340B	0	1
CASA-12-21649	R-43 S2	REG	SW-846:6010B	0	17
CASA-12-21649	R-43 S2	REG	SW-846:6020	0	11
CASA-12-21649	R-43 S2	REG	SW-846:6850	0	1
CASA-12-21650	SCI-2	REG	EPA:120.1	0	1
CASA-12-21650	SCI-2	REG	EPA:150.1	0	1
CASA-12-21650	SCI-2	REG	EPA:160.1	0	1
CASA-12-21650	SCI-2	REG	EPA:245.2	0	1
CASA-12-21650	SCI-2	REG	EPA:300.0	0	4
CASA-12-21650	SCI-2	REG	EPA:310.1	0	2
CASA-12-21650	SCI-2	REG	EPA:350.1	0	1
CASA-12-21650	SCI-2	REG	EPA:353.2	0	1
CASA-12-21650	SCI-2	REG	EPA:365.4	0	1
CASA-12-21650	SCI-2	REG	SM:A2340B	0	1
CASA-12-21650	SCI-2	REG	SW-846:6010B	0	17
CASA-12-21650	SCI-2	REG	SW-846:6020	0	11
CASA-12-21650	SCI-2	REG	SW-846:6850	0	1
CASA-12-22309	SCI-2	FD	EPA:351.2	0	1
CASA-12-22309	SCI-2	FD	SW-846:9060	0	1
CASA-12-22310	SCI-2	FD	EPA:120.1	0	1
CASA-12-22310	SCI-2	FD	EPA:150.1	0	1
CASA-12-22310	SCI-2	FD	EPA:160.1	0	1
CASA-12-22310	SCI-2	FD	EPA:245.2	0	1
CASA-12-22310	SCI-2	FD	EPA:300.0	0	4
CASA-12-22310	SCI-2	FD	EPA:310.1	0	2
CASA-12-22310	SCI-2	FD	EPA:350.1	0	1
CASA-12-22310	SCI-2	FD	EPA:353.2	0	1
CASA-12-22310	SCI-2	FD	EPA:365.4	0	1
CASA-12-22310	SCI-2	FD	SM:A2340B	0	1
CASA-12-22310	SCI-2	FD	SW-846:6010B	0	17
CASA-12-22310	SCI-2	FD	SW-846:6020	0	11
CASA-12-22310	SCI-2	FD	SW-846:6850	0	1



August 19, 2012

www.gel.com

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: 309669
SDG: 12-1495

Dear Keith Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on August 15, 2012, and analyzed for General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Hope Taylor for
Valerie Davis
Project Manager

Purchase Order: 63641-10
Chain of Custody: 12-1495
Enclosures



ARS International (63641-10)
LANL-WQH Water Samples
Work Order #: 309669
SDG: 12-1495

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Case Narrative

**Case Narrative for
ARS International (63641-10)
LANL-WQH Water Samples
Workorder #: 309669
SDG # : 12-1495**

August 19, 2012

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 August 15, 2012 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
309669001	CASA-12-21645
309669002	CASA-12-21649
309669003	CASA-12-21646
309669004	CASA-12-21650
309669005	CASA-12-22309
309669006	CASA-12-22310

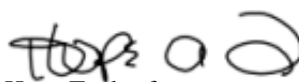
Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry.

I certify that this data report is in compliance with the terms and conditions of the subcontract and task order, both technically and for completeness, for other than the conditions detailed in the attached case narrative.

A handwritten signature in black ink, appearing to read 'Hope Taylor'.

Hope Taylor for
Valerie Davis
Project Manager

List of current GEL Certifications as of 19 August 2012

State	Certification
Arizona	AZ0766
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	P330-09-00191
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	LA120008
Maryland	270
Massachusetts	M-SC012
Mississippi	SC00012
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
South Carolina Chemistry	10120001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-12-7
Utah NELAP	SC00012
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
Wisconsin	999887790

Chain of Custody and Supporting Documentation

SAMPLE RECEIPT & REVIEW FORM

Client: <u>LANL</u>		SDG/AR/COC/Work Order: <u>12-1495</u>	
Received By: <u>H. Taylor</u>		Date Received: <u>15 AUG 12</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?			Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0cpm</u>
Classified Radioactive II or III by RSO?			If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?			
Package, COC, and/or Samples marked as beryllium or asbestos containing?			If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?			Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?			

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> <u>Blue ice</u> Dry ice None Other (describe) <u>5</u> *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>51050001</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: <u>CHASA-12-21445</u> If Preservation added, Lot#: <u>LD3022</u>
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Carrier and tracking number.				Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7209 7856 8952-4</u>

Comments (Use Continuation Form if needed):

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

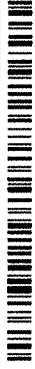
SHIP DATE: 14RUG12
ACTWGT: 53.0 LB MAN
CAD: 0014176/CAFE2511

BILL SENDER

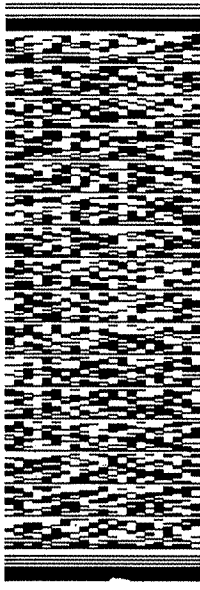
TO **VALERIE DAVIS**
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171
REF: MR1A015AGWKO



FedEx
Express



WED - 15 AUG A1
PRIORITY OVERNIGHT

TRK# 7209 7856 8952
0201

XX CHSA

29407
SC-US CHS



Part # 156148-434 RIT2 10/11 80

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.

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorate by LC/MSMS
ARS International (ARSL)
SDG 12-1495**

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: 1238723

Prep Batch Number: 1238722

Sample Analysis

Sample ID	Client ID
309669002	CASA-12-21649
309669004	CASA-12-21650
309669006	CASA-12-22310
1202720856	Interference Check Sample (ICS)
1202720852	Method Blank (MB)
1202720853	Laboratory Control Sample (LCS)
1202720854	309669002(CASA-12-21649) Matrix Spike (MS)
1202720855	309669002(CASA-12-21649) 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# 9.

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this SDG.

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

ICV Requirements

All associated initial calibration verification standards (ICV) met the acceptance criteria.

CCB Requirements

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

CCV Requirements

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

Low Level Standard (CRI) Requirements

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

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

The MB analyzed with this SDG met the acceptance criteria.

Interference Check Sample (ICS)

The interference check sample (ICS) met all recovery acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Client sample 309669002 (CASA-12-21649) 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 RPD(s) 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

Samples 309669004 (CASA-12-21650) and 309669006 (CASA-12-22310) were diluted to bring the over range concentrations 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: 12-1495 GEL Work Order: 309669

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: 27 AUG 2012

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1238722Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-12-21649Date Received: 15-AUG-12GEL Job No (SDG): 12-1495GEL Sample ID: 309669002Date Filtered: 22-AUG-12Injection 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	0.497	ug/L		1	22-AUG-12 16:33	per0822024a
	Perchlorate Isotope Ratio			3.25			1	22-AUG-12 16:33	per0822024a
14797-73-0	Perchlorate-101	.05	.2	0.529	ug/L		1	22-AUG-12 16:33	per0822024a
	Perchlorate-O(18)			0.556	ug/L		1	22-AUG-12 16:33	per0822024a

^ 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: 1238722Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-12-21650Date Received: 15-AUG-12GEL Job No (SDG): 12-1495GEL Sample ID: 309669004Date Filtered: 22-AUG-12Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.1	.4	1.03	ug/L		2	23-AUG-12 14:25	per0823012a
	Perchlorate Isotope Ratio			3.24			2	23-AUG-12 14:25	per0823012a
14797-73-0	Perchlorate-101	.1	.4	1.03	ug/L		2	23-AUG-12 14:25	per0823012a
	Perchlorate-O(18)			1.09	ug/L		2	23-AUG-12 14:25	per0823012a

^ 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: 1238722Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-12-22310Date Received: 15-AUG-12GEL Job No (SDG): 12-1495GEL Sample ID: 309669006Date Filtered: 22-AUG-12Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.1	.4	1.02	ug/L		2	23-AUG-12 14:33	per0823013a
	Perchlorate Isotope Ratio			3.23			2	23-AUG-12 14:33	per0823013a
14797-73-0	Perchlorate-101	.1	.4	1.03	ug/L		2	23-AUG-12 14:33	per0823013a
	Perchlorate-O(18)			1.08	ug/L		2	23-AUG-12 14:33	per0823013a

^ 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): 12-1495

Extract Batch Code: 1238722

Date Filtered: 22-AUG-12

Matrix: WATER

Sample ID: 1202720853

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.196	ug/L	98.0		85 - 115
Perchlorate Isotope Ratio		3.15				-
Perchlorate-101	0.200	.215	ug/L	108		85 - 115
Perchlorate-O(18)		.51	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): 12-1495

Extract Batch Code: 1238722

Date Extracted: 22-AUG-12

GEL MS/PS ID: 1202720854

Client ID: CASA-12-21649

GEL MSD/PSD ID: 1202720855

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	0.497	ug/L	0.684	93.4	.705	104	2.96	30	75 - 125
Perchlorate Isotope Ratio	0	3.25		3.27		3.3		.742		-
Perchlorate-101	0.200	0.529	ug/L	0.723	96.9	.739	105	2.21	30	75 - 125
Perchlorate-O(18)	0	0.556	ug/L	0.550		.558		1.52		-

^ 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: 1238722Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 22-AUG-12GEL Job No (SDG): 12-1495GEL Sample ID: 1202720852Date Filtered: 22-AUG-12Injection 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	0.050	ug/L	U	1	22-AUG-12 15:03	per0822012a
	Perchlorate Isotope Ratio						1	22-AUG-12 15:03	per0822012a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	22-AUG-12 15:03	per0822012a
	Perchlorate-O(18)			0.503	ug/L		1	22-AUG-12 15:03	per0822012a

^ 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: 1238722Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 22-AUG-12GEL Job No (SDG): 12-1495GEL Sample ID: 1202720853Date Filtered: 22-AUG-12Injection 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	0.196	ug/L	J	1	22-AUG-12 15:10	per0822013a
	Perchlorate Isotope Ratio			3.15			1	22-AUG-12 15:10	per0822013a
14797-73-0	Perchlorate-101	.05	.2	0.215	ug/L		1	22-AUG-12 15:10	per0822013a
	Perchlorate-O(18)			0.510	ug/L		1	22-AUG-12 15:10	per0822013a

^ 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: 1238722Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 12-1495GEL Sample ID: 1202720856Date Filtered: 22-AUG-12Injection 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	0.228	ug/L		1	22-AUG-12 15:18	per0822014a
	Perchlorate Isotope Ratio			3.21			1	22-AUG-12 15:18	per0822014a
14797-73-0	Perchlorate-101	.05	.2	0.245	ug/L		1	22-AUG-12 15:18	per0822014a
	Perchlorate-O(18)			0.555	ug/L		1	22-AUG-12 15:18	per0822014a

^ 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: 1238722Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-12-21649MSDate Received: 15-AUG-12GEL Job No (SDG): 12-1495GEL Sample ID: 1202720854Date Filtered: 22-AUG-12Injection 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	0.684	ug/L		1	22-AUG-12 16:41	per0822025a
	Perchlorate Isotope Ratio			3.27			1	22-AUG-12 16:41	per0822025a
14797-73-0	Perchlorate-101	.05	.2	0.723	ug/L		1	22-AUG-12 16:41	per0822025a
	Perchlorate-O(18)			0.550	ug/L		1	22-AUG-12 16:41	per0822025a

^ 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: 1238722Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-12-21649MSDDate Received: 15-AUG-12GEL Job No (SDG): 12-1495GEL Sample ID: 1202720855Date Filtered: 22-AUG-12Injection 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	0.705	ug/L		1	22-AUG-12 16:48	per0822026a
	Perchlorate Isotope Ratio			3.3			1	22-AUG-12 16:48	per0822026a
14797-73-0	Perchlorate-101	.05	.2	0.739	ug/L		1	22-AUG-12 16:48	per0822026a
	Perchlorate-O(18)			0.558	ug/L		1	22-AUG-12 16:48	per0822026a

^ 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 12-1495**

Sample Analysis

Sample ID	Client ID
309669002	CASA-12-21649
309669004	CASA-12-21650
309669006	CASA-12-22310
1202721241	Method Blank (MB) ICP
1202721242	Laboratory Control Sample (LCS)
1202721245	309709002(CAMO-12-21793L) Serial Dilution (SD)
1202721243	309709002(CAMO-12-21793D) Sample Duplicate (DUP)
1202721244	309709002(CAMO-12-21793S) Matrix Spike (MS)
1202721231	Method Blank (MB) ICP-MS
1202721232	Laboratory Control Sample (LCS)
1202721235	309709002(CAMO-12-21793L) Serial Dilution (SD)
1202721233	309709002(CAMO-12-21793D) Sample Duplicate (DUP)
1202721234	309709002(CAMO-12-21793S) Matrix Spike (MS)
1202729830	Method Blank (MB) CVAA
1202729831	Laboratory Control Sample (LCS)
1202729839	309781001(WTRO-12-22560L) Serial Dilution (SD)
1202729834	309781001(WTRO-12-22560D) Sample Duplicate (DUP)
1202729835	309781001(WTRO-12-22560S) Matrix Spike (MS)

Method/Analysis Information

Analytical Batch:	1238931, 1238926, 1242339 and 1244992
Prep Batch :	1238929, 1238925 and 1242337
Standard Operating Procedures:	GL-MA-E-013 REV# 21, GL-MA-E-006 REV# 9, GL-MA-E-014 REV# 24, GL-MA-E-010 REV# 25 and GL-GC-E-107 REV# 7
Analytical Method:	SW846 3005/6010B, SW846 3005/6020 DOE-AL, EPA 245.1/245.2 and SM 2340 B

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

Preparation/Analytical Method Verification

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

System Configuration

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

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

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

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

Calibration Information

Instrument Calibration

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

CRDL Requirements

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

ICSA/ICSAB Statement

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

Continuing Calibration Blank (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

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

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 309709002 (CAMO-12-21793)-ICP and ICP-MS and 309781001 (WTRO-12-22560)-CVAA.

Matrix Spike (MS) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

Serial Dilution % Difference Statement

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

Technical Information**Holding Time Specifications**

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

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

Preparation Information

The samples in this SDG were prepared exactly according to the cited SOP.

Miscellaneous Information**Electronic Packaging Comment**

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

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

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

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

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

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

Certification Statement

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

narrative.

Review Validation:

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

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

Reviewer: Nick-Cole A. Elmore **Date:** 09.11.12

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: 12-1495 GEL Work Order: 309669

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.

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 detection limit.

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

 09.11.12

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 12-1495

METHOD TYPE: EPA

SAMPLE ID: 309669002

CLIENT ID: CASA-12-21649

CONTRACT: ESHL00210

MATRIX:W

DATE RECEIVED 15-AUG-12

LEVEL: Low %SOLIDS:

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7439-97-6	Mercury	0.067	ug/L	U		AV	0.067	1	MER536	083112W1-5
7429-90-5	Aluminum	68	ug/L	U		P	68	1	OPTIMA3	082712-1
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS5	120905-3
7440-38-2	Arsenic	2.49	ug/L	J		MS	1.7	1	ICPMS5	120906-4
7440-39-3	Barium	18.1	ug/L			P	1	1	OPTIMA3	082712-1
7440-41-7	Beryllium	1	ug/L	U		P	1	1	OPTIMA3	082712-1
7440-42-8	Boron	38.6	ug/L	J		P	15	1	OPTIMA3	082712-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS5	120905-3
7440-70-2	Calcium	16600	ug/L			P	50	1	OPTIMA3	082712-1
7440-47-3	Chromium	2.85	ug/L	J		MS	2	1	ICPMS5	120905-3
7440-48-4	Cobalt	1	ug/L	U		P	1	1	OPTIMA3	082712-1
7440-50-8	Copper	3	ug/L	U		P	3	1	OPTIMA3	082712-1
7439-89-6	Iron	30	ug/L	U		P	30	1	OPTIMA3	082712-1
7439-92-1	Lead	0.5	ug/L	U		MS	0.5	1	ICPMS5	120905-3
7439-95-4	Magnesium	4680	ug/L			P	110	1	OPTIMA3	082712-1
7439-96-5	Manganese	2	ug/L	U		P	2	1	OPTIMA3	082712-1
7439-98-7	Molybdenum	1.57	ug/L			MS	0.165	1	ICPMS5	120906-4
7440-02-0	Nickel	0.695	ug/L	J		MS	0.5	1	ICPMS5	120905-3
7440-09-7	Potassium	1510	ug/L			P	50	1	OPTIMA3	082712-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS5	120906-4
7631-86-9	Silica	69600	ug/L			P	53	1	OPTIMA3	082712-1
7440-22-4	Silver	0.2	ug/L	U		MS	0.2	1	ICPMS5	120905-3
7440-23-5	Sodium	16600	ug/L			P	100	1	OPTIMA3	082712-1
7440-24-6	Strontium	103	ug/L			P	1	1	OPTIMA3	082712-1
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS5	120905-3
7440-31-5	Tin	2.5	ug/L	U		P	2.5	1	OPTIMA3	082712-1

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 12-1495**METHOD TYPE:** EPA**SAMPLE ID:** 309669002**CLIENT ID:** CASA-12-21649**CONTRACT:** ESHL00210**MATRIX:**W**DATE RECEIVED** 15-AUG-12**LEVEL:** Low **%SOLIDS:**

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	1.02	ug/L			MS	0.067	1	ICPMS5	120905-3
7440-62-2	Vanadium	8.09	ug/L			P	1	1	OPTIMA3	082712-1
7440-66-6	Zinc	3.3	ug/L	U		P	3.3	1	OPTIMA3	082712-1
	Hardness as CaCO3	60.8	mg/L				0.453	1	CALC001	

***Analytical Methods:**

MS SW846 3005/6020 DOE-AL
P SW846 3005/6010B
AV EPA 245.1/245.2
SM 2340 B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 12-1495

METHOD TYPE: EPA

SAMPLE ID: 309669004

CLIENT ID: CASA-12-21650

CONTRACT: ESHL00210

MATRIX:W

DATE RECEIVED 15-AUG-12

LEVEL: Low %SOLIDS:

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7439-97-6	Mercury	0.067	ug/L	U		AV	0.067	1	MER536	083112W1-5
7429-90-5	Aluminum	68	ug/L	U		P	68	1	OPTIMA3	082712-1
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS5	120905-3
7440-38-2	Arsenic	1.91	ug/L	J		MS	1.7	1	ICPMS5	120906-4
7440-39-3	Barium	68.5	ug/L			P	1	1	OPTIMA3	082712-1
7440-41-7	Beryllium	1	ug/L	U		P	1	1	OPTIMA3	082712-1
7440-42-8	Boron	22.7	ug/L	J		P	15	1	OPTIMA3	082712-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS5	120905-3
7440-70-2	Calcium	69400	ug/L			P	50	1	OPTIMA3	082712-1
7440-47-3	Chromium	491	ug/L			MS	2	1	ICPMS5	120905-3
7440-48-4	Cobalt	1	ug/L	U		P	1	1	OPTIMA3	082712-1
7440-50-8	Copper	3	ug/L	U		P	3	1	OPTIMA3	082712-1
7439-89-6	Iron	30	ug/L	U		P	30	1	OPTIMA3	082712-1
7439-92-1	Lead	0.5	ug/L	U		MS	0.5	1	ICPMS5	120905-3
7439-95-4	Magnesium	16200	ug/L			P	110	1	OPTIMA3	082712-1
7439-96-5	Manganese	2	ug/L	U		P	2	1	OPTIMA3	082712-1
7439-98-7	Molybdenum	0.727	ug/L			MS	0.165	1	ICPMS5	120906-4
7440-02-0	Nickel	17.6	ug/L			MS	0.5	1	ICPMS5	120905-3
7440-09-7	Potassium	3730	ug/L			P	50	1	OPTIMA3	082712-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS5	120906-4
7631-86-9	Silica	66700	ug/L			P	53	1	OPTIMA3	082712-1
7440-22-4	Silver	0.2	ug/L	U		MS	0.2	1	ICPMS5	120905-3
7440-23-5	Sodium	22500	ug/L			P	100	1	OPTIMA3	082712-1
7440-24-6	Strontium	336	ug/L			P	1	1	OPTIMA3	082712-1
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS5	120905-3
7440-31-5	Tin	25	ug/L	U		P	25	10	OPTIMA3	082812A-2

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 12-1495**METHOD TYPE:** EPA**SAMPLE ID:** 309669004**CLIENT ID:** CASA-12-21650**CONTRACT:** ESHL00210**MATRIX:**W**DATE RECEIVED** 15-AUG-12**LEVEL:** Low **%SOLIDS:**

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	1.83	ug/L			MS	0.067	1	ICPMS5	120905-3
7440-62-2	Vanadium	1.56	ug/L	J		P	1	1	OPTIMA3	082712-1
7440-66-6	Zinc	3.3	ug/L	U		P	3.3	1	OPTIMA3	082712-1
	Hardness as CaCO3	240	mg/L				0.453	1	CALC001	

***Analytical Methods:**

MS SW846 3005/6020 DOE-AL
P SW846 3005/6010B
AV EPA 245.1/245.2
SM 2340 B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 12-1495

METHOD TYPE: EPA

SAMPLE ID: 309669006

CLIENT ID: CASA-12-22310

CONTRACT: ESHL00210

MATRIX:W

DATE RECEIVED 15-AUG-12

LEVEL: Low %SOLIDS:

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7439-97-6	Mercury	0.067	ug/L	U		AV	0.067	1	MER536	083112W1-5
7429-90-5	Aluminum	68	ug/L	U		P	68	1	OPTIMA3	082712-1
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS5	120905-3
7440-38-2	Arsenic	1.7	ug/L	U		MS	1.7	1	ICPMS5	120906-4
7440-39-3	Barium	69.2	ug/L			P	1	1	OPTIMA3	082712-1
7440-41-7	Beryllium	1	ug/L	U		P	1	1	OPTIMA3	082712-1
7440-42-8	Boron	23.3	ug/L	J		P	15	1	OPTIMA3	082712-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS5	120905-3
7440-70-2	Calcium	70300	ug/L			P	50	1	OPTIMA3	082712-1
7440-47-3	Chromium	453	ug/L			MS	2	1	ICPMS5	120905-3
7440-48-4	Cobalt	1	ug/L	U		P	1	1	OPTIMA3	082712-1
7440-50-8	Copper	3	ug/L	U		P	3	1	OPTIMA3	082712-1
7439-89-6	Iron	30	ug/L	U		P	30	1	OPTIMA3	082712-1
7439-92-1	Lead	0.5	ug/L	U		MS	0.5	1	ICPMS5	120905-3
7439-95-4	Magnesium	16400	ug/L			P	110	1	OPTIMA3	082712-1
7439-96-5	Manganese	2	ug/L	U		P	2	1	OPTIMA3	082712-1
7439-98-7	Molybdenum	0.676	ug/L			MS	0.165	1	ICPMS5	120906-4
7440-02-0	Nickel	15.9	ug/L			MS	0.5	1	ICPMS5	120905-3
7440-09-7	Potassium	3730	ug/L			P	50	1	OPTIMA3	082712-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS5	120906-4
7631-86-9	Silica	67500	ug/L			P	53	1	OPTIMA3	082712-1
7440-22-4	Silver	0.2	ug/L	U		MS	0.2	1	ICPMS5	120905-3
7440-23-5	Sodium	22500	ug/L			P	100	1	OPTIMA3	082712-1
7440-24-6	Strontium	338	ug/L			P	1	1	OPTIMA3	082712-1
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS5	120905-3
7440-31-5	Tin	25	ug/L	U		P	25	10	OPTIMA3	082812A-2

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 12-1495**METHOD TYPE:** EPA**SAMPLE ID:** 309669006**CLIENT ID:** CASA-12-22310**CONTRACT:** ESHL00210**MATRIX:**W**DATE RECEIVED** 15-AUG-12**LEVEL:** Low **%SOLIDS:**

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	1.63	ug/L			MS	0.067	1	ICPMS5	120905-3
7440-62-2	Vanadium	1.59	ug/L	J		P	1	1	OPTIMA3	082712-1
7440-66-6	Zinc	3.3	ug/L	U		P	3.3	1	OPTIMA3	082712-1
	Hardness as CaCO3	243	mg/L				0.453	1	CALC001	

***Analytical Methods:**

MS SW846 3005/6020 DOE-AL
P SW846 3005/6010B
AV EPA 245.1/245.2
SM 2340 B

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 12-1495
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>
1202721231	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
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Selenium	1.5	ug/L	+/-5	U	MS	1.5	5
	Silver	0.2	ug/L	+/-1	U	MS	0.2	1
	Thallium	0.45	ug/L	+/-2	U	MS	0.45	2
	Uranium	0.074	ug/L	+/-0.2	J	MS	0.067	0.2
1202721241	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1202729830	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

*Analytical Methods:

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

METALS

-5a-

Matrix Spike Summary

SDG NO. 12-1495

Client ID: CAMO-12-21793S

Contract: ESHL00210

Level: Low

Matrix: WATER

% Solids:

Sample ID: 309709002

Spike ID: 1202721234

<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	213		1	U	200	106		MS
Arsenic	ug/L	75-125	80.8		3.55	J	80	96.6		MS
Cadmium	ug/L	75-125	10.5		0.11	U	10	105		MS
Chromium	ug/L	75-125	53.8		2	U	50	105		MS
Lead	ug/L	75-125	41.5		0.5	U	40	104		MS
Molybdenum	ug/L	75-125	93.2		41.2		50	104		MS
Nickel	ug/L	75-125	50.2		2.28		50	95.9		MS
Selenium	ug/L	75-125	20.2		1.84	J	20	91.6		MS
Silver	ug/L	75-125	53.4		0.2	U	50	107		MS
Thallium	ug/L	75-125	97.1		0.45	U	100	97.1		MS
Uranium	ug/L	75-125	52.8		0.817		50	104		MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

METALS

-5a-

Matrix Spike Summary

SDG NO. 12-1495

Client ID: CAMO-12-21793S

Contract: ESHL00210

Level: Low

Matrix: WATER

% Solids:

Sample ID: 309709002

Spike ID: 1202721244

<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	4930		68	U	5000	97.5		P
Barium	ug/L	75-125	708		202		500	101		P
Beryllium	ug/L	75-125	521		1	U	500	104		P
Boron	ug/L	75-125	576		63.3		500	102		P
Calcium	ug/L		30200		25400		5000	96.6	N/A	P
Cobalt	ug/L	75-125	518		1	U	500	104		P
Copper	ug/L	75-125	533		3.01	J	500	106		P
Iron	ug/L	75-125	5260		36.6	J	5000	105		P
Magnesium	ug/L	75-125	10400		5340		5000	102		P
Manganese	ug/L	75-125	500		3.93	J	500	99.1		P
Potassium	ug/L	75-125	21000		16500		5000	88.7		P
Silica	ug/L		53200		43000		10700	95.9	N/A	P
Sodium	ug/L		58500		54500		5000	79	N/A	P
Strontium	ug/L	75-125	655		154		500	100		P
Tin	ug/L	75-125	576		12.5	U	500	115		P
Vanadium	ug/L	75-125	531		2.11	J	500	106		P
Zinc	ug/L	75-125	513		4.08	J	500	102		P

*Analytical Methods:

P SW846 3005/6010B

METALS

-5a-

Matrix Spike Summary

SDG NO. 12-1495

Client ID: WTRO-12-22560S

Contract: ESHL00510

Level: Low

Matrix: STORM WATER

% Solids:

Sample ID: 309781001

Spike ID: 1202729835

<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	2.34		0.067	U	2	117		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 12-1495

Lab Code: GEL

Contract: ESHL00210

Client ID: CAMO-12-21793D

Matrix: LIQUID

Level: Low

Sample ID: 309709002

Duplicate ID: 1202721233

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	3.55 J		3.9 J		9.38		MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L		2 U		2 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/-20%	41.2		40.1		2.74		MS
Nickel	ug/L	+/-2	2.28		3.61		45.2		MS
Selenium	ug/L	+/-5	1.84 J		2.03 J		9.61		MS
Silver	ug/L		0.2 U		0.2 U				MS
Thallium	ug/L		0.45 U		0.45 U				MS
Uranium	ug/L	+/-2	0.817		0.825		.974		MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

Metals
-6-
Duplicate Sample Summary

SDG No.: 12-1495

Lab Code: GEL

Contract: ESHL00210

Client ID: CAMO-12-21793D

Matrix: LIQUID

Level: Low

Sample ID: 309709002

Duplicate ID: 1202721243

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%	202		205		1.11		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	63.3		64.6		2.04		P
Calcium	ug/L	+/-20%	25400		25600		1.11		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3.01 J		3 U		200		P
Iron	ug/L		36.6 J		30 U		200		P
Magnesium	ug/L	+/-20%	5340		5340		.114		P
Manganese	ug/L		3.93 J		2 U		200		P
Potassium	ug/L	+/-20%	16500		16700		.885		P
Silica	ug/L	+/-20%	43000		43400		1.12		P
Sodium	ug/L	+/-20%	54500		55600		1.85		P
Strontium	ug/L	+/-20%	154		156		1.28		P
Tin	ug/L		12.5 U		12.5 U				P
Vanadium	ug/L	+/-5	2.11 J		2.12 J		.733		P
Zinc	ug/L		4.08 J		3.3 U		200		P

*Analytical Methods:

P SW846 3005/6010B

Metals
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Duplicate Sample Summary

SDG No.: 12-1495**Lab Code:** GEL**Contract:** ESHL00210**Client ID:** WTRO-12-22560D**Matrix:** LIQUID**Level:** Low**Sample ID:** 309781001**Duplicate ID:** 1202729834**Percent Solids for Dup:** N/A

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

***Analytical Methods:**

AV EPA 245.1/245.2

METALS

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Laboratory Control Sample Summary

SDG NO. 12-1495

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>
1202721232								
	Antimony	ug/L	50	50.7		101	80-120	MS
	Arsenic	ug/L	50	50.9		102	80-120	MS
	Cadmium	ug/L	50	51.2		102	80-120	MS
	Chromium	ug/L	50	51.4		103	80-120	MS
	Lead	ug/L	50	53.5		107	80-120	MS
	Molybdenum	ug/L	50	51.8		104	80-120	MS
	Nickel	ug/L	50	52.3		105	80-120	MS
	Selenium	ug/L	50	50.8		102	80-120	MS
	Silver	ug/L	50	52.6		105	80-120	MS
	Thallium	ug/L	50	49.2		98.5	80-120	MS
	Uranium	ug/L	50	52.8		106	80-120	MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

METALS

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Laboratory Control Sample Summary

SDG NO. 12-1495

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>
1202721242								
	Aluminum	ug/L	5000	5070		101	80-120	P
	Barium	ug/L	500	534		107	80-120	P
	Beryllium	ug/L	500	535		107	80-120	P
	Boron	ug/L	500	522		104	80-120	P
	Calcium	ug/L	5000	5410		108	80-120	P
	Cobalt	ug/L	500	546		109	80-120	P
	Copper	ug/L	500	538		108	80-120	P
	Iron	ug/L	5000	5390		108	80-120	P
	Magnesium	ug/L	5000	5420		108	80-120	P
	Manganese	ug/L	500	526		105	80-120	P
	Potassium	ug/L	5000	5250		105	80-120	P
	Silica	ug/L	10700	11300		105	80-120	P
	Sodium	ug/L	5000	5260		105	80-120	P
	Strontium	ug/L	500	520		104	80-120	P
	Tin	ug/L	500	554		111	80-120	P
	Vanadium	ug/L	500	542		108	80-120	P
	Zinc	ug/L	500	525		105	80-120	P

*Analytical Methods:

P SW846 3005/6010B

METALS

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Laboratory Control Sample Summary

SDG NO. 12-1495

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>
1202729831	Mercury	ug/L	2	2.07		104	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 12-1495

Client ID: CAMO-12-21793L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 309709002

Serial Dilution ID: 1202721235

<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	3.55	J	8.5	U	100			MS
Cadmium	.11	U	.55	U				MS
Chromium	2	U	10	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	41.2		37.9		8.07		10	MS
Nickel	2.28		2.5	U	100			MS
Selenium	1.84	J	7.5	U	100			MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.25	U				MS
Uranium	.817		.745	J	8.81			MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

METALS

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Serial Dilution Sample Summary

SDG NO. 12-1495

Client ID: CAMO-12-21793L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 309709002

Serial Dilution ID: 1202721245

<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	202		195		3.79		10	P
Beryllium	1	U	5	U				P
Boron	63.3		75	U	100			P
Calcium	25400		25000		1.57		10	P
Cobalt	1	U	5	U				P
Copper	3.01	J	15	U	100			P
Iron	36.6	J	150	U	100			P
Magnesium	5340		5320		.242			P
Manganese	3.93	J	10	U	100			P
Potassium	16500		16600		.441		10	P
Silica	43000		42200		1.85		10	P
Sodium	54500		54800		.484		10	P
Strontium	154		151		2.08		10	P
Tin	2.5	U	12.5	U				P
Vanadium	2.11	J	5	U	100			P
Zinc	4.08	J	16.5	U	100			P

*Analytical Methods:

P SW846 3005/6010B

METALS

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Serial Dilution Sample Summary

SDG NO. 12-1495 **Client ID:** WTRO-12-22560L**Contract:** ESHL00210**Matrix:** LIQUID **Level:** Low**Sample ID:** 309781001 **Serial Dilution ID:** 1202729839

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Mercury	.067	U	.335	U				AV

*Analytical Methods:

AV EPA 245.1/245.2

General Chem Analysis

Case Narrative

**General Chemistry Narrative
ARS International (ARSL)
SDG 12-1495**

Method/Analysis Information

Product: Carbon, Total Organic

Analytical Batch: 1238959

Method: SW 9060 Total Organic Carbon

Sample Analysis

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

Sample ID	Client ID
309669001	CASA-12-21645
309669003	CASA-12-21646
309669005	CASA-12-22309
1202721306	Method Blank (MB)
1202721307	309548006(CAMO-12-21786) Sample Duplicate (DUP)
1202721308	309548006(CAMO-12-21786) Post Spike (PS)
1202721309	Laboratory Control Sample (LCS)
1202722598	309870001(CAMO-12-21738) Sample Duplicate (DUP)
1202722599	309870001(CAMO-12-21738) Post Spike (PS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-093 REV# 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 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 samples were selected for QC analysis: 309548006 (CAMO-12-21786) and 309870001 (CAMO-12-21738).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The following samples were re-analyzed to verify the results: 1202722598 (CAMO-12-21738) and 1202722599 (CAMO-12-21738).

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: 1241565

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
309669002	CASA-12-21649
309669004	CASA-12-21650
309669006	CASA-12-22310
1202727788	309669002(CASA-12-21649) Sample Duplicate (DUP)
1202727789	309548008(CAMO-12-21796) Sample Duplicate (DUP)
1202727790	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 samples were selected for QC analysis: 309548008 (CAMO-12-21796) and 309669002

(CASA-12-21649).

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: 1239874 **Method:** EPA 150.1 pH

Sample Analysis

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

Sample ID	Client ID
309669002	CASA-12-21649
309669004	CASA-12-21650
309669006	CASA-12-22310
1202723542	309454002(CAMO-12-21743) Sample Duplicate (DUP)
1202723543	309669002(CASA-12-21649) Sample Duplicate (DUP)
1202723544	Laboratory Control Sample (LCS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information (CCV)

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

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 309454002 (CAMO-12-21743) and 309669002 (CASA-12-21649).

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

The following samples from this sample group were received by the lab outside of the method specified holding time: 309669002 (CASA-12-21649), 309669004 (CASA-12-21650) and 309669006 (CASA-12-22310).

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: 1112791 309669002 (CASA-12-21649), 309669004 (CASA-12-21650) and 309669006 (CASA-12-22310).

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: 1238086

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:

Sample ID	Client ID
309669002	CASA-12-21649
309669004	CASA-12-21650
309669006	CASA-12-22310
1202719109	Method Blank (MB)
1202719113	309548002(CAMO-12-21794) Sample Duplicate (DUP)
1202719114	309548002(CAMO-12-21794) Post Spike (PS)
1202719115	Laboratory Control Sample (LCS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 21.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 309548002 (CAMO-12-21794).

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 following samples in this sample group were diluted due to high concentration: 309669004 (CASA-12-21650) and 309669006 (CASA-12-22310).

Sample Re-analysis

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

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

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

Manual Integrations

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202719113 (CAMO-12-21794), 1202719114 (CAMO-12-21794), 309669002 (CASA-12-21649), 309669004 (CASA-12-21650) and 309669006 (CASA-12-22310).

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: 1237606 **Method:** EPA 350.1 Nitrogen and Ammonia L

Prep Batch : 1237605 **Method:** EEPA 350.2 Prep

Sample Analysis

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

Sample ID	Client ID
309669002	CASA-12-21649
309669004	CASA-12-21650
309669006	CASA-12-22310
1202717810	Method Blank (MB)
1202717811	309454002(CAMO-12-21743) Sample Duplicate (DUP)
1202717812	309454002(CAMO-12-21743) Matrix Spike (MS)
1202717813	309454002(CAMO-12-21743) Matrix Spike Duplicate (MSD)
1202717814	Laboratory Control Sample (LCS)
1202720910	309548002(CAMO-12-21794) Sample Duplicate (DUP)
1202720911	309548002(CAMO-12-21794) Matrix Spike (MS)
1202720912	309548002(CAMO-12-21794) Matrix Spike Duplicate (MSD)

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# 8.

Preparation/Analytical Method Verification

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

Calibration Information

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

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: 309454002 (CAMO-12-21743) and 309548002 (CAMO-12-21794).

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

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

Matrix Spike Duplicate (MSD) Recovery Statement

The spike duplicate recovery falls outside of the established acceptance limits. Since both the spike recovery and the RPD between the spike and spike duplicate fall within acceptance limits, the data is reported. 1202720912 (CAMO-12-21794).

MS/MSD Relative Percent Difference (RPD) Statement

The RPDs between the spike and spike duplicate met the 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: 1202717811 (CAMO-12-21743). The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1202720910 (CAMO-12-21794).

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The following samples were re-analyzed to verify the results: 1202717811 (CAMO-12-21743), 1202717812 (CAMO-12-21743) and 1202717813 (CAMO-12-21743).

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

The following DER was generated for this SDG: 1112653 1202717811 (CAMO-12-21743) and 1202720912 (CAMO-12-21794).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1237603	Method:	Nitrogen and Total Kjeldahl (TKN)
Prep Batch :	1237601	Method:	EEPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
309669001	CASA-12-21645
309669003	CASA-12-21646
309669005	CASA-12-22309
1202717799	Method Blank (MB)
1202717800	309454001(CAMO-12-21735) Sample Duplicate (DUP)
1202717801	309454001(CAMO-12-21735) Matrix Spike (MS)
1202717802	309454001(CAMO-12-21735) Matrix Spike Duplicate (MSD)
1202717803	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# 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 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: 309454001 (CAMO-12-21735).

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

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

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recovery for this sample set was within the required acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the spike and spike duplicate met the 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. 1202717800 (CAMO-12-21735).

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The following samples were re-analyzed due to CCV failure: 1202717799 (MB) and 1202717803 (LCS). The following sample was re-analyzed to verify the result: 309669001 (CASA-12-21645).

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:	Nitrate Nitrite by Cadmium Reduction		
Analytical Batch:	1239601	Method:	EPA 353.2 Nitrogen and Nitrate/Nitrite

Sample Analysis

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

Sample ID	Client ID
309669002	CASA-12-21649
309669004	CASA-12-21650
309669006	CASA-12-22310
1202722832	Method Blank (MB)
1202722833	309548002(CAMO-12-21794) Sample Duplicate (DUP)
1202722834	309785001(SWWS46-12-22928) Sample Duplicate (DUP)
1202722835	309548002(CAMO-12-21794) Post Spike (PS)
1202722836	309785001(SWWS46-12-22928) Post Spike (PS)
1202722837	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# 7.

Preparation/Analytical Method Verification

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

Calibration Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 309548002 (CAMO-12-21794) and 309785001 (SWWS46-12-22928).

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

The spike recovery falls outside of the GEL acceptance limits but within the client specified limits. 1202722835 (CAMO-12-21794).

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: 309669004 (CASA-12-21650) and 309669006 (CASA-12-22310). The following samples in this sample group were diluted due to matrix interference: 1202722833 (CAMO-12-21794), 1202722835 (CAMO-12-21794) and 309669002 (CASA-12-21649).

Sample Re-analysis

The following samples were reanalyzed due to PS failure: 1202722833 (CAMO-12-21794) and 1202722835 (CAMO-12-21794). The following samples were re-analyzed to verify the results: 1202722832 (MB) and 1202722837 (LCS).

Miscellaneous Information

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1112776 1202722835 (CAMO-12-21794).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1239580	Method:	EPA 365.4 Phosphorus and Total in
Prep Batch :	1239579	Method:	EEPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
309669002	CASA-12-21649
309669004	CASA-12-21650
309669006	CASA-12-22310
1202722776	Method Blank (MB)
1202722777	309548002(CAMO-12-21794) Sample Duplicate (DUP)
1202722779	309548002(CAMO-12-21794) Matrix Spike (MS)
1202722781	309548002(CAMO-12-21794) Matrix Spike Duplicate (MSD)
1202722783	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# 8.

Preparation/Analytical Method Verification

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

Calibration Information

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

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: 309548002 (CAMO-12-21794).

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

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

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recovery for this sample set was within the required acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the spike and spike duplicate met the acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Solids, Total Dissolved

Analytical Batch: 1238748

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:

Sample ID	Client ID
309669002	CASA-12-21649
309669004	CASA-12-21650
309669006	CASA-12-22310
1202720890	Method Blank (MB)
1202720891	309669006(CASA-12-22310) Sample Duplicate (DUP)
1202720892	Laboratory Control Sample (LCS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-001 REV# 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 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: 309669006 (CASA-12-22310).

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 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: 1239566 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
309669002	CASA-12-21649
309669004	CASA-12-21650
309669006	CASA-12-22310
1202722739	Laboratory Control Sample (LCS)
1202722740	309669002(CASA-12-21649) Sample Duplicate (DUP)
1202722741	309669002(CASA-12-21649) Matrix Spike (MS)
1202722742	Method Blank (MB)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

The Titration analysis was performed on a Manually operated buret.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 309669002 (CASA-12-21649).

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 Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Certification Statement

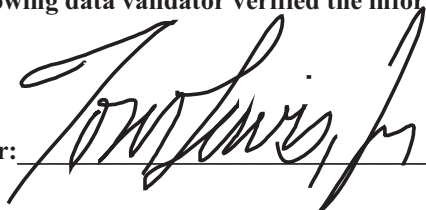
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

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

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

Reviewer:

A handwritten signature in black ink, appearing to read "Tom Lewis". The signature is written over a horizontal line that serves as a baseline for the signature and the date.

Date:

11Sep12

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: 12-1495 GEL Work Order: 309669

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

H Analytical holding time was exceeded

J Value is estimated

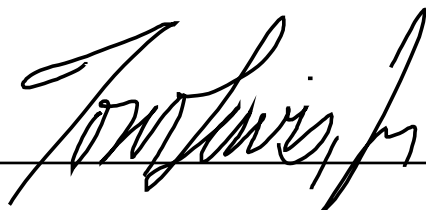
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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 detection limit.

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

Reviewed by

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: September 7, 2012

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

Client SDG: 12-1495

Client Sample ID: CASA-12-21645
Sample ID: 309669001
Matrix: W
Collect Date: 13-AUG-12 12:06
Receive Date: 15-AUG-12
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	0.641	0.330	1.00	mg/L	1	TSM	08/21/12	1658	1238959	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl	U	ND	0.035	0.100	mg/L	1	KLP1	08/30/12	1621	1237603	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	08/29/12	1630	1237601

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 351.2	

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 7, 2012

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

Contact: Keith Greene
Project: LANL-WQH Water Samples

Client SDG: 12-1495

Client Sample ID: CASA-12-21649
Sample ID: 309669002
Matrix: W
Collect Date: 13-AUG-12 12:06
Receive Date: 15-AUG-12
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		186	1.00	1.00	umhos/cm	1	TXT1	08/28/12	1128	1241565	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 11.8C	H	8.71	0.010	0.100	SU	1	LXA1	08/21/12	1204	1239874	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide	U	ND	0.067	0.200	mg/L	1	VH1	08/22/12	0505	1238086	3
Chloride		3.72	0.067	0.200	mg/L	1					
Fluoride		0.285	0.033	0.100	mg/L	1					
Sulfate		4.15	0.133	0.400	mg/L	1					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia	J	0.0294	0.017	0.050	mg/L	1	KLP1	08/21/12	1129	1237606	4
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		1.33	0.085	0.250	mg/L	5	AXH3	08/21/12	1343	1239601	5
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P	J	0.0197	0.017	0.050	mg/L	1	KLP1	08/30/12	1313	1239580	6
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		154	3.40	14.3	mg/L		LYG1	08/16/12	0930	1238748	7
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		83.6	0.725	1.00	mg/L		LXA1	08/20/12	1516	1239566	8
Carbonate alkalinity (CaCO3)		10.6	0.725	1.00	mg/L						

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	08/20/12	1645	1237605
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	08/29/12	1630	1239579

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Certificate of Analysis

Report Date: September 7, 2012

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

Contact: Keith Greene
Project: LANL-WQH Water Samples

Client SDG: 12-1495

Client Sample ID: CASA-12-21649
Sample ID: 309669002

Project: ESHL00210
Client ID: ARSL001

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 7, 2012

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

Client SDG: 12-1495

Client Sample ID: CASA-12-21646
Sample ID: 309669003
Matrix: W
Collect Date: 13-AUG-12 10:42
Receive Date: 15-AUG-12
Collector: Client

Project: ESHL00210
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average		1.37	0.330	1.00	mg/L	1	TSM	08/21/12	1731	1238959	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl	U	ND	0.035	0.100	mg/L	1	KLP1	08/30/12	1507	1237603	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	08/29/12	1630	1237601

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 351.2	

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: September 7, 2012

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

Contact: Keith Greene
Project: LANL-WQH Water Samples

Client SDG: 12-1495

Client Sample ID: CASA-12-21650
Sample ID: 309669004
Matrix: W
Collect Date: 13-AUG-12 10:42
Receive Date: 15-AUG-12
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		600	1.00	1.00	umhos/cm	1	TXT1	08/28/12	1128	1241565	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 11.3C	H	7.86	0.010	0.100	SU	1	LXA1	08/21/12	1206	1239874	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide		0.590	0.067	0.200	mg/L	1	VH1	08/22/12	0533	1238086	3
Fluoride		0.186	0.033	0.100	mg/L	1					
Chloride		59.8	0.670	2.00	mg/L	10	VH1	08/22/12	1810	1238086	4
Sulfate		85.4	1.33	4.00	mg/L	10					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia	J	0.0436	0.017	0.050	mg/L	1	KLP1	08/21/12	1130	1237606	5
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		4.89	0.170	0.500	mg/L	10	AXH3	08/21/12	1344	1239601	6
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P	J	0.0429	0.017	0.050	mg/L	1	KLP1	08/30/12	1314	1239580	7
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		396	3.40	14.3	mg/L		LYG1	08/16/12	0930	1238748	8
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		83.6	0.725	1.00	mg/L		LXA1	08/20/12	1533	1239566	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	08/20/12	1645	1237605
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	08/29/12	1630	1239579

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Certificate of Analysis

Report Date: September 7, 2012

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

Contact: Keith Greene
Project: LANL-WQH Water Samples

Client SDG: 12-1495

Client Sample ID: CASA-12-21650
Sample ID: 309669004

Project: ESHL00210
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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										

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Los Alamos, New Mexico 87545

Contact: Keith Greene
Project: LANL-WQH Water Samples

Client SDG: 12-1495

Client Sample ID: CASA-12-22309
Sample ID: 309669005
Matrix: W
Collect Date: 13-AUG-12 10:42
Receive Date: 15-AUG-12
Collector: Client

Project: ESHL00210
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average		1.38	0.330	1.00	mg/L	1	TSM	08/21/12	1805	1238959	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl	J	0.0591	0.035	0.100	mg/L	1	KLP1	08/30/12	1508	1237603	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	08/29/12	1630	1237601

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 351.2	

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Certificate of Analysis

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

Client SDG: 12-1495

Client Sample ID: CASA-12-22310
Sample ID: 309669006
Matrix: W
Collect Date: 13-AUG-12 10:42
Receive Date: 15-AUG-12
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		596	1.00	1.00	umhos/cm	1	TXT1	08/28/12	1128	1241565	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 11.3C	H	7.78	0.010	0.100	SU	1	LXA1	08/21/12	1209	1239874	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide		0.581	0.067	0.200	mg/L	1	VH1	08/22/12	0601	1238086	3
Fluoride		0.185	0.033	0.100	mg/L	1					
Chloride		61.5	0.670	2.00	mg/L	10	VH1	08/22/12	1838	1238086	4
Sulfate		88.0	1.33	4.00	mg/L	10					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia		0.174	0.017	0.050	mg/L	1	KLP1	08/21/12	1131	1237606	5
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		4.78	0.170	0.500	mg/L	10	AXH3	08/21/12	1350	1239601	6
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P		0.0593	0.017	0.050	mg/L	1	KLP1	08/30/12	1315	1239580	7
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		400	3.40	14.3	mg/L		LYG1	08/16/12	0930	1238748	8
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		84.1	0.725	1.00	mg/L		LXA1	08/20/12	1542	1239566	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	08/20/12	1645	1237605
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	08/29/12	1630	1239579

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Certificate of Analysis

Report Date: September 7, 2012

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

Client SDG: 12-1495

Client Sample ID: CASA-12-22310
Sample ID: 309669006

Project: ESHL00210
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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										

Quality Control Summary

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QC Summary

Report Date: September 7, 2012

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

Contact: Keith Greene

Workorder: 309669

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1238959										
QC1202721307	309548006	DUP									
Total Organic Carbon Average			1.05	1.09	mg/L	3.46	^	(+/-1.00)	TSM	08/21/12	15:56
QC1202722598	309870001	DUP									
Total Organic Carbon Average	J	0.534	J	0.562	mg/L	5.11	^	(+/-1.00)		08/22/12	09:40
QC1202721309	LCS										
Total Organic Carbon Average	10.0			10.1	mg/L			101	(85%-115%)	08/21/12	14:40
QC1202721306	MB										
Total Organic Carbon Average			U	ND	mg/L					08/21/12	14:31
QC1202721308	309548006	PS									
Total Organic Carbon Average	10.0		1.05	10.4	mg/L			93.9	(65%-120%)	08/21/12	16:16
QC1202722599	309870001	PS									
Total Organic Carbon Average	10.0	J	0.534	10.1	mg/L			95.5	(65%-120%)	08/22/12	10:00
Conductivity Analysis											
Batch	1241565										
QC1202727788	309669002	DUP									
Conductivity			186	186	umhos/cm	0.00		(0%-10%)	TXT1	08/28/12	11:28
QC1202727789	309548008	DUP									
Conductivity			180	180	umhos/cm	0.333		(0%-10%)		08/28/12	11:27
QC1202727790	LCS										
Conductivity	1410			1410	umhos/cm			100	(95%-105%)	08/28/12	11:26
Electrode Analysis											
Batch	1239874										
QC1202723542	309454002	DUP									
pH	H	7.77	H	7.80	SU	0.385		(0%-10%)	LXA1	08/21/12	11:26
QC1202723543	309669002	DUP									
pH	H	8.71	H	8.73	SU	0.229		(0%-10%)		08/21/12	12:05
QC1202723544	LCS										
pH	7.00			7.02	SU			100	(99%-101%)	08/21/12	11:12
Ion Chromatography											
Batch	1238086										
QC1202719113	309548002	DUP									
Bromide	U	ND	U	ND	mg/L	N/A			VH1	08/22/12	03:40
Chloride		2.54		2.63	mg/L	3.29		(0%-20%)			
Fluoride		0.334		0.339	mg/L	1.52	^	(+/-0.100)			
Sulfate		3.74		3.80	mg/L	1.55		(0%-20%)			
QC1202719115	LCS										
Bromide	2.50			2.55	mg/L			102	(90%-110%)	08/22/12	02:44
Chloride	10.0			9.63	mg/L			96.3	(90%-110%)		
Fluoride	5.00			5.04	mg/L			101	(90%-110%)		
Sulfate	20.0			19.5	mg/L			97.7	(90%-110%)		
QC1202719109	MB										

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QC Summary

Workorder: 309669

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1238086										
Bromide			U	ND	mg/L					08/22/12	02:16
Chloride			U	ND	mg/L				VH1		
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1202719114	309548002	PS									
Bromide	2.50	U	ND	2.64	mg/L		106	(90%-110%)		08/22/12	04:08
Chloride	10.0		2.54	12.6	mg/L		101	(90%-110%)			
Fluoride	5.00		0.334	5.29	mg/L		99.1	(90%-110%)			
Sulfate	20.0		3.74	23.4	mg/L		98.3	(90%-110%)			
Nutrient Analysis											
Batch	1237603										
QC1202717800	309454001	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	08/30/12	14:54
QC1202717803	LCS										
Nitrogen, Total Kjeldahl	1.00			1.03	mg/L		103	(90%-110%)		08/30/12	14:49
QC1202717799	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					08/30/12	14:48
QC1202717801	309454001	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.02	mg/L		102	(90%-110%)		08/30/12	14:55
QC1202717802	309454001	MSD									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.02	mg/L	0.00	102	(0%-20%)		08/30/12	14:56
Batch	1237606										
QC1202717811	309454002	DUP									
Nitrogen, Ammonia			0.144	0.217	mg/L	40.4* ^		(+/-0.050)	KLP1	08/21/12	12:40
QC1202720910	309548002	DUP									
Nitrogen, Ammonia		J	0.0328	J	0.0235	mg/L	33.0 ^	(+/-0.050)		08/21/12	11:25
QC1202717814	LCS										
Nitrogen, Ammonia	1.00			1.09	mg/L		109	(90%-110%)		08/21/12	11:14
QC1202717810	MB										
Nitrogen, Ammonia			U	ND	mg/L					08/21/12	11:13
QC1202717812	309454002	MS									
Nitrogen, Ammonia	1.00		0.144	1.13	mg/L		98.6	(90%-110%)		08/21/12	12:41
QC1202720911	309548002	MS									
Nitrogen, Ammonia	1.00	J	0.0328	1.08	mg/L		105	(90%-110%)		08/21/12	11:26
QC1202717813	309454002	MSD									
Nitrogen, Ammonia	1.00		0.144	1.07	mg/L	5.45	92.6	(0%-15%)		08/21/12	12:42
QC1202720912	309548002	MSD									
Nitrogen, Ammonia	1.00	J	0.0328	1.17	mg/L	8.00	114*	(0%-15%)		08/21/12	11:26
Batch	1239580										
QC1202722777	309548002	DUP									
Phosphorus, Total as P		J	0.0173	J	0.0199	mg/L	14.0 ^	(+/-0.050)	KLP1	08/30/12	13:10
QC1202722783	LCS										
Phosphorus, Total as P	1.00			1.06	mg/L		106	(84%-122%)		08/30/12	13:08
QC1202722776	MB										
Phosphorus, Total as P			U	ND	mg/L					08/30/12	13:08
QC1202722779	309548002	MS									
				1.07							

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QC Summary

Workorder: 309669

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch 1239580											
Phosphorus, Total as P	1.00	J	0.0173		mg/L		105	(46%-146%)		08/30/12	13:11
QC1202722781 309548002 MSD											
Phosphorus, Total as P	1.00	J	0.0173	1.09	mg/L	1.85	107	(0%-21%)	KLP1	08/30/12	13:12
Batch 1239601											
QC1202722833 309548002 DUP											
Nitrogen, Nitrate/Nitrite			0.875	0.850	mg/L	2.90 ^		(+/-0.250)	AXH3	08/21/12	14:16
QC1202722834 309785001 DUP											
Nitrogen, Nitrate/Nitrite			0.535	0.526	mg/L	1.70		(0%-20%)		08/21/12	13:57
QC1202722837 LCS											
Nitrogen, Nitrate/Nitrite	1.00			1.08	mg/L		108	(90%-110%)		08/21/12	13:38
QC1202722832 MB											
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					08/21/12	13:37
QC1202722835 309548002 PS											
Nitrogen, Nitrate/Nitrite	1.00		0.175	0.933	mg/L		75.8*	(90%-110%)		08/21/12	14:17
QC1202722836 309785001 PS											
Nitrogen, Nitrate/Nitrite	1.00		0.535	1.50	mg/L		96.5	(90%-110%)		08/21/12	13:58
Solids Analysis											
Batch 1238748											
QC1202720891 309669006 DUP											
Total Dissolved Solids			400	401	mg/L	0.357		(0%-10%)	LYG1	08/16/12	09:30
QC1202720892 LCS											
Total Dissolved Solids	300			286	mg/L		95.2	(95%-105%)		08/16/12	09:30
QC1202720890 MB											
Total Dissolved Solids			U	ND	mg/L					08/16/12	09:30
Titration Analysis											
Batch 1239566											
QC1202722740 309669002 DUP											
Alkalinity, Total as CaCO3			83.6	83.6	mg/L	0.00		(0%-20%)	LXA1	08/20/12	15:27
Carbonate alkalinity (CaCO3)			10.6	10.6	mg/L	0.00		(0%-20%)			
QC1202722739 LCS											
Alkalinity, Total as CaCO3	50.0			52.4	mg/L		105	(90%-110%)		08/20/12	12:32
QC1202722742 MB											
Alkalinity, Total as CaCO3			U	ND	mg/L					08/20/12	12:30
Carbonate alkalinity (CaCO3)			U	ND	mg/L						
QC1202722741 309669002 MS											
Alkalinity, Total as CaCO3	50.0		83.6	135	mg/L		103	(80%-120%)		08/20/12	15:31

Notes:

RER is calculated at the 95% confidence level (2-sigma).

The Qualifiers in this report are defined as follows:

** Analyte is a surrogate compound

< Result is less than value reported

> Result is greater than value reported

A The TIC is a suspected aldol-condensation product

B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.

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QC Summary

Workorder: 309669

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
BD	Results are either below the MDC or tracer recovery is low										
C	Analyte has been confirmed by GC/MS analysis										
D	Results are reported from a diluted aliquot of the sample										
E	General Chemistry--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										
E	Organics--Concentration of the target analyte exceeds the instrument calibration range										
F	Estimated Value										
FB	Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies										
H	Analytical holding time was exceeded										
J	Value is estimated										
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	Matrix Related Failure										
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	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, difference is also <70%										
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	QC Samples were not spiked with this compound										
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
d	5-day BOD--The 2:1 depletion requirement was not met for this sample										
h	Preparation or preservation holding time was exceeded										

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QC Summary

Workorder: 309669

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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

DATA EXCEPTION REPORT			
Mo.Day Yr. 21-AUG-12	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 350.1	Matrix Type: Liquid	Client Code: ESHL, ORNL, UDSL
Batch ID: 1237606	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 309454(12-1481),309455(12-1482),309477,309548(12-1492),309643,309669(12-1495),309704(12-1496),309709(12-1498) Application Issues: Failed RPD for DUP Failed Recovery for MSD/PSD			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed RPD for DUP: QC 1202717811DUP 2. Failed Recovery for MSD: QC 1202720912MSD		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. 2. The spike duplicate recovery falls outside of the established acceptance limits. Since both the spike recovery and the RPD between the spike and spike duplicate fall within acceptance limits, the data is reported.	

Originator's Name:
Kristen Parson 21-AUG-12

Data Validator/Group Leader:
Julia Hamilton 21-AUG-12

DATA EXCEPTION REPORT			
Mo.Day Yr. 21-AUG-12	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 353.2	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1239601	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 309548(12-1492),309669(12-1495),309704(12-1496),309709(12-1498),309783(12-1501),309784(12-1503),309785(12-1505),309791(12-1502),309870(12-1506) Application Issues: Failed Recovery for MS/PS			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed Recovery for PS: QC 1202722835PS		1. The spike recovery falls outside of the GEL acceptance limits but within the client specified limits.	

Originator's Name:
Aubrey Kingsbury 22-AUG-12

Data Validator/Group Leader:
Julia Hamilton 22-AUG-12

DATA EXCEPTION REPORT			
Mo.Day Yr. 21-AUG-12	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: EPA 150.1	Matrix Type: Liquid	Client Code: BRKL, DMAX, ESHL, FDAN
Batch ID: 1239874	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 309321,309454(12-1481),309455(12-1482),309497(2012-2174),309548(12-1492),309550(2012-2188),309641(32181),309648(32182),309669(12-1495),309704(12-1496),309709(12-1498),309866 Application Issues: Sample received out of holding			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Sample received out of holding: 309321 006,007,008,009 309454 002,004 309455 003 309497 006 309548 002,005 309550 006,016 309641 001 309648 001 309669 002,004,006 309704 002 309709 002 309866 001		1. Samples were received out of holding.	

Originator's Name:
Lindsey Jensen 21-AUG-12

Data Validator/Group Leader:
Julia Hamilton 24-AUG-12

Radiological Analysis

**Radiochemistry Case Narrative
ARS International (ARSL)
SDG 12-1495
Work Order 309669**

Method/Analysis Information

Product: Alphaspec Am241 Liquid
Analytical Method: DOE EML HASL-300, Am-05-RC Modified
Analytical Batch Number: 1238473

Sample ID	Client ID
309669001	CASA-12-21645
1202720212	Method Blank (MB)
1202720213	309548007(CAMO-12-21787) Sample Duplicate (DUP)
1202720214	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# 22.

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 1202720212 (MB) and 1202720214 (LCS) were changed to 1.0 per client request.

Designated QC

The following sample was used for QC: 309548007 (CAMO-12-21787). The QC was from ARSL work order 309548.

QC Information

All of the QC samples met the required acceptance limits.

CSU

The blank result is less than 1.65 times the CSU.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Additional Comments

The MDCs are calculated using a blank population.

Blank Decision Level

The blank result is less than the decision level.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Alphaspec Pu, Liquid
Analytical Method:	DOE EML HASL-300, Pu-11-RC Modified
Analytical Batch Number:	1238475

Sample ID	Client ID
309669001	CASA-12-21645
1202720219	Method Blank (MB)
1202720220	309548001(CAMO-12-21785) Sample Duplicate (DUP)
1202720221	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# 22.

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 1202720219 (MB) and 1202720221 (LCS) were changed to 1.0 per client request.

Designated QC

The following sample was used for QC: 309548001 (CAMO-12-21785). The QC was from ARSL work order 309548.

QC Information

All of the QC samples met the required acceptance limits.

CSU

The blank result is less than 1.65 times the CSU.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Additional Comments

The MDCs are calculated using a blank population.

Blank Decision Level

The blank result is less than the decision level.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: Alphaspec U, Liquid
Analytical Method: DOE EML HASL-300, U-02-RC Modified
Analytical Batch Number: 1238477

Sample ID	Client ID
309669001	CASA-12-21645
1202720222	Method Blank (MB)
1202720223	309548001(CAMO-12-21785) Sample Duplicate (DUP)
1202720224	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# 22.

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 1202720222 (MB) and 1202720224 (LCS) were changed to 1.0 per client request.

Designated QC

The following sample was used for QC: 309548001 (CAMO-12-21785). The QC was from ARSL work order 309548.

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The blank result for Uranium-238 is greater than the MDC but less than the required detection limit.

CSU

The blank result for Uranium 233/234 and Uranium-238 is greater than 1.65 times the CSU but less than the RDL.

Technical Information:**Holding Time**

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

Sample Re-prep/Re-analysis

Sample 1202720222 (MB) was recounted due to a suspected false positive. The recount is reported.

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

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

Manual Integration

No manual integrations were performed on data in this batch.

Additional Comments

The MDCs are calculated using a blank population.

Blank Decision Level

The blank result for Uranium-238 is greater than the decision level but less than the RDL. The blank result for Uranium-233/234 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: 1238310

Sample ID	Client ID
309669001	CASA-12-21645
1202719791	Method Blank (MB)
1202719792	309548001(CAMO-12-21785) Sample Duplicate (DUP)
1202719793	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# 24.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. The initial Calibrations were performed in June 2012 and July 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: 309548001 (CAMO-12-21785). The QC was from ARSL work order 309548.

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: 1239939

Sample ID	Client ID
309669001	CASA-12-21645
1202723779	Method Blank (MB)
1202723780	309911001(CASA-12-21643) Sample Duplicate (DUP)
1202723781	309911001(CASA-12-21643) Matrix Spike (MS)
1202723782	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 April 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 1202723779 (MB) and 1202723782 (LCS) were changed to 1.0 per client request.

Designated QC

The following sample was used for QC: 309911001 (CASA-12-21643). The QC was from ARSL work order 309911.

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 1202723780 (CASA-12-21643) was recounted due to high MDC. The recount is reported. Sample 309669001 (CASA-12-21645) was taken through additional clean up steps and recounted due to possible interference. The recounts are reported.

Chemical Recoveries

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

Miscellaneous Information:

Data Exception (DER) Documentation

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

Additional Comments

The matrix spike, 1202723781 (CASA-12-21643), 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

Product:	WSP-GrossA/B
Analytical Method:	EPA 900.0/SW846 9310
Analytical Batch Number:	1239941

Sample ID	Client ID
309669001	CASA-12-21645
1202723792	Method Blank (MB)
1202723793	309454003(CAMO-12-21736) Sample Duplicate (DUP)
1202723796	309454003(CAMO-12-21736) Matrix Spike (MS)
1202723797	309454003(CAMO-12-21736) Matrix Spike Duplicate (MSD)
1202723798	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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. The initial Calibration was performed in September 2011. The discrimination settings are calibrated in beta discriminating mode to reduce beta to alpha crosstalk.

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 1202723792 (MB) and 1202723798 (LCS) were changed to 1.0 per client request.

Designated QC

The following sample was used for QC: 309454003 (CAMO-12-21736). The QC was from ARSL work order 309454.

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.

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, 1202723796 (CAMO-12-21736) and 1202723797 (CAMO-12-21736), 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: 12-1495 GEL Work Order: 309669


The Qualifiers in this report are defined as follows:

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

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: Theresa Austin

Date: 07 SEP 2012

Title: Group Leader

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

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

Contact: Keith Greene
Project: LANL-WQH Water Samples

Report Date: September 7, 2012

Client Sample ID: CASA-12-21645
Sample ID: 309669001
Matrix: W
Collect Date: 13-AUG-12
Receive Date: 15-AUG-12
Collector: Client

Project: ESHL00210
Client ID: ARSL001

Parameter	Qualifier	Result	Uncertainty	DL	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	0.00384	+/-0.00719	0.0263	+/-0.00719	0.050	pCi/L		HAKB	08/24/12	1223	1238473	1
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Alphaspec Pu, Liquid "As Received"

Plutonium-238	U	0.00	+/-0.00653	0.0179	+/-0.00653	0.050	pCi/L		HAKB	08/22/12	1415	1238475	2
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Plutonium-239/240	U	0.00799	+/-0.00596	0.0321	+/-0.00597	0.050	pCi/L						
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Alphaspec U, Liquid "As Received"

Uranium-234		0.803	+/-0.0537	0.0889	+/-0.0762	1.00	pCi/L		HAKB	08/21/12	1339	1238477	3
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Uranium-235/236	U	0.0123	+/-0.0136	0.0574	+/-0.0137	1.00	pCi/L						
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Uranium-238		0.309	+/-0.0328	0.0451	+/-0.0387	0.500	pCi/L						
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Rad Gamma Spec Analysis

Gammasepec "As Received"

Cesium-137	U	-0.416	+/-1.23	4.47	+/-1.23	8.00	pCi/L		KXG3	08/24/12	1134	1238310	4
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Cobalt-60	U	-0.423	+/-1.19	4.50	+/-1.19	8.00	pCi/L						
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Neptunium-237	U	2.84	+/-2.27	8.48	+/-2.27	10.0	pCi/L						
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Potassium-40	U	35.6	+/-13.7	46.7	+/-13.7	10.0	pCi/L						
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Sodium-22	U	0.0861	+/-1.15	4.53	+/-1.15	10.0	pCi/L						
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Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	-0.27	+/-0.131	0.495	+/-0.131	0.500	pCi/L		VXC2	08/30/12	1237	1239939	5
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WSP-GrossA/B "As Received"

Beta	U	1.81	+/-0.738	2.34	+/-0.754	3.00	pCi/L		DYT1	08/31/12	1005	1239941	6
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Alpha	U	0.690	+/-0.617	2.26	+/-0.620	3.00	pCi/L		DYT1	09/01/12	1917	1239941	7
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The following Analytical Methods were performed

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

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1238473	93.7	(50%-105%)
Plutonium-242 Tracer	Alphaspec Pu, Liquid "As Received"	1238475	82.8	(50%-105%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1238477	65.4	(50%-105%)
Strontium Carrier	GFPC, Sr90, liquid "As Received"	1239939	79.9	(50%-105%)

GEL LABORATORIES LLC

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Certificate of Analysis

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

Report Date: September 7, 2012

Contact: Keith Greene

Project: LANL-WQH Water Samples

Client Sample ID: CASA-12-21645

Sample ID: 309669001

Project: ESHL00210

Client ID: ARSL001

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test									Batch ID	Recovery%	Acceptable Limits	

Notes:

TPU and Uncertainty are calculated at the 67% confidence level (1-sigma).

Quality Control Data

GEL LABORATORIES LLC

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QC Summary

Report Date: September 7, 2012

Page 1 of 6

Client : Los Alamos National Laboratory
PO Box 1663
TA-03, SM271, Drop Pt. 02U, Rm
Los Alamos, New Mexico
Contact: Keith Greene
Workorder: 309669

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1238473										
QC1202720213	309548007	DUP									
Americium-241	U	0.0122	U	0.0143	pCi/L	0.0719		(0-1)	HAKB	08/24/12	12:23
	Uncert:	+/-0.00645		+/-0.00791							
	TPU:	+/-0.00647		+/-0.00794							
**Americium-243 Tracer	2.67	2.32		2.07	pCi/L		77.5	(50%-105%)			
	Uncert:	+/-0.074		+/-0.0742							
	TPU:	+/-0.131		+/-0.131							
QC1202720214	LCS										
Americium-241	1.42			1.25	pCi/L		88.1	(80%-120%)			
	Uncert:			+/-0.0424							
	TPU:			+/-0.0646							
**Americium-243 Tracer	2.14			1.98	pCi/L		92.8	(50%-105%)			
	Uncert:			+/-0.0554							
	TPU:			+/-0.100							
QC1202720212	MB										
Americium-241			U	0.00627	pCi/L					08/24/12	12:23
	Uncert:			+/-0.00495							
	TPU:			+/-0.00496							
**Americium-243 Tracer	2.14			1.84	pCi/L		86.1	(50%-105%)			
	Uncert:			+/-0.0581							
	TPU:			+/-0.103							
Batch	1238475										
QC1202720220	309548001	DUP									
Plutonium-238	U	0.00	U	0.00273	pCi/L	0.104		(0-1)	HAKB	08/22/12	14:15
	Uncert:	+/-0.00593		+/-0.00722							
	TPU:	+/-0.00593		+/-0.00722							
Plutonium-239/240	U	0.00297	U	0.00546	pCi/L	0.103		(0-1)			
	Uncert:	+/-0.00663		+/-0.00546							
	TPU:	+/-0.00663		+/-0.00546							
**Plutonium-242 Tracer	2.41	1.82		1.95	pCi/L		80.7	(50%-105%)			
	Uncert:	+/-0.0849		+/-0.0814							
	TPU:	+/-0.139		+/-0.134							
QC1202720221	LCS										
Plutonium-238				0.0228	pCi/L			(80%-120%)		08/22/12	14:02
	Uncert:			+/-0.0121							
	TPU:			+/-0.0121							
Plutonium-239/240	2.03			2.12	pCi/L		105	(80%-120%)			
	Uncert:			+/-0.0699							
	TPU:			+/-0.118							
**Plutonium-242 Tracer	1.93			1.46	pCi/L		75.8	(50%-105%)			
	Uncert:			+/-0.0669							
	TPU:			+/-0.110							
QC1202720219	MB										

GEL LABORATORIES LLC

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QC Summary

Workorder: 309669

Page 2 of 6

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1238475										
Plutonium-238			U	0.00	pCi/L						
		Uncert:		+/-0.00559							
		TPU:		+/-0.00559							
Plutonium-239/240			U	0.00684	pCi/L						
		Uncert:		+/-0.00603							
		TPU:		+/-0.00604							
**Plutonium-242 Tracer	1.93			1.46	pCi/L		75.7	(50%-105%)			
		Uncert:		+/-0.0667							
		TPU:		+/-0.110							
Batch	1238477										
QC1202720223	309548001 DUP										
Uranium-234		0.568		0.720	pCi/L	0.607		(0-1)	HAKB	08/21/1213:39	
		Uncert:	+/-0.0457	+/-0.0465							
		TPU:	+/-0.0594	+/-0.0662							
Uranium-235/236		U	0.0274	U	0.0134	pCi/L	0.326	(0-1)			
		Uncert:	+/-0.013	+/-0.00823							
		TPU:	+/-0.0131	+/-0.00828							
Uranium-238		0.367		0.381	pCi/L	0.0808		(0-1)			
		Uncert:	+/-0.035	+/-0.0326							
		TPU:	+/-0.0425	+/-0.0409							
**Uranium-232 Tracer	2.74	2.11		2.18	pCi/L		79.4	(50%-105%)			
		Uncert:	+/-0.0937	+/-0.087							
		TPU:	+/-0.204	+/-0.198							
QC1202720224	LCS										
Uranium-234				2.55	pCi/L					08/21/1213:39	
		Uncert:		+/-0.0751							
		TPU:		+/-0.181							
Uranium-235/236				0.125	pCi/L						
		Uncert:		+/-0.0194							
		TPU:		+/-0.021							
Uranium-238	2.67			2.66	pCi/L		99.7	(80%-120%)			
		Uncert:		+/-0.0762							
		TPU:		+/-0.188							
**Uranium-232 Tracer	2.19			1.86	pCi/L		85	(50%-105%)			
		Uncert:		+/-0.0692							
		TPU:		+/-0.158							
QC1202720222	MB										
Uranium-234			U	0.0413	pCi/L					08/22/1214:02	
		Uncert:		+/-0.0136							
		TPU:		+/-0.0139							
Uranium-235/236			U	0.00743	pCi/L						
		Uncert:		+/-0.00553							
		TPU:		+/-0.00556							
Uranium-238				0.030	pCi/L						
		Uncert:		+/-0.0096							
		TPU:		+/-0.00979							
**Uranium-232 Tracer	2.19			2.02	pCi/L		92.1	(50%-105%)			
		Uncert:		+/-0.0668							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1238477										
		TPU:		+/-0.156							
Rad Gamma Spec											
Batch	1238310										
QC1202719792	309548001	DUP									
Cesium-137		U	-0.869	U	1.93	pCi/L	0.435	(0-1)	KXG3	08/25/12	10:29
		Uncert:	+/-1.62		+/-1.60						
		TPU:	+/-1.62		+/-1.60						
Cobalt-60		U	-2.42	U	-1.15	pCi/L	0.200	(0-1)			
		Uncert:	+/-1.62		+/-1.55						
		TPU:	+/-1.62		+/-1.55						
Neptunium-237		U	0.880	U	-3.39	pCi/L	0.348	(0-1)			
		Uncert:	+/-3.18		+/-2.96						
		TPU:	+/-3.18		+/-2.96						
Potassium-40		U	6.77	U	-13.6	pCi/L	0.220	(0-1)			
		Uncert:	+/-23.4		+/-22.8						
		TPU:	+/-23.4		+/-22.8						
Sodium-22		U	1.04	U	1.50	pCi/L	0.0733	(0-1)			
		Uncert:	+/-1.56		+/-1.55						
		TPU:	+/-1.56		+/-1.55						
QC1202719793	LCS										
Americium-241		2780			2760	pCi/L		99.1	(80%-120%)	08/24/12	11:46
		Uncert:			+/-156						
		TPU:			+/-156						
Cesium-137		6120			6240	pCi/L		102	(80%-120%)		
		Uncert:			+/-258						
		TPU:			+/-258						
Cobalt-60		5830			5670	pCi/L		97.1	(80%-120%)		
		Uncert:			+/-237						
		TPU:			+/-237						
Neptunium-237				U	47.1	pCi/L					
		Uncert:			+/-20.3						
		TPU:			+/-20.3						
Potassium-40				U	28.9	pCi/L					
		Uncert:			+/-37.8						
		TPU:			+/-37.8						
Sodium-22				U	-1.49	pCi/L					
		Uncert:			+/-6.05						
		TPU:			+/-6.05						
QC1202719791	MB										
Cesium-137				U	-1.69	pCi/L	08/24/12				
		Uncert:			+/-1.16						
		TPU:			+/-1.16						
Cobalt-60				U	-1.49	pCi/L					
		Uncert:			+/-1.09						
		TPU:			+/-1.09						
Neptunium-237				U	-4.41	pCi/L					
		Uncert:			+/-2.42						
		TPU:			+/-2.42						

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
Batch	1238310										
Potassium-40			U	7.75	pCi/L						
		Uncert:		+/-15.4							
		TPU:		+/-15.4							
Sodium-22			U	0.0894	pCi/L						
		Uncert:		+/-1.04							
		TPU:		+/-1.04							
Rad Gas Flow											
Batch	1239939										
QC1202723780	309911001	DUP									
Strontium-90		U	0.149	U	0.293	pCi/L	0.251	(0-1)	VXC2	09/05/12	13:07
		Uncert:	+/-0.135		+/-0.149						
		TPU:	+/-0.135		+/-0.151						
**Strontium Carrier	8.14		6.30		6.80	mg		83.5	(50%-105%)		
QC1202723782	LCS										
Strontium-90		25.0			27.5	pCi/L		110	(80%-120%)	08/30/12	17:07
		Uncert:			+/-0.613						
		TPU:			+/-2.37						
**Strontium Carrier	8.14				6.70	mg		82.3	(50%-105%)		
QC1202723779	MB										
Strontium-90			U	-0.0406	pCi/L					08/30/12	17:06
		Uncert:		+/-0.0673							
		TPU:		+/-0.0673							
**Strontium Carrier	8.14				6.70	mg		82.3	(50%-105%)		
QC1202723781	309911001	MS									
Strontium-90		125	U	0.149	130	pCi/L		104	(75%-125%)	08/30/12	17:07
		Uncert:		+/-0.135	+/-2.96						
		TPU:		+/-0.135	+/-10.8						
**Strontium Carrier	8.14				6.90	mg		84.8	(50%-105%)		
Batch	1239941										
QC1202723793	309454003	DUP									
Alpha		U	-0.106	U	0.181	pCi/L	0.177	(0-1)	DYT1	09/01/12	19:27
		Uncert:	+/-0.385		+/-0.423						
		TPU:	+/-0.386		+/-0.424						
Beta		U	1.37	U	1.70	pCi/L	0.129	(0-1)		08/31/12	09:35
		Uncert:	+/-0.619		+/-0.637						
		TPU:	+/-0.630		+/-0.652						
QC1202723798	LCS										
Alpha		12.0			11.2	pCi/L		92.9	(80%-120%)	09/01/12	19:17
		Uncert:			+/-0.627						
		TPU:			+/-1.23						
Beta		49.9			47.7	pCi/L		95.5	(80%-120%)	08/31/12	09:48
		Uncert:			+/-0.865						
		TPU:			+/-4.03						
QC1202723792	MB										
Alpha			U	0.0052	pCi/L					09/01/12	19:17
		Uncert:		+/-0.0545							
		TPU:		+/-0.0546							
Beta			U	0.189	pCi/L					08/31/12	09:33

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1239941										
		Uncert:		+/-0.180							
		TPU:		+/-0.180							
QC1202723796 309454003 MS											
Alpha	481	U	-0.106	448	pCi/L		93	(75%-125%)		09/01/1219:17	
		Uncert:	+/-0.385	+/-25.5							
		TPU:	+/-0.386	+/-45.6							
Beta	2000	U	1.37	2020	pCi/L		101	(75%-125%)		08/31/1209:48	
		Uncert:	+/-0.619	+/-37.0							
		TPU:	+/-0.630	+/-171							
QC1202723797 309454003 MSD											
Alpha	481	U	-0.106	456	pCi/L	0.0453	94.7	(0-1)		09/01/1219:17	
		Uncert:	+/-0.385	+/-26.1							
		TPU:	+/-0.386	+/-46.6							
Beta	2000	U	1.37	2140	pCi/L	0.174	107	(0-1)		08/31/1209:48	
		Uncert:	+/-0.619	+/-37.6							
		TPU:	+/-0.630	+/-181							

Notes:

The Qualifiers in this report are defined as follows:

**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
A	The TIC is a suspected aldol-condensation product
B	For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
E	General Chemistry--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
E	Organics--Concentration of the target analyte exceeds the instrument calibration range
F	Estimated Value
FB	Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies
H	Analytical holding time was exceeded
J	Value is estimated
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	Matrix Related Failure
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	RPD or %Recovery limits do not apply.
N1	See case narrative

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
ND	Analyte concentration is not detected above the detection limit									
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, difference is also <70%									
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	QC Samples were not spiked with this compound									
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.									
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.									
d	5-day BOD--The 2:1 depletion requirement was not met for this sample									
h	Preparation or preservation holding time was exceeded									

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

** Indicates analyte is a surrogate/tracer compound.

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

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

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