

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of field COCs
3. Validation Report
4. Laboratory analysis

Comments:

2018-487		TEST - Explosives		YES	NO
Samples collected from a WFO area?					X
Field Test for Explosives Results				YES	NO
Spot test shows presence of explosives residues. If YES - Do not ship.					X

TEST - Chemical Preservation		YES	NO
Samples are chemically preserved?		X	
Field Team Member Statement		YES	NO
Chemical preservation exceeds limits given 40 CFR 136, Table II - Required Containers, Preservation Techniques and Holding Times (footnote 3). If YES - Do not ship.			X

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				X
Sample Activity (dpm/100cm ²)	Shipment Activity (dpm*g/100cm ²)	Sampled Location	YES	NO
Alpha detectable	Alpha >160,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49		X
Alpha > 125	Alpha >1,250,000	other locations		
Beta > 1,500	Beta >15,000,000	any location		
The sample Alpha >16,000,000 dpm*g/100cm ² or Beta > 160,000,000 dpm*g/100cm ² . If YES - Do not ship.				
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm ² , beta activity ≥ 240 dpm/cm ² , or surface activity ≥ 0.5 mR/hr. If YES - Do not ship.				
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on field screening measurements of alpha and beta activity.				

TEST - Location		YES	NO
Prior analytical measurements of radioactive isotopes are available?		X	
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO
<ul style="list-style-type: none"> Am-241 > 27 Cs-137 > 270 Pu-238 > 27 Pu-239/240 > 27 Th-228 > 27 U-234 > 270 U-238 > 270 H-3 > 27,000,000 	<ul style="list-style-type: none"> Am-241 > 270,000 Cs-137 > 270,000 Pu-238 > 270,000 Pu-239/240 > 270,000 Th-228 > 270,000 U-234 > 1,600,000,000 U-238 > unlimited H-3 > 27,000,000,000 		X
Am-241, Pu-238, Pu-239/240, or Th 228 > 27,000,000 pCi; or Cs-137 > 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. If YES - Do not ship.			X
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on prior analytical measurements of radioactive isotopes.			X

TEST - AK		YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.				X
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, and the sample is submitted to ARS or RP for hazard classification analysis.				X

HOLD SAMPLES FOR ANALYSIS	
The samples are held per ER-SOP-10094, Rev. 1, 5.2.2 [7]	

These samples do not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200. The sample(s) contained in this shipment have been assigned a tentative proper DOT shipping name, hazard class, identification number, and packing group, based on the shipper's knowledge of the sample:

Hazard Assessment Completed By:	Date/Time
(Printed Name) Melissa Monte	10/17/17
(Signature)	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) Sherwood	10/17/17
(Signature)	3:00

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1

SAMPLE ID: CAMO-18-147637

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/16/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1322		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-38		FIELD PREP:	F	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
MA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP- GENINORG+PerChlorate	1 LITER POLY	1	ICE		
	WSP- NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time _____ HH:MM Dissolved Oxygen _____ Flow (in gpm) _____
Oxidation-Reduction Potential _____ pH _____ Specific Conductance _____
Temperature _____ Turbidity _____

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) <i>Tanner Bonham</i> (Signature) <i>[Signature]</i>	Date/Time 10/16/2017 1425	RECEIVED BY (Printed Name) <i>S. Sherwood</i> (Signature) <i>[Signature]</i>	Date/Time 10/16/17 1425
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1

SAMPLE ID: CAMO-18-147652

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/16/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1322		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-38		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
MA	MSGP-Hg	500 ML POLY	1	HNO3	Y	MA
	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: Sampled 50 ft. from running diesel generator

LOCATION COMMENTS: MA

FIELD PARAMETERS:

Sample Time	1322	HH:MM	Dissolved Oxygen	6.41	Flow (in gpm)	2.65
Oxidation-Reduction Potential	195.9		pH	7.14	Specific Conductance	138.6
Temperature	18.8		Turbidity	0.32		

COLLECTED BY (PRINT): T. Bonham

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1

SAMPLE ID: CAMO-18-147652

WORK ORDER:

RELINQUISHED BY (Printed Name) <i>Tanner Bonham</i> (Signature) <i>[Signature]</i>	Date/Time 10/16/2017 1425	RECEIVED BY <i>B. Sherwood</i> (Printed Name) (Signature) <i>[Signature]</i>	Date/Time 10/16/17 1425
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1

SAMPLE ID: CAMO-18-147675

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/16/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1322		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-38		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	10/16/17	HCL	V	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time _____ HH:MM _____ Dissolved Oxygen _____ Flow (in gpm) _____
Oxidation-Reduction _____ pH _____ Specific _____
Potential _____ Conductance _____
Temperature _____ Turbidity _____

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) T. Bonham (Signature) <i>T. Bonham</i>	Date/Time 10/16/2017 1425	RECEIVED BY (Printed Name) Sherwood (Signature) <i>Sherwood</i>	Date/Time 10/16/17 1428
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

DATA VALIDATION REPORT

Chain Of Custody No. 2018-487

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
435410	EPA:120.1	1				
435410	EPA:150.1	1				
435410	EPA:160.1	1				
435410	EPA:170.0	2		1		
435410	EPA:245.2	2				
435410	EPA:300.0	1				
435410	EPA:310.1	1				
435410	EPA:335.4	1				
435410	EPA:350.1	1				
435410	EPA:351.2	1				
435410	EPA:353.2	1				
435410	EPA:365.4	1				
435410	EPA:900	1				
435410	EPA:901.1	1				
435410	EPA:905.0	1				
435410	HASL-300:AM-241	1				
435410	HASL-300:ISOPU	1				
435410	HASL-300:ISOU	1				
435410	SM:A2340B	1				
435410	SW-846:6010C	1				
435410	SW-846:6020	1				
435410	SW-846:6850	1				
435410	SW-846:8260B	1		1		
435410	SW-846:8270D	1				
435410	SW-846:9060	1				

DATA VALIDATION REPORT

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
435410	EPA:120.1	1713570	1713570	1										1			2				
435410	EPA:150.1	1713318	1713318	1										1			2				
435410	EPA:160.1	1711939	1711939	1					1					1			1				
435410	EPA:170.0	NA	NA	2		1															
435410	EPA:245.2	1715243	1715242	2					1	1				1			1				
435410	EPA:300.0	1711016	1711016	1					1					1			1				
435410	EPA:310.1	1713308	1713308	1						1				1			1				
435410	EPA:335.4	1710429	1710428	1					1	1				1			1				
435410	EPA:350.1	1711720	1711719	1					1	1				1			1				
435410	EPA:351.2	1711716	1711713	1					1	1				1			1				
435410	EPA:353.2	1710548	1710548	1					1					1			1				
435410	EPA:365.4	1712663	1712662	1					1	1				1			1				
435410	EPA:900	1714187	1714187	1					1	1	1			1			1				
435410	EPA:900	1717894	1717894	1					1	1	1			1			1				
435410	EPA:901.1	1711850	1711850	1					1					1			1				
435410	EPA:905.0	1714181	1714181	1					1	1				1			1				
435410	HASL-300:AM-241	1711133	1711133	1					1					1			1				
435410	HASL-300:ISOPU	1711134	1711134	1					1					1			1				
435410	HASL-300:ISOU	1711135	1711135	1					1					1			1				
435410	SM:A2340B	1718402	1718402	1																	
435410	SW-846:6010C	1710686	1710685	1					1	1				1			1				
435410	SW-846:6020	1710695	1710694	1					1	1				1			1				
435410	SW-846:6850	1711756	1711753	1					1	1	1			1							
435410	SW-846:8260B	1712545	1712545	1		1			2					4							
435410	SW-846:8270D	1711213	1711212	1					1	1	1			1							
435410	SW-846:9060	1710507	1710507	1					1					1			2				

2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
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DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-147637	1203906356	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-147637	435410001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203906355	LCS	0	0	1	0
EPA:120.1	GENERAL CHEMISTRY	WST15-17-148253	1203906357	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-147634	1203905767	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-147637	1203905766	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-147637	435410001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203905765	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-147637	1203902608	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-147637	435410001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203902606	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203902605	MB	1	0	0	0
EPA:170.0	VOC	CAMO-18-147637	435410001	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-147652	435410002	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-147675	435410003	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-147637	1203910683	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-147637	1203910684	MS	0	0	1	0
EPA:245.2	INORGANIC	CAMO-18-147637	435410001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-147652	435410002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203910682	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203910681	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-147637	1203900349	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-147637	435410001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203900347	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203900346	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-147637	1203905732	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-147637	1203905734	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-147637	435410001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203905729	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAMO-18-147652	1203899436	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAMO-18-147652	1203899437	MS	0	0	1	0
EPA:335.4	INORGANIC	CAMO-18-147652	435410002	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203898893	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203898892	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-147637	435410001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203901947	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203901946	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	WST15-18-148149	1203901948	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	WST15-18-148149	1203901952	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-147652	435410002	REG	1	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:351.2	GENERAL CHEMISTRY	LCS	1203901925	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203901924	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	WST15-18-148149	1203901926	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	WST15-18-148149	1203901927	MS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-147634	1203899901	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-147637	435410001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203899213	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203899212	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-147634	1203904076	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-147634	1203904077	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-147637	435410001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203904075	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203904074	MB	1	0	0	0
EPA:900	RAD	CAMO-18-147649	1203917215	DUP	1	0	0	0
EPA:900	RAD	CAMO-18-147649	1203917216	MS	0	0	1	0
EPA:900	RAD	CAMO-18-147649	1203917217	MSD	0	0	1	0
EPA:900	RAD	CAMO-18-147652	435410002	REG	2	0	0	0
EPA:900	RAD	CAMO-18-147684	1203908000	DUP	1	0	0	0
EPA:900	RAD	CAMO-18-147684	1203908001	MS	0	0	1	0
EPA:900	RAD	CAMO-18-147684	1203908002	MSD	0	0	1	0
EPA:900	RAD	LCS	1203908003	LCS	0	0	1	0
EPA:900	RAD	LCS	1203917218	LCS	0	0	1	0
EPA:900	RAD	MB	1203907999	MB	1	0	0	0
EPA:900	RAD	MB	1203917214	MB	1	0	0	0
EPA:901.1	RAD	CAMO-18-147652	1203902341	DUP	5	0	0	0
EPA:901.1	RAD	CAMO-18-147652	435410002	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203902342	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203902340	MB	5	0	0	0
EPA:905.0	RAD	CAMO-18-147652	435410002	REG	1	0	0	0
EPA:905.0	RAD	CAPA-18-147591	1203907991	DUP	1	0	0	0
EPA:905.0	RAD	CAPA-18-147591	1203907992	MS	0	0	1	0
EPA:905.0	RAD	LCS	1203907993	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203907990	MB	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-147652	1203900608	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-147652	435410002	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203900609	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203900607	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-147652	1203900611	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-147652	435410002	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203900612	LCS	0	0	1	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
HASL-300:ISOPU	RAD	MB	1203900610	MB	2	0	0	0
HASL-300:ISOU	RAD	CAMO-18-147652	1203900614	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAMO-18-147652	435410002	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203900615	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203900613	MB	3	0	0	0
SM:A2340B	INORGANIC	CAMO-18-147637	435410001	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-147634	1203899602	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-147634	1203899603	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAMO-18-147637	435410001	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203899601	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203899600	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-18-147634	1203899624	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-147634	1203899625	MS	0	0	11	0
SW-846:6020	INORGANIC	CAMO-18-147637	435410001	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203899623	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203899622	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-147634	1203902044	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-147634	1203902045	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-147637	435410001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203902043	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203902042	MB	1	0	0	0
SW-846:8260B	VOC	CAMO-18-147652	435410002	REG	80	3	0	0
SW-846:8260B	VOC	CAMO-18-147675	435410003	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203903829	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203903830	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203904820	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203906644	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203903828	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203904819	MB	80	3	0	0
SW-846:8270D	SVOC	CAMO-18-147649	1203900841	MS	0	6	76	0
SW-846:8270D	SVOC	CAMO-18-147649	1203900842	MSD	0	6	76	0
SW-846:8270D	SVOC	CAMO-18-147652	435410002	REG	80	6	0	0
SW-846:8270D	SVOC	LCS	1203900840	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203900839	MB	80	6	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-147652	435410002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWR-18-147311	1203899114	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWR-18-147315	1203899115	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203899113	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203899112	MB	1	0	0	0

DATA VALIDATION REPORT

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203899600	METHOD BLANK	SW-846:6010C	W	Sodium	160	J	ug/L	300
MB	1203899600	METHOD BLANK	SW-846:6010C	W	Zinc	-4.58	J	ug/L	10.0
MB	1203904074	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.036	J	mg/L	0.050
CAMO-18-147675	435410003	TRIP BLANK	EPA:170.0	W	Temperature	1		Deg C	

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAMO-18-147637	1203904074	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.036	mg/L	0.0638		0.050	Y	5	100	Y
CAMO-18-147637	1203899600	METHOD BLANK	SW-846:6010C	Zinc	-4.58	ug/L	3.30	U	10.0	N			

6. Any surrogate recoveries outside the control limits?

No.

DATA VALIDATION REPORT

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
WST15-18-148149	1203901927		EPA:351.2	Total Kjeldahl Nitrogen	1711713	10-25-2017	W	119		110	90	10		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

Field Sample ID	Lab Sample ID	LD Lab Sample ID	Analytical Method	Parameter Name	Sample Matrix	Lab Result	LD Lab Result	Lab Units	Detect Flag	LD Detect Flag	RPD	RPD Limit
CAMO-18-147637	435410001	1203902608	EPA:160.1	Total Dissolved	W	123	113	mg/L	Y	Y	8.48	5

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
-------------	------------	-----------------	----------------	--------------------	------------------	-------------------	----------------	---------------	----------------------	-------------------------	-------------	------------	-----------	---------------	--------------	------------	--------------------	------------	-------------	---------	-----------------	------------------------	----------

DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-38	2018-487	CAMO-18-147637	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus	U	U	I4	N	0.0638	mg/L	0.0638	mg/L			W	10/16/2017		1712663	VAL	Y
R-38	2018-487	CAMO-18-147652	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	-0.00227	pCi/L	-0.00227	pCi/L	0.0398	0.00752	W	10/16/2017		1711133	VAL	Y
R-38	2018-487	CAMO-18-147652	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.321	pCi/L	0.321	pCi/L	4.33	1.15	W	10/16/2017		1711850	VAL	Y
R-38	2018-487	CAMO-18-147652	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.479	pCi/L	0.479	pCi/L	4.10	0.935	W	10/16/2017		1711850	VAL	Y
R-38	2018-487	CAMO-18-147652	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.503	pCi/L	0.503	pCi/L	2.64	0.677	W	10/16/2017		1717894	VAL	Y
R-38	2018-487	CAMO-18-147652	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-2.02	pCi/L	-2.02	pCi/L	7.43	2.10	W	10/16/2017		1711850	VAL	Y
R-38	2018-487	CAMO-18-147652	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.0131	pCi/L	0.0131	pCi/L	0.0377	0.00814	W	10/16/2017		1711134	VAL	Y
R-38	2018-487	CAMO-18-147652	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.0087	pCi/L	0.0087	pCi/L	0.0489	0.00754	W	10/16/2017		1711134	VAL	Y
R-38	2018-487	CAMO-18-147652	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	10.7	pCi/L	10.7	pCi/L	45.3	14.6	W	10/16/2017		1711850	VAL	Y
R-38	2018-487	CAMO-18-147652	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	0.534	pCi/L	0.534	pCi/L	4.30	1.00	W	10/16/2017		1711850	VAL	Y
R-38	2018-487	CAMO-18-147652	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.111	pCi/L	0.111	pCi/L	0.448	0.126	W	10/16/2017		1714181	VAL	Y

Reason Code

Description

I4	the sample result is =<5x the concentration of related analyte in the method blank.
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.
R5	Analyte is not detected because the amount reported is less than the MDC.
U_LAB	The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-147637	R-38	REG	EPA:120.1	0	1
CAMO-18-147637	R-38	REG	EPA:150.1	0	1
CAMO-18-147637	R-38	REG	EPA:160.1	0	1
CAMO-18-147637	R-38	REG	EPA:170.0	0	1
CAMO-18-147637	R-38	REG	EPA:245.2	0	1
CAMO-18-147637	R-38	REG	EPA:300.0	0	4
CAMO-18-147637	R-38	REG	EPA:310.1	0	2

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-147637	R-38	REG	EPA:350.1	0	1
CAMO-18-147637	R-38	REG	EPA:353.2	0	1
CAMO-18-147637	R-38	REG	EPA:365.4	0	1
CAMO-18-147637	R-38	REG	SM:A2340B	0	1
CAMO-18-147637	R-38	REG	SW-846:6010C	0	17
CAMO-18-147637	R-38	REG	SW-846:6020	0	11
CAMO-18-147637	R-38	REG	SW-846:6850	0	1
CAMO-18-147652	R-38	REG	EPA:170.0	0	1
CAMO-18-147652	R-38	REG	EPA:245.2	0	1
CAMO-18-147652	R-38	REG	EPA:335.4	0	1
CAMO-18-147652	R-38	REG	EPA:351.2	0	1
CAMO-18-147652	R-38	REG	EPA:900	0	2
CAMO-18-147652	R-38	REG	EPA:901.1	0	5
CAMO-18-147652	R-38	REG	EPA:905.0	0	1
CAMO-18-147652	R-38	REG	HASL-300:AM-241	0	1
CAMO-18-147652	R-38	REG	HASL-300:ISOPU	0	2
CAMO-18-147652	R-38	REG	HASL-300:ISOU	0	3
CAMO-18-147652	R-38	REG	SW-846:8260B	0	80
CAMO-18-147652	R-38	REG	SW-846:8270D	0	80
CAMO-18-147652	R-38	REG	SW-846:9060	0	1
CAMO-18-147675	R-38	FTB	EPA:170.0	0	1
CAMO-18-147675	R-38	FTB	SW-846:8260B	0	80

November 13, 2017

Ms. Nita Patel
Los Alamos National Laboratory
TA-00, SM1237, Rm104C
Los Alamos, New Mexico 87545

Re: LANL- WQH Water Samples
Work Order: 435410
SDG: 2018-487

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on October 18, 2017, and analyzed for GC/MS Semivolatile, GC/MS Volatile, General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,



Katrina Hiott for
Valerie Davis
Project Manager

Chain of Custody: 2018-487
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 435410
SDG: 2018-487

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 435410
SDG # : 2018-487**

November 13, 2017

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 October 18, 2017 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 temperatures were checked, documented, and within specifications. Shipping container temperature was within specification (0 - 6C). There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
435410001	CAMO-18-147637
435410002	CAMO-18-147652
435410003	CAMO-18-147675

Case Narrative

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

Data Package

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

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


Katrina Hiott for
Valerie Davis
Project Manager

List of current GEL Certifications as of 13 November 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-24
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Chain of Custody and Supporting Documentation

COC:

2018-480 TEST - Explosives		YES	NO
Samples collected from a WFO area?			X
Field Test for Explosives Results		YES	NO NA
Spot test shows presence of explosives residues. If YES - Do not ship.			X

TEST - Chemical Preservation		YES	NO
Samples are chemically preserved?		X	
Field Team Member Statement		YES	NO NA
Chemical preservation exceeds limits given 40 CFR 136, Table II - Required Containers, Preservation Techniques and Holding Times (footnote 3). If YES - Do not ship.			X

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				X
Sample Activity (dpm/100cm ²)	Shipment Activity (dpm*g/100cm ²)	Sampled Location	YES	NO NA
Alpha detectable	Alpha >160,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49		X
Alpha > 125	Alpha >1,250,000	other locations		
Beta > 1,500	Beta >15,000,000	any location		
The sample Alpha >16,000,000 dpm*g/100cm ² or Beta > 160,000,000 dpm*g/100cm ² . If YES - Do not ship.				
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm ² , beta activity ≥ 240 dpm/cm ² , or surface activity ≥ 0.5 mR/hr. If YES - Do not ship.				
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on field screening measurements of alpha and beta activity.				

TEST - Location		YES	NO
Prior analytical measurements of radioactive isotopes are available?		X	
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO NA
<ul style="list-style-type: none"> Am-241 > 27 Cs-137 > 270 Pu-238 > 27 Pu-239/240 > 27 Th-228 > 27 U-234 > 270 U-238 > 270 H-3 > 27,000,000 	<ul style="list-style-type: none"> Am-241 > 270,000 Cs-137 > 270,000 Pu-238 > 270,000 Pu-239/240 > 270,000 Th-228 > 270,000 U-234 > 1,600,000,000 U-238 > unlimited H-3 > 27,000,000,000 		X
Am-241, Pu-238, Pu-239/240, or Th 228 > 27,000,000 pCi; or Cs-137 > 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. If YES - Do not ship.			X
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on prior analytical measurements of radioactive isotopes.			X

TEST - AK		YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.				X
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, and the sample is submitted to ARS or RP for hazard classification analysis.				X

HOLD SAMPLES FOR ANALYSIS	
The samples are held per ER-SOP-10094, Rev. 1, 5.2.2 [7]	

These samples do not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200. The sample(s) contained in this shipment have been assigned a tentative proper DOT shipping name, hazard class, identification number, and packing group, based on the shipper's knowledge of the sample:

Hazard Assessment Completed By:	Date/Time
(Printed Name) Melissa Montez	10/17/17
(Signature) [Signature]	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) Sherwood	10/17/17
(Signature) [Signature]	3:00



Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: <u>ESH</u>		SDG/AR/COC/Work Order: <u>435410</u>	
Received By: <u>ZKW</u>		Date Received: <u>10/18/17</u>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>5908 1782 9700</u> <u>5908 1782 9695</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet ice <input checked="" type="checkbox"/> Ice Packs Dry ice None Other: _____ *all temperatures are recorded in Celsius TEMP: <u>1°C</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No ___ N/A ___ Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials KH/ottDate 10/18/17Page 1 of 1

GL-CHL-SR-001 Rev 5

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

ACTWGT: 59.0 LB MAN
CAD: 0014176/CAFE291

LOS ALAMOS, NM 87545
UNITED STATES US

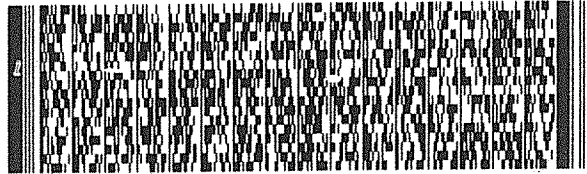
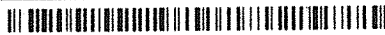
BILL SENDER

0 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



FedEx
Express



1 of 2

TRK# 5908 1782 9695
0201

MASTER

X7 RBWA

WED - 18 OCT 10:30A
PRIORITY OVERNIGHT

29407
SC-US CHS

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: 17OCT17
ACTWGT: 38.0 LB MAN
CAD: 0014176/CAFE291

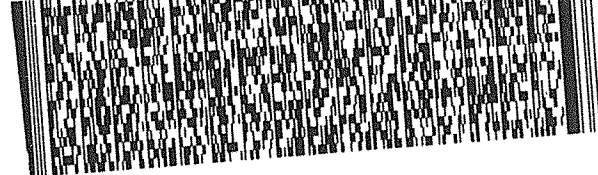
BILL SENDER

0 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



FedEx
Express



2 of 2

MPS# 5908 1782 9700
0263

Mstr# 5908 1782 9695

X7 RBWA

WED - 18 OCT 10:30A
PRIORITY OVERNIGHT

29407
SC-US CHS



Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

Qualifier Explanation

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

** Analyte is a surrogate compound

< Result is less than value reported

> Result is greater than value reported

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL

A The TIC is a suspected aldol-condensation product

B Target analyte was detected in the associated blank

B Metals-Either presence of analyte detected in the associated blank, or
MDL/IDL < sample value < PQL

BD Results are either below the MDC or tracer recovery is low

C Analyte has been confirmed by GC/MS analysis

D Results are reported from a diluted aliquot of the sample

d 5-day BOD-The 2:1 depletion requirement was not met for this sample

E Organics-Concentration of the target analyte exceeds the instrument calibration range

E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria

H Analytical holding time was exceeded

h Preparation or preservation holding time was exceeded

J Value is estimated

N Metals-The Matrix spike sample recovery is not within specified control limits

N Organics-Presumptive evidence based on mass spectral library search to make a tentative
identification of the analyte (TIC). Quantitation is based on nearest internal standard
response factor

N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration
by 4X or more

ND Analyte concentration is not detected above the reporting limit

UI Gamma Spectroscopy-Uncertain identification

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Y QC Samples were not spiked with this compound

Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.
For HPLC, the difference is >70%.

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

Volatile Analysis

Case Narrative

**GC/MS Volatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-487
Work Order #: 435410**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch
Number: 1712545

Sample Analysis

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

Sample ID	Client ID
435410002	CAMO-18-147652
435410003	CAMO-18-147675
1203903828	Method Blank (MB)
1203903829	Laboratory Control Sample (LCS)
1203903830	Laboratory Control Sample (LCS)
1203903831	435410002(CAMO-18-147652) Post Spike (PS)
1203903832	435410002(CAMO-18-147652) Post Spike (PS)
1203903833	435410002(CAMO-18-147652) Post Spike Duplicate (PSD)
1203903834	435410002(CAMO-18-147652) Post Spike Duplicate (PSD)
1203904819	Method Blank (MB)
1203904820	Laboratory Control Sample (LCS)
1203906644	Laboratory Control Sample (LCS)

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

The data results reported met all SOP and method criteria, unless otherwise discussed below.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-038 REV# 26.

Calibration Information

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package. The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were added by the auto sampler at a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an

industry shortage.

Initial Calibration

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

Continuing Calibration Verification Requirements

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

Quality Control (QC) Information

Blank (MB) Statement

Target analytes were detected in the blank 1203904819 (MB) below the reporting limit.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 435410002 (CAMO-18-147652) was designated for spike analysis.

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits.

Sample	Analyte	Value
1203903833 (CAMO-18-147652PSD)	Bromoform	141* (64%-138%)

Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information

Holding Time Specifications

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

Sample Preservation and Integrity

All samples met the sample preservation and integrity requirements.

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Manual Integrations

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

TIC Comment

Tentatively identified compounds (TIC) may be requested for samples 435410002 (CAMO-18-147652) and 435410003 (CAMO-18-147675) in this delivery group/work order. Please note that non-requested calibrated analytes detected in a client sample may be reported on the Form 1/Certificate of Analysis as TICs. TIC data, if requested, were included on the Sample Data Summary (Form 1) and included with the sample raw data.

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

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

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually 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 of each electronic package will indicate the reviewer name associated with the generation of the data and package. 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.

System Configuration

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

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

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all 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

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-487 GEL Work Order: 435410

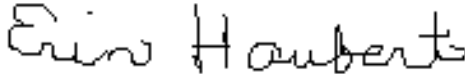
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 11 NOV 2017

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487
Lab Sample ID: 435410002

Date Collected: 10/16/2017 13:22
Date Received: 10/18/2017 09:00

Matrix: W

Client ID: CAMO-18-147652
Batch ID: 1712545
Run Date: 10/25/2017 10:11
Prep Date: 10/25/2017 10:11
Data File: 102417V9\9P255.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA9.I
Analyst: RXY1

Project: ESHL00114
SOP Ref: GL-OA-E-038
Dilution: 1
Purge Vol: 5 mL

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-487
Lab Sample ID: 435410002

Date Collected: 10/16/2017 13:22
Date Received: 10/18/2017 09:00

Matrix: W

Client ID: CAMO-18-147652
Batch ID: 1712545
Run Date: 10/25/2017 10:11
Prep Date: 10/25/2017 10:11
Data File: 102417V9\9P255.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA9.I
Analyst: RXY1

Project: ESHL00114
SOP Ref: GL-OA-E-038
Dilution: 1
Purge Vol: 5 mL

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-487	Date Collected: 10/16/2017 13:22	Matrix: W
Lab Sample ID: 435410002	Date Received: 10/18/2017 09:00	
	Client: ARSL004	Project: ESHL00114
Client ID: CAMO-18-147652	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1712545	Inst: VOA9.I	Dilution: 1
Run Date: 10/25/2017 10:11	Analyst: RXY1	Purge Vol: 5 mL
Prep Date: 10/25/2017 10:11		
Data File: 102417V9\9P255.D	Column: DB-624	

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	54.5	50.0	ug/L 109	(71%-134%)
Bromofluorobenzene	53.0	50.0	ug/L 106	(70%-131%)
Toluene-d8	49.9	50.0	ug/L 100	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
No Tentatively Identified Compounds Found				ug/L		

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487
Lab Sample ID: 435410003

Date Collected: 10/16/2017 13:22
Date Received: 10/18/2017 09:00

Matrix: W

Client ID: CAMO-18-147675

Client: ARSL004

Project: ESHL00114

Batch ID: 1712545

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 10/25/2017 06:11

Inst: VOA9.I

Dilution: 1

Prep Date: 10/25/2017 06:11

Analyst: RXY1

Purge Vol: 5 mL

Data File: 102417V9\9P246.D

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-487
Lab Sample ID: 435410003

Date Collected: 10/16/2017 13:22
Date Received: 10/18/2017 09:00

Matrix: W

Client ID: CAMO-18-147675

Client: ARSL004

Project: ESHL00114

Batch ID: 1712545

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 10/25/2017 06:11

Inst: VOA9.I

Dilution: 1

Prep Date: 10/25/2017 06:11

Analyst: RXY1

Purge Vol: 5 mL

Data File: 102417V9\9P246.D

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-487	Date Collected: 10/16/2017 13:22	Matrix: W
Lab Sample ID: 435410003	Date Received: 10/18/2017 09:00	
	Client: ARSL004	Project: ESHL00114
Client ID: CAMO-18-147675	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1712545	Inst: VOA9.I	Dilution: 1
Run Date: 10/25/2017 06:11	Analyst: RXY1	Purge Vol: 5 mL
Prep Date: 10/25/2017 06:11		
Data File: 102417V9\9P246.D	Column: DB-624	

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.1	50.0	ug/L	106 (71%-134%)
Bromofluorobenzene	51.8	50.0	ug/L	104 (70%-131%)
Toluene-d8	51.0	50.0	ug/L	102 (74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
No Tentatively Identified Compounds Found				ug/L		

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-487**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203903829	LCS for batch 1712545	99	101	101
1203903830	LCS for batch 1712545	101	103	104
1203903828	MB for batch 1712545	101	99	102
435410003	CAMO-18-147675	106	102	104
435410002	CAMO-18-147652	109	100	106
1203904820	LCS for batch 1712545	98	104	106
1203906644	LCS for batch 1712545	95	105	103
1203904819	MB for batch 1712545	98	104	107
1203903831	CAMO-18-147652PS	101	102	107
1203903833	CAMO-18-147652PSD	98	101	105
1203903832	CAMO-18-147652PS	97	102	105
1203903834	CAMO-18-147652PSD	96	102	102

Surrogate**Acceptance Limits**

DCED4 = 1,2-Dichloroethane-d4

(71%-134%)

TOL = Toluene-d8

(74%-124%)

BFB = Bromofluorobenzene

(70%-131%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712545

Matrix: WATER

Lab Sample ID 1203903829

Instrument: VOA9.I

Analysis Date: 10/25/2017 01:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	90.7	91	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1020	82	61-125
67-64-1	LCS Acetone	250	0.0	187	75	48-157
74-88-4	LCS Iodomethane	250	0.0	187	75	72-128
75-15-0	LCS Carbon disulfide	250	0.0	180	72	69-138
108-05-4	LCS Vinyl acetate	250	0.0	258	103	67-125
78-93-3	LCS 2-Butanone	250	0.0	199	80	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	219	87	66-124
591-78-6	LCS 2-Hexanone	250	0.0	210	84	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	55.1	110	40-160
74-87-3	LCS Chloromethane	50.0	0.0	58.9	118	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	54.4	109	65-137
74-83-9	LCS Bromomethane	50.0	0.0	53.0	106	63-137
75-00-3	LCS Chloroethane	50.0	0.0	52.2	104	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	51.1	102	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	52.4	105	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	39.9	80	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	44.2	88	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	43.5	87	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	43.0	86	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	43.7	87	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	44.6	89	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712545

Matrix: WATER

Lab Sample ID 1203903829

Instrument: VOA9.I

Analysis Date: 10/25/2017 01:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	LCS 2,2-Dichloropropane	50.0	0.0	43.4	87	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	42.3	85	76-125
67-66-3	LCS Chloroform	50.0	0.0	43.3	87	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	44.7	89	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	41.8	84	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	45.9	92	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	44.8	90	74-122
71-43-2	LCS Benzene	50.0	0.0	42.4	85	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	43.7	87	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	45.0	90	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	43.9	88	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	48.5	97	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	46.5	93	78-131
108-88-3	LCS Toluene	50.0	0.0	43.8	88	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	48.9	98	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	45.6	91	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	44.0	88	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	42.0	84	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	44.1	88	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	45.6	91	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	43.2	86	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	43.9	88	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712545

Matrix: WATER

Lab Sample ID 1203903829

Instrument: VOA9.I

Analysis Date: 10/25/2017 01:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	44.4	89	74-126
100-42-5	LCS Styrene	50.0	0.0	46.8	94	72-130
75-25-2	LCS Bromoform	50.0	0.0	54.7	109	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	45.5	91	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	45.3	91	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	45.0	90	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	43.2	86	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	44.2	88	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	46.3	93	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	44.2	88	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	43.9	88	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	45.6	91	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	45.3	91	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	45.7	91	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	45.4	91	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	41.7	83	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	42.0	84	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	43.8	88	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	51.1	102	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	42.8	86	72-136
91-20-3	LCS Naphthalene	50.0	0.0	44.6	89	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	43.8	88	70-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712545

Matrix: WATER

Lab Sample ID 1203903829

Instrument: VOA9.I

Analysis Date: 10/25/2017 01:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	42.3	85	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	47.6	95	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	42.6	85	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4610	92	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712545

Matrix: WATER

Lab Sample ID 1203903830

Instrument: VOA9.I

Analysis Date: 10/25/2017 02:37

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	LCS Acrolein	250	0.0	238	95	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	256	102	61-148
107-05-1	LCS Allyl chloride	250	0.0	234	94	59-125
107-13-1	LCS Acrylonitrile	250	0.0	250	100	65-122
107-12-0	LCS Propionitrile	250	0.0	245	98	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	252	101	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	251	101	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	262	105	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2420	97	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	45.5	91	66-147

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Post Spike

Client ID: CAMO-18-147652PS

Matrix: W

Lab Sample ID 1203903831

Instrument: VOA9.I

Analysis Date: 10/30/2017 18:42

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	PS m,p-Xylenes	100	0.00 U	102	102	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1170	93	56-131
67-64-1	PS Acetone	250	0.00 U	157	63	25-155
74-88-4	PS Iodomethane	250	0.00 U	232	93	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	244	98	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	266	106	48-133
78-93-3	PS 2-Butanone	250	0.00 U	206	82	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	247	99	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	227	91	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	53.0	106	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	58.1	116	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	54.2	108	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	51.1	102	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	50.9	102	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	50.3	101	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	53.3	107	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	50.9	102	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	51.2	102	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	51.5	103	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	50.1	100	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	49.7	99	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	50.6	101	69-127

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-487

Sample Type: Post Spike

Client ID: CAMO-18-147652PS

Matrix: W

Lab Sample ID 1203903831

Instrument: VOA9.I

Analysis Date: 10/30/2017 18:42

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	PS 2,2-Dichloropropane	50.0	0.00 U	52.2	104	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	47.7	95	71-130
67-66-3	PS Chloroform	50.0	0.00 U	48.0	96	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	51.4	103	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	47.7	95	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	53.4	107	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	50.8	102	69-130
71-43-2	PS Benzene	50.0	0.00 U	47.5	95	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	49.0	98	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	50.7	101	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	50.8	102	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	55.2	110	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	53.9	108	70-134
108-88-3	PS Toluene	50.0	0.00 U	48.0	96	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	57.3	115	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	51.1	102	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	49.8	100	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	46.8	94	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	50.9	102	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	52.0	104	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	48.2	96	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	49.0	98	61-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 8

SDG Number: 2018-487

Sample Type: Post Spike

Client ID: CAMO-18-147652PS

Matrix: W

Lab Sample ID 1203903831

Instrument: VOA9.I

Analysis Date: 10/30/2017 18:42

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	PS o-Xylene	50.0	0.00 U	49.8	100	62-131
100-42-5	PS Styrene	50.0	0.00 U	51.4	103	59-135
75-25-2	PS Bromoform	50.0	0.00 U	66.0	132	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	49.9	100	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	52.2	104	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	51.6	103	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	48.6	97	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	48.9	98	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	51.4	103	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	49.5	99	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	48.9	98	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	50.3	101	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	50.3	101	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	50.1	100	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	50.1	100	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	46.7	93	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	47.3	95	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	48.8	98	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	58.9	118	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	46.9	94	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	47.8	96	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	47.8	96	52-135

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 8

SDG Number: 2018-487

Sample Type: Post Spike

Client ID: CAMO-18-147652PS

Matrix: W

Lab Sample ID 1203903831

Instrument: VOA9.I

Analysis Date: 10/30/2017 18:42

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	PS 1,2,4-Trichlorobenzene	50.0	0.00 U	47.2	94	50-133
630-20-6	PS 1,1,1,2-Tetrachloroethane	50.0	0.00 U	53.2	106	71-133
95-50-1	PS 1,2-Dichlorobenzene	50.0	0.00 U	47.2	94	60-125
71-36-3	PS n-Butyl alcohol	5000	0.00 U	5320	106	60-140

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-147652PSD

Matrix: W

Lab Sample ID 1203903833

Instrument: VOA9.I

Analysis Date: 10/30/2017 19:09

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
179601-23-1	PSD m,p-Xylenes	100	0.00 U	105	105	59-132	3	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1180	94	56-131	1	0-20
67-64-1	PSD Acetone	250	0.00 U	158	63	25-155	1	0-20
74-88-4	PSD Iodomethane	250	0.00 U	239	96	66-133	3	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	245	98	61-141	0	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	271	108	48-133	2	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	209	84	25-143	2	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	255	102	61-127	3	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	233	93	33-138	3	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	51.3	103	33-164	3	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	56.9	114	53-139	2	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	55.8	112	58-140	3	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	50.6	101	59-146	1	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	50.1	100	65-129	2	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	49.6	99	65-141	2	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	55.1	110	69-127	3	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	51.8	104	59-130	2	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	53.7	107	62-123	5	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	54.1	108	69-132	5	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	52.1	104	65-127	4	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	51.8	104	67-127	4	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	52.1	104	69-127	3	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 6 of 8

SDG Number: 2018-487

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-147652PSD

Matrix: W

Lab Sample ID 1203903833

Instrument: VOA9.I

Analysis Date: 10/30/2017 19:09

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
594-20-7	PSD 2,2-Dichloropropane	50.0	0.00 U	54.0	108	66-137	3	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00 U	50.7	101	71-130	6	0-20
67-66-3	PSD Chloroform	50.0	0.00 U	49.7	99	71-129	3	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00 U	52.3	105	69-139	2	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00 U	49.8	100	67-130	4	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00 U	54.5	109	66-143	2	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00 U	52.6	105	69-130	3	0-20
71-43-2	PSD Benzene	50.0	0.00 U	49.3	99	66-125	4	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00 U	50.7	101	65-131	3	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00 U	52.4	105	67-127	3	0-20
74-95-3	PSD Dibromomethane	50.0	0.00 U	53.2	106	72-129	5	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00 U	57.5	115	70-138	4	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00 U	56.9	114	70-134	5	0-20
108-88-3	PSD Toluene	50.0	0.00 U	49.9	100	60-126	4	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00 U	60.3	121	69-135	5	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00 U	53.2	106	66-125	4	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00 U	51.9	104	67-124	4	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00 U	48.9	98	60-130	5	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00 U	54.4	109	68-143	7	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00 U	54.9	110	71-127	5	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00 U	50.4	101	64-124	5	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00 U	50.1	100	61-130	2	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 7 of 8

SDG Number: 2018-487

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-147652PSD

Matrix: W

Lab Sample ID 1203903833

Instrument: VOA9.I

Analysis Date: 10/30/2017 19:09

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
95-47-6	PSD o-Xylene	50.0	0.00 U	51.4	103	62-131	3	0-20
100-42-5	PSD Styrene	50.0	0.00 U	53.7	107	59-135	4	0-20
75-25-2	PSD Bromoform	50.0	0.00 U	70.6	141 *	64-138	7	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00 U	51.7	103	55-133	4	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00 U	53.8	108	62-129	3	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00 U	53.7	107	70-124	4	0-20
108-86-1	PSD Bromobenzene	50.0	0.00 U	50.8	102	62-124	4	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00 U	50.3	101	50-133	3	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00 U	52.8	106	53-135	3	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00 U	51.3	103	56-128	4	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00 U	51.1	102	53-130	4	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00 U	52.5	105	55-135	4	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00 U	52.0	104	53-132	3	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00 U	51.1	102	50-138	2	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00 U	51.7	103	49-138	3	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00 U	48.3	97	56-126	3	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00 U	49.1	98	55-125	4	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00 U	50.0	100	43-142	2	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00 U	62.4	125	62-141	6	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00 U	49.6	99	40-147	6	0-20
91-20-3	PSD Naphthalene	50.0	0.00 U	51.4	103	62-134	7	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00 U	50.7	101	52-135	6	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 8 of 8

SDG Number: 2018-487

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-147652PSD

Matrix: W

Lab Sample ID 1203903833

Instrument: VOA9.I

Analysis Date: 10/30/2017 19:09

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
120-82-1	PSD 1,2,4-Trichlorobenzene	50.0	0.00 U	50.3	101	50-133	6	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	55.6	111	71-133	4	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	49.2	98	60-125	4	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	5320	106	60-140	0	0-20

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-487

Sample Type: Post Spike

Client ID: CAMO-18-147652PS

Matrix: W

Lab Sample ID 1203903832

Instrument: VOA9.I

Analysis Date: 10/30/2017 19:35

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	PS Acrolein	250	0.00 U	257	103	49-141
76-13-1	PS Trichlorotrifluoroethane	250	0.00 U	280	112	57-149
107-05-1	PS Allyl chloride	250	0.00 U	256	102	54-128
107-13-1	PS Acrylonitrile	250	0.00 U	267	107	59-129
107-12-0	PS Propionitrile	250	0.00 U	264	105	58-131
126-98-7	PS Methacrylonitrile	250	0.00 U	267	107	59-134
80-62-6	PS Methyl methacrylate	250	0.00 U	269	108	62-135
97-63-2	PS Ethyl methacrylate	250	0.00 U	275	110	60-136
78-83-1	PS Isobutyl alcohol	2500	0.00 U	2510	100	60-143
126-99-8	PS 2-Chloro-1,3-butadiene	50.0	0.00 U	48.7	97	63-146

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-487

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-147652PSD

Matrix: W

Lab Sample ID 1203903834

Instrument: VOA9.I

Analysis Date: 10/30/2017 20:02

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD Acrolein	250	0.00 U	264	105	49-141	3	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00 U	253	101	57-149	10	0-20
107-05-1	PSD Allyl chloride	250	0.00 U	233	93	54-128	9	0-20
107-13-1	PSD Acrylonitrile	250	0.00 U	240	96	59-129	11	0-20
107-12-0	PSD Propionitrile	250	0.00 U	232	93	58-131	13	0-20
126-98-7	PSD Methacrylonitrile	250	0.00 U	236	95	59-134	12	0-20
80-62-6	PSD Methyl methacrylate	250	0.00 U	236	95	62-135	13	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00 U	248	99	60-136	10	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00 U	2160	86	60-143	15	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00 U	43.6	87	63-146	11	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712545

Matrix: WATER

Lab Sample ID 1203904820

Instrument: VOA9.I

Analysis Date: 10/30/2017 14:10

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	97.6	98	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1060	85	61-125
67-64-1	LCS Acetone	250	0.0	307	123	48-157
74-88-4	LCS Iodomethane	250	0.0	223	89	72-128
75-15-0	LCS Carbon disulfide	250	0.0	231	92	69-138
108-05-4	LCS Vinyl acetate	250	0.0	247	99	67-125
78-93-3	LCS 2-Butanone	250	0.0	289	116	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	252	101	66-124
591-78-6	LCS 2-Hexanone	250	0.0	313	125	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	47.9	96	40-160
74-87-3	LCS Chloromethane	50.0	0.0	54.8	110	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	51.4	103	65-137
74-83-9	LCS Bromomethane	50.0	0.0	49.1	98	63-137
75-00-3	LCS Chloroethane	50.0	0.0	49.2	98	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	46.8	94	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	48.6	97	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	47.6	95	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	48.9	98	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	49.2	98	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	48.0	96	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	47.2	94	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	47.5	95	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712545

Matrix: WATER

Lab Sample ID 1203904820

Instrument: VOA9.I

Analysis Date: 10/30/2017 14:10

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	LCS 2,2-Dichloropropane	50.0	0.0	51.8	104	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	45.8	92	76-125
67-66-3	LCS Chloroform	50.0	0.0	45.1	90	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	48.3	97	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	46.8	94	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	50.7	101	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	46.3	93	74-122
71-43-2	LCS Benzene	50.0	0.0	45.6	91	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	47.2	94	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	46.8	94	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	47.1	94	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	51.2	102	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	51.1	102	78-131
108-88-3	LCS Toluene	50.0	0.0	46.3	93	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	53.8	108	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	47.3	95	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	45.4	91	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	46.0	92	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	47.8	96	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	49.1	98	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	45.6	91	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	46.2	92	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712545

Matrix: WATER

Lab Sample ID 1203904820

Instrument: VOA9.I

Analysis Date: 10/30/2017 14:10

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	47.3	95	74-126
100-42-5	LCS Styrene	50.0	0.0	48.6	97	72-130
75-25-2	LCS Bromoform	50.0	0.0	61.5	123	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	48.5	97	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	47.4	95	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	46.8	94	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	45.9	92	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	46.7	93	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	49.3	99	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	47.1	94	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	46.9	94	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	49.4	99	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	48.0	96	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	48.4	97	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	48.9	98	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	44.8	90	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	45.3	91	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	47.6	95	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	56.6	113	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	48.2	96	72-136
91-20-3	LCS Naphthalene	50.0	0.0	48.3	97	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	48.9	98	70-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712545

Matrix: WATER

Lab Sample ID 1203904820

Instrument: VOA9.I

Analysis Date: 10/30/2017 14:10

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	49.6	99	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	50.9	102	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	44.7	89	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4630	93	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712545

Matrix: WATER

Lab Sample ID 1203906644

Instrument: VOA9.I

Analysis Date: 10/30/2017 15:04

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1712545

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	LCS Acrolein	250	0.0	225	90	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	241	96	61-148
107-05-1	LCS Allyl chloride	250	0.0	238	95	59-125
107-13-1	LCS Acrylonitrile	250	0.0	233	93	65-122
107-12-0	LCS Propionitrile	250	0.0	227	91	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	229	92	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	231	92	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	242	97	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2110	84	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	45.1	90	66-147

Method Blank Summary

Page 1 of 1

SDG Number:	2018-487	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1712545	Instrument ID:	VOA9.I	Data File:	102417V9\9P239B.D
Lab Sample ID:	1203903828	Prep Date:	10/25/2017 03:04	Analyzed:	10/25/17 03:04
Column:	DB-624				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1712545	1203903829	102417V9\9P236L.D	10/25/17	0144
02 LCS for batch 1712545	1203903830	102417V9\9P238L.D	10/25/17	0237
03 CAMO-18-147675	435410003	102417V9\9P246.D	10/25/17	0611
04 CAMO-18-147652	435410002	102417V9\9P255.D	10/25/17	1011

Method Blank Summary

Page 1 of 1

SDG Number:	2018-487	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1712545	Instrument ID:	VOA9.I	Data File:	103017V9\9Q113B1.D
Lab Sample ID:	1203904819	Prep Date:	10/30/2017 15:31	Analyzed:	10/30/17 15:31
Column:	DB-624				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
06 LCS for batch 1712545	1203904820	103017V9\9Q110L1.D	10/30/17	1410
07 LCS for batch 1712545	1203906644	103017V9\9Q112L1.D	10/30/17	1504
08 CAMO-18-147652PS	1203903831	103017V9\9Q120.D	10/30/17	1842
09 CAMO-18-147652PSD	1203903833	103017V9\9Q121.D	10/30/17	1909
10 CAMO-18-147652PS	1203903832	103017V9\9Q122.D	10/30/17	1935
11 CAMO-18-147652PSD	1203903834	103017V9\9Q123.D	10/30/17	2002

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-487

Lab Sample ID: 1203903828

Client Sample: QC for batch 1712545

Client ID: MB for batch 1712545

Batch ID: 1712545

Run Date: 10/25/2017 03:04

Prep Date: 10/25/2017 03:04

Data File: 102417V9\9P239B.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487

Lab Sample ID: 1203903828

Client Sample: QC for batch 1712545

Client ID: MB for batch 1712545

Batch ID: 1712545

Run Date: 10/25/2017 03:04

Prep Date: 10/25/2017 03:04

Data File: 102417V9\9P239B.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-487

Lab Sample ID: 1203903828

Client Sample: QC for batch 1712545

Client ID: MB for batch 1712545

Batch ID: 1712545

Run Date: 10/25/2017 03:04

Prep Date: 10/25/2017 03:04

Data File: 102417V9\9P239B.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.7	50.0	ug/L 101	(71%-134%)
Bromofluorobenzene	51.2	50.0	ug/L 102	(70%-131%)
Toluene-d8	49.5	50.0	ug/L 99	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
No Tentatively Identified Compounds Found				ug/L		

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487

Lab Sample ID: 1203903829

Client Sample: QC for batch 1712545

Client ID: LCS for batch 1712545

Batch ID: 1712545

Run Date: 10/25/2017 01:44

Prep Date: 10/25/2017 01:44

Data File: 102417V9\9P236L.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		47.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		44.7	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		45.3	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		45.6	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		43.7	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		39.9	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		41.8	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		43.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		45.0	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		42.3	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		45.3	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		51.1	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		45.6	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		42.6	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		44.8	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		45.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		46.3	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		41.7	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		44.0	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		42.0	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		43.4	ug/L	0.300	1.00
78-93-3	2-Butanone		199	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		44.2	ug/L	0.300	1.00
591-78-6	2-Hexanone		210	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		43.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		45.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		219	ug/L	1.50	5.00
67-64-1	Acetone		187	ug/L	1.50	10.0
75-05-8	Acetonitrile		1020	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		42.4	ug/L	0.300	1.00
108-86-1	Bromobenzene		43.2	ug/L	0.300	1.00
74-97-5	Bromochloromethane		42.3	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		48.5	ug/L	0.300	1.00
75-25-2	Bromoform		54.7	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487

Lab Sample ID: 1203903829

Client Sample: QC for batch 1712545

Client ID: LCS for batch 1712545

Batch ID: 1712545

Run Date: 10/25/2017 01:44

Prep Date: 10/25/2017 01:44

Data File: 102417V9\9P236L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		53.0	ug/L	0.300	1.00
75-15-0	Carbon disulfide		180	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		45.9	ug/L	0.300	1.00
108-90-7	Chlorobenzene		43.2	ug/L	0.300	1.00
75-00-3	Chloroethane		52.2	ug/L	0.300	1.00
67-66-3	Chloroform		43.3	ug/L	0.300	1.00
74-87-3	Chloromethane		58.9	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.1	ug/L	0.300	1.00
74-95-3	Dibromomethane		43.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		55.1	ug/L	0.300	1.00
60-29-7	Ethyl ether		52.4	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		43.9	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		42.8	ug/L	0.300	1.00
74-88-4	Iodomethane		187	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		45.5	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		44.2	ug/L	1.00	10.0
91-20-3	Naphthalene		44.6	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		46.8	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		42.0	ug/L	0.300	1.00
108-88-3	Toluene		43.8	ug/L	0.300	1.00
79-01-6	Trichloroethylene		43.7	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		51.1	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		258	ug/L	1.50	5.00
75-01-4	Vinyl chloride		54.4	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		44.6	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		46.5	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		90.7	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4610	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		43.8	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		44.2	ug/L	0.300	1.00
95-47-6	o-Xylene		44.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		45.7	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

Page 3 of 3

SDG Number:	2018-487	Matrix:	WATER
Lab Sample ID:	1203903829		
Client Sample:	QC for batch 1712545	Client:	ARSL004
Client ID:	LCS for batch 1712545	Method:	SW-846:8260B
Batch ID:	1712545	Inst:	VOA9.I
Run Date:	10/25/2017 01:44	Analyst:	RXY1
Prep Date:	10/25/2017 01:44		
Data File:	102417V9\9P236L.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		43.5	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		45.6	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		43.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		48.9	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.6	50.0	99	(71%-134%)
Bromofluorobenzene	50.5	50.0	101	(70%-131%)
Toluene-d8	50.5	50.0	101	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-487

Lab Sample ID: 1203903830

Client Sample: QC for batch 1712545

Client ID: LCS for batch 1712545

Batch ID: 1712545

Run Date: 10/25/2017 02:37

Prep Date: 10/25/2017 02:37

Data File: 102417V9\9P238L.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		45.5	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		238	ug/L	1.50	5.00
107-13-1	Acrylonitrile		250	ug/L	1.50	5.00
107-05-1	Allyl chloride		234	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487

Lab Sample ID: 1203903830

Client Sample: QC for batch 1712545

Client ID: LCS for batch 1712545

Batch ID: 1712545

Run Date: 10/25/2017 02:37

Prep Date: 10/25/2017 02:37

Data File: 102417V9\9P238L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		262	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2420	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		252	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		251	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		245	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		256	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number:	2018-487	Matrix:	WATER
Lab Sample ID:	1203903830		
Client Sample:	QC for batch 1712545	Client:	ARSL004
Client ID:	LCS for batch 1712545	Method:	SW-846:8260B
Batch ID:	1712545	Inst:	VOA9.I
Run Date:	10/25/2017 02:37	Analyst:	RXY1
Prep Date:	10/25/2017 02:37	Purge Vol:	5 mL
Data File:	102417V9\9P238L.D	Column:	DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.5	50.0	101	(71%-134%)
Bromofluorobenzene	51.8	50.0	104	(70%-131%)
Toluene-d8	51.3	50.0	103	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487	Date Collected: 10/16/2017 13:22	Matrix: W
Lab Sample ID: 1203903831	Date Received: 10/18/2017 09:00	
Client Sample: QC for batch 1712545	Client: ARSL004	Project: QC
Client ID: CAMO-18-147652PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1712545	Inst: VOA9.I	Dilution: 1
Run Date: 10/30/2017 18:42	Analyst: RXY1	Purge Vol: 5 mL
Prep Date: 10/30/2017 18:42		
Data File: 103017V9\9Q120.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		53.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		51.4	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		52.2	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		51.1	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		49.7	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		50.9	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		47.7	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		47.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		51.6	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		47.2	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		50.3	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		58.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		52.0	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		47.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		50.8	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		50.7	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		51.4	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		46.7	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		49.8	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		47.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		52.2	ug/L	0.300	1.00
78-93-3	2-Butanone		206	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		49.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		227	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		48.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		50.1	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		247	ug/L	1.50	5.00
67-64-1	Acetone		157	ug/L	1.50	10.0
75-05-8	Acetonitrile		1170	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		47.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.6	ug/L	0.300	1.00
74-97-5	Bromochloromethane		47.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		55.2	ug/L	0.300	1.00
75-25-2	Bromoform		66.0	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-487	Date Collected:	10/16/2017 13:22	Matrix:	W
Lab Sample ID:	1203903831	Date Received:	10/18/2017 09:00		
Client Sample:	QC for batch 1712545	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-147652PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1712545	Inst:	VOA9.I	Dilution:	1
Run Date:	10/30/2017 18:42	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	10/30/2017 18:42				
Data File:	103017V9\9Q120.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		51.1	ug/L	0.300	1.00
75-15-0	Carbon disulfide		244	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		53.4	ug/L	0.300	1.00
108-90-7	Chlorobenzene		48.2	ug/L	0.300	1.00
75-00-3	Chloroethane		50.9	ug/L	0.300	1.00
67-66-3	Chloroform		48.0	ug/L	0.300	1.00
74-87-3	Chloromethane		58.1	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		50.9	ug/L	0.300	1.00
74-95-3	Dibromomethane		50.8	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		53.0	ug/L	0.300	1.00
60-29-7	Ethyl ether		53.3	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		49.0	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		46.9	ug/L	0.300	1.00
74-88-4	Iodomethane		232	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		49.9	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		51.2	ug/L	1.00	10.0
91-20-3	Naphthalene	B	47.8	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		51.4	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.8	ug/L	0.300	1.00
108-88-3	Toluene		48.0	ug/L	0.300	1.00
79-01-6	Trichloroethylene		49.0	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		50.3	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		266	ug/L	1.50	5.00
75-01-4	Vinyl chloride		54.2	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		50.6	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		53.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		102	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5320	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		48.8	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		48.9	ug/L	0.300	1.00
95-47-6	o-Xylene		49.8	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		50.1	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-487	Date Collected:	10/16/2017 13:22	Matrix:	W
Lab Sample ID:	1203903831	Date Received:	10/18/2017 09:00		
Client Sample:	QC for batch 1712545	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-147652PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1712545	Inst:	VOA9.I	Dilution:	1
Run Date:	10/30/2017 18:42	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	10/30/2017 18:42				
Data File:	103017V9\9Q120.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		51.5	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		50.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		50.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		57.3	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.6	50.0	101	(71%-134%)
Bromofluorobenzene	53.4	50.0	107	(70%-131%)
Toluene-d8	51.0	50.0	102	(74%-124%)

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-487	Date Collected:	10/16/2017 13:22	Matrix:	W
Lab Sample ID:	1203903832	Date Received:	10/18/2017 09:00		
Client Sample:	QC for batch 1712545	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-147652PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1712545	Inst:	VOA9.I	Dilution:	1
Run Date:	10/30/2017 19:35	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	10/30/2017 19:35				
Data File:	103017V9\9Q122.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		48.7	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		257	ug/L	1.50	5.00
107-13-1	Acrylonitrile		267	ug/L	1.50	5.00
107-05-1	Allyl chloride		256	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-487	Date Collected:	10/16/2017 13:22	Matrix:	W
Lab Sample ID:	1203903832	Date Received:	10/18/2017 09:00		
Client Sample:	QC for batch 1712545	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-147652PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1712545	Inst:	VOA9.I	Dilution:	1
Run Date:	10/30/2017 19:35	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	10/30/2017 19:35				
Data File:	103017V9\9Q122.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		275	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2510	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		267	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		269	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		264	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		280	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-487	Date Collected:	10/16/2017 13:22	Matrix:	W
Lab Sample ID:	1203903832	Date Received:	10/18/2017 09:00		
Client Sample:	QC for batch 1712545	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-147652PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1712545	Inst:	VOA9.I	Dilution:	1
Run Date:	10/30/2017 19:35	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	10/30/2017 19:35				
Data File:	103017V9\9Q122.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.4	50.0	97	(71%-134%)
Bromofluorobenzene	52.4	50.0	105	(70%-131%)
Toluene-d8	51.2	50.0	102	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487	Date Collected: 10/16/2017 13:22	Matrix: W
Lab Sample ID: 1203903833	Date Received: 10/18/2017 09:00	
Client Sample: QC for batch 1712545	Client: ARSL004	Project: QC
Client ID: CAMO-18-147652PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1712545	Inst: VOA9.I	Dilution: 1
Run Date: 10/30/2017 19:09	Analyst: RXY1	Purge Vol: 5 mL
Prep Date: 10/30/2017 19:09		
Data File: 103017V9\9Q121.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		55.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		52.3	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		53.8	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		53.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		51.8	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		51.8	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		49.8	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		50.7	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		53.7	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		50.3	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		52.0	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		62.4	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		54.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		49.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		52.6	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		52.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		52.8	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		48.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		51.9	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		49.1	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		54.0	ug/L	0.300	1.00
78-93-3	2-Butanone		209	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		51.3	ug/L	0.300	1.00
591-78-6	2-Hexanone		233	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		51.1	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		51.7	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		255	ug/L	1.50	5.00
67-64-1	Acetone		158	ug/L	1.50	10.0
75-05-8	Acetonitrile		1180	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		49.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		50.8	ug/L	0.300	1.00
74-97-5	Bromochloromethane		50.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		57.5	ug/L	0.300	1.00
75-25-2	Bromoform		70.6	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487	Date Collected: 10/16/2017 13:22	Matrix: W
Lab Sample ID: 1203903833	Date Received: 10/18/2017 09:00	
Client Sample: QC for batch 1712545	Client: ARSL004	Project: QC
Client ID: CAMO-18-147652PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1712545	Inst: VOA9.I	Dilution: 1
Run Date: 10/30/2017 19:09	Analyst: RXY1	Purge Vol: 5 mL
Prep Date: 10/30/2017 19:09		
Data File: 103017V9\9Q121.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		50.6	ug/L	0.300	1.00
75-15-0	Carbon disulfide		245	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		54.5	ug/L	0.300	1.00
108-90-7	Chlorobenzene		50.4	ug/L	0.300	1.00
75-00-3	Chloroethane		50.1	ug/L	0.300	1.00
67-66-3	Chloroform		49.7	ug/L	0.300	1.00
74-87-3	Chloromethane		56.9	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		54.4	ug/L	0.300	1.00
74-95-3	Dibromomethane		53.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		51.3	ug/L	0.300	1.00
60-29-7	Ethyl ether		55.1	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		50.1	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		49.6	ug/L	0.300	1.00
74-88-4	Iodomethane		239	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		51.7	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		53.7	ug/L	1.00	10.0
91-20-3	Naphthalene	B	51.4	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		53.7	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		48.9	ug/L	0.300	1.00
108-88-3	Toluene		49.9	ug/L	0.300	1.00
79-01-6	Trichloroethylene		50.7	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		49.6	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		271	ug/L	1.50	5.00
75-01-4	Vinyl chloride		55.8	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		52.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		56.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		105	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5320	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		50.0	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		50.3	ug/L	0.300	1.00
95-47-6	o-Xylene		51.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		51.1	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-487	Date Collected:	10/16/2017 13:22	Matrix:	W
Lab Sample ID:	1203903833	Date Received:	10/18/2017 09:00		
Client Sample:	QC for batch 1712545	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-147652PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1712545	Inst:	VOA9.I	Dilution:	1
Run Date:	10/30/2017 19:09	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	10/30/2017 19:09				
Data File:	103017V9\9Q121.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		54.1	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		52.5	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		52.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		60.3	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.2	50.0	98	(71%-134%)
Bromofluorobenzene	52.3	50.0	105	(70%-131%)
Toluene-d8	50.5	50.0	101	(74%-124%)

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-487	Date Collected:	10/16/2017 13:22	Matrix:	W
Lab Sample ID:	1203903834	Date Received:	10/18/2017 09:00		
Client Sample:	QC for batch 1712545	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-147652PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1712545	Inst:	VOA9.I	Dilution:	1
Run Date:	10/30/2017 20:02	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	10/30/2017 20:02				
Data File:	103017V9\9Q123.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		43.6	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		264	ug/L	1.50	5.00
107-13-1	Acrylonitrile		240	ug/L	1.50	5.00
107-05-1	Allyl chloride		233	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-487	Date Collected:	10/16/2017 13:22	Matrix:	W
Lab Sample ID:	1203903834	Date Received:	10/18/2017 09:00		
Client Sample:	QC for batch 1712545	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-147652PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1712545	Inst:	VOA9.I	Dilution:	1
Run Date:	10/30/2017 20:02	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	10/30/2017 20:02				
Data File:	103017V9\9Q123.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		248	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2160	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		236	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		236	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		232	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		253	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-487	Date Collected: 10/16/2017 13:22	Matrix: W
Lab Sample ID: 1203903834	Date Received: 10/18/2017 09:00	
Client Sample: QC for batch 1712545	Client: ARSL004	Project: QC
Client ID: CAMO-18-147652PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1712545	Inst: VOA9.I	Dilution: 1
Run Date: 10/30/2017 20:02	Analyst: RXY1	Purge Vol: 5 mL
Prep Date: 10/30/2017 20:02		
Data File: 103017V9\9Q123.D	Column: DB-624	

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	47.8	50.0	96	(71%-134%)
Bromofluorobenzene	50.8	50.0	102	(70%-131%)
Toluene-d8	51.2	50.0	102	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-487

Lab Sample ID: 1203904819

Client Sample: QC for batch 1712545

Client ID: MB for batch 1712545

Batch ID: 1712545

Run Date: 10/30/2017 15:31

Prep Date: 10/30/2017 15:31

Data File: 103017V9\9Q113B1.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487

Lab Sample ID: 1203904819

Client Sample: QC for batch 1712545

Client ID: MB for batch 1712545

Batch ID: 1712545

Run Date: 10/30/2017 15:31

Prep Date: 10/30/2017 15:31

Data File: 103017V9\9Q113B1.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

**Volatile
Certificate of Analysis
Sample Summary**

Page 3 of 3

SDG Number: 2018-487	Matrix: WATER	
Lab Sample ID: 1203904819		
Client Sample: QC for batch 1712545	Client: ARSL004	Project: QC
Client ID: MB for batch 1712545	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1712545	Inst: VOA9.I	Dilution: 1
Run Date: 10/30/2017 15:31	Analyst: RXY1	Purge Vol: 5 mL
Prep Date: 10/30/2017 15:31		
Data File: 103017V9\9Q113B1.D	Column: DB-624	

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.9	50.0	ug/L	98 (71%-134%)
Bromofluorobenzene	53.3	50.0	ug/L	107 (70%-131%)
Toluene-d8	52.0	50.0	ug/L	104 (74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
No Tentatively Identified Compounds Found				ug/L		

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487

Lab Sample ID: 1203904820

Client Sample: QC for batch 1712545

Client ID: LCS for batch 1712545

Batch ID: 1712545

Run Date: 10/30/2017 14:10

Prep Date: 10/30/2017 14:10

Data File: 103017V9\9Q110L1.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		50.9	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		48.3	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.3	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		47.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		47.6	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		46.8	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		48.9	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		46.8	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		49.6	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		48.0	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		56.6	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		49.1	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		44.7	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		46.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		46.8	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		49.3	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		44.8	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		45.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		45.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		51.8	ug/L	0.300	1.00
78-93-3	2-Butanone		289	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		47.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		313	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		46.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		48.9	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		252	ug/L	1.50	5.00
67-64-1	Acetone		307	ug/L	1.50	10.0
75-05-8	Acetonitrile		1060	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		45.6	ug/L	0.300	1.00
108-86-1	Bromobenzene		45.9	ug/L	0.300	1.00
74-97-5	Bromochloromethane		45.8	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		51.2	ug/L	0.300	1.00
75-25-2	Bromoform		61.5	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-487
Lab Sample ID: 1203904820
Client Sample: QC for batch 1712545
Client ID: LCS for batch 1712545
Batch ID: 1712545
Run Date: 10/30/2017 14:10
Prep Date: 10/30/2017 14:10
Data File: 103017V9\9Q110L1.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA9.I
Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC
SOP Ref: GL-OA-E-038
Dilution: 1
Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		49.1	ug/L	0.300	1.00
75-15-0	Carbon disulfide		231	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		50.7	ug/L	0.300	1.00
108-90-7	Chlorobenzene		45.6	ug/L	0.300	1.00
75-00-3	Chloroethane		49.2	ug/L	0.300	1.00
67-66-3	Chloroform		45.1	ug/L	0.300	1.00
74-87-3	Chloromethane		54.8	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		47.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		47.1	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		47.9	ug/L	0.300	1.00
60-29-7	Ethyl ether		48.6	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		46.2	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		48.2	ug/L	0.300	1.00
74-88-4	Iodomethane		223	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		48.5	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		48.9	ug/L	1.00	10.0
91-20-3	Naphthalene	B	48.3	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		48.6	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.0	ug/L	0.300	1.00
108-88-3	Toluene		46.3	ug/L	0.300	1.00
79-01-6	Trichloroethylene		47.2	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		46.8	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		247	ug/L	1.50	5.00
75-01-4	Vinyl chloride		51.4	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		47.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		51.1	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		97.6	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4630	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		47.6	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		46.7	ug/L	0.300	1.00
95-47-6	o-Xylene		47.3	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		48.4	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number:	2018-487	Matrix:	WATER
Lab Sample ID:	1203904820		
Client Sample:	QC for batch 1712545	Client:	ARSL004
Client ID:	LCS for batch 1712545	Method:	SW-846:8260B
Batch ID:	1712545	Inst:	VOA9.I
Run Date:	10/30/2017 14:10	Analyst:	RXY1
Prep Date:	10/30/2017 14:10		
Data File:	103017V9\9Q110L1.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		49.2	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		49.4	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		48.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		53.8	ug/L	0.300	1.00
Surrogate/Tracer recovery		Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4		49.1	50.0	ug/L	98	(71%-134%)
Bromofluorobenzene		53.1	50.0	ug/L	106	(70%-131%)
Toluene-d8		52.2	50.0	ug/L	104	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-487

Lab Sample ID: 1203906644

Client Sample: QC for batch 1712545

Client ID: LCS for batch 1712545

Batch ID: 1712545

Run Date: 10/30/2017 15:04

Prep Date: 10/30/2017 15:04

Data File: 103017V9\9Q112L1.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		45.1	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		225	ug/L	1.50	5.00
107-13-1	Acrylonitrile		233	ug/L	1.50	5.00
107-05-1	Allyl chloride		238	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-487

Lab Sample ID: 1203906644

Client Sample: QC for batch 1712545

Client ID: LCS for batch 1712545

Batch ID: 1712545

Run Date: 10/30/2017 15:04

Prep Date: 10/30/2017 15:04

Data File: 103017V9\9Q112L1.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		242	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2110	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		229	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		231	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		227	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		241	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

Page 3 of 3

SDG Number:	2018-487	Matrix:	WATER
Lab Sample ID:	1203906644		
Client Sample:	QC for batch 1712545	Client:	ARSL004
Client ID:	LCS for batch 1712545	Method:	SW-846:8260B
Batch ID:	1712545	Inst:	VOA9.I
Run Date:	10/30/2017 15:04	Analyst:	RXY1
Prep Date:	10/30/2017 15:04	Purge Vol:	5 mL
Data File:	103017V9\9Q112L1.D	Column:	DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	47.6	50.0	95	(71%-134%)
Bromofluorobenzene	51.5	50.0	103	(70%-131%)
Toluene-d8	52.3	50.0	105	(74%-124%)

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-487
Work Order #: 435410**

Method/Analysis Information

Procedure:	Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry
Analytical Method:	SW846 3510C/8270D
Prep Method:	SW846 3510C
Analytical Batch Number:	1711213
Prep Batch Number:	1711212

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3510C/8270D:

Sample ID	Client ID
435410002	CAMO-18-147652
1203900839	Method Blank (MB)
1203900840	Laboratory Control Sample (LCS)
1203900841	435429002(CAMO-18-147649) Matrix Spike (MS)
1203900842	435429002(CAMO-18-147649) 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-009 REV# 39.

Raw data reports are processed and reviewed by the analyst using the data analysis software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package. The various calibration mixes may not be calibrated using all of the calibration levels. In addition, not all of the mixes are calibrated using the same levels.

Diphenylamine has now superseded N-Nitroso-diphenylamine on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Methodologies referenced N-Nitroso-diphenylamine. However, as stated in EPA Methodology, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, showed that they not only co-elute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG) in this batch. A second source initial calibration verification (ICV) was included in the standard section directly behind the initial calibration.

CCV Requirements

All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8270D for sample 435410002 (CAMO-18-147652) and the associated QC. However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8270D outlier acceptance criteria. If required, a CRDL was analyzed after the CCVs to demonstrate that there is adequate sensitivity to detect the failed compounds at the applicable lower quantitation limit.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG in this batch met the acceptance criteria.

Surrogate Recoveries

All the surrogate recoveries were within the established acceptance criteria for this SDG in this batch.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 435429002 (CAMO-18-147649) was selected for analysis as the matrix spike and matrix spike duplicate.

Spike Recovery Statement

The MS and MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) between the MS and MSD (See Below) did not meet acceptance limits. As the individual MS and MSD recoveries were within the acceptance limits, the failures had no adverse impact on the reported sample data.

Sample	Analyte	Value
1203900841MS and 1203900842MSD (CAMO-18-147649)	Pyridine	31* (0.0%-30.0%)

Internal Standard (ISTD) Acceptance

The internal standard responses used to quantitate the requested target analytes were within the required acceptance criteria for the SDG associated samples in this batch.

Technical Information:

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. All reported compound mass spectra met the detection specifications in the method.

Sample Dilutions

The samples in this SDG in this batch did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG in this analytical batch unless confirmations or dilutions were required.

Miscellaneous Information:

Manual Integrations

Manual integrations were not required on samples in this batch in this SDG for detected target analytes or surrogates.

TIC Comment

Tentatively identified compounds (TIC) were requested for sample 435410002 (CAMO-18-147652) in this SDG in this batch.

Additional Comments

Additional comments were not required for the SDG associated samples in this batch.

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually 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 of each electronic package will indicate the reviewer name associated with the generation of the data and package. 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.

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description
MSD5.I	Agilent 6890/5973 GC/MS w/ 7683 Autosampler	HP6890/HP5973	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)

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

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-487 GEL Work Order: 435410

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, MDC 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: Barbara Bailey

Date: 08 NOV 2017

Title: Data Validator

Sample Data Summary

**Semi-Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-487
Lab Sample ID: 435410002

Date Collected: 10/16/2017 13:22
Date Received: 10/18/2017 09:00

Matrix: W

Client ID: CAMO-18-147652
Batch ID: 1711213
Run Date: 10/20/2017 21:54
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2023.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 980 mL
Column: DB-5ms

Project: ESHL00114
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.06	ug/L	3.06	10.2
120-82-1	1,2,4-Trichlorobenzene	U	3.06	ug/L	3.06	10.2
95-50-1	1,2-Dichlorobenzene	U	3.06	ug/L	3.06	10.2
122-66-7	Azobenzene	U	3.06	ug/L	3.06	10.2
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.06	ug/L	3.06	10.2
106-46-7	1,4-Dichlorobenzene	U	3.06	ug/L	3.06	10.2
123-91-1	1,4-Dioxane	U	3.06	ug/L	3.06	10.2
90-12-0	1-Methylnaphthalene	U	0.306	ug/L	0.306	1.02
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.06	ug/L	3.06	10.2
95-95-4	2,4,5-Trichlorophenol	U	3.06	ug/L	3.06	10.2
88-06-2	2,4,6-Trichlorophenol	U	3.06	ug/L	3.06	10.2
120-83-2	2,4-Dichlorophenol	U	3.06	ug/L	3.06	10.2
105-67-9	2,4-Dimethylphenol	U	3.06	ug/L	3.06	10.2
51-28-5	2,4-Dinitrophenol	U	5.10	ug/L	5.10	20.4
121-14-2	2,4-Dinitrotoluene	U	3.06	ug/L	3.06	10.2
606-20-2	2,6-Dinitrotoluene	U	3.06	ug/L	3.06	10.2
91-58-7	2-Chloronaphthalene	U	0.418	ug/L	0.418	1.02
95-57-8	2-Chlorophenol	U	3.06	ug/L	3.06	10.2
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.06	ug/L	3.06	10.2
91-57-6	2-Methylnaphthalene	U	0.306	ug/L	0.306	1.02
88-75-5	2-Nitrophenol	U	3.06	ug/L	3.06	10.2
91-94-1	3,3'-Dichlorobenzidine	U	3.06	ug/L	3.06	10.2
101-55-3	4-Bromophenylphenylether	U	3.06	ug/L	3.06	10.2
59-50-7	Parachlorometa cresol	U	3.06	ug/L	3.06	10.2
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.37	ug/L	3.37	10.2
7005-72-3	4-Chlorophenylphenylether	U	3.06	ug/L	3.06	10.2
100-02-7	4-Nitrophenol	U	3.06	ug/L	3.06	10.2
83-32-9	Acenaphthene	U	0.306	ug/L	0.306	1.02
208-96-8	Acenaphthylene	U	0.306	ug/L	0.306	1.02
62-53-3	Aniline	U	4.29	ug/L	4.29	10.2
120-12-7	Anthracene	U	0.306	ug/L	0.306	1.02
1912-24-9	Atrazine	U	3.06	ug/L	3.06	10.2
92-87-5	Benzidine	U	3.98	ug/L	3.98	10.2
56-55-3	Benzo(a)anthracene	U	0.306	ug/L	0.306	1.02
50-32-8	Benzo(a)pyrene	U	0.306	ug/L	0.306	1.02
205-99-2	Benzo(b)fluoranthene	U	0.306	ug/L	0.306	1.02
191-24-2	Benzo(ghi)perylene	U	0.306	ug/L	0.306	1.02

**Semi-Volatile
Certificate of Analysis
Sample Summary**

Page 2 of 3

SDG Number: 2018-487
Lab Sample ID: 435410002

Date Collected: 10/16/2017 13:22
Date Received: 10/18/2017 09:00

Matrix: W

Client ID: CAMO-18-147652
Batch ID: 1711213
Run Date: 10/20/2017 21:54
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2023.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 980 mL
Column: DB-5ms

Project: ESHL00114
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.306	ug/L	0.306	1.02
65-85-0	Benzoic acid	U	6.12	ug/L	6.12	20.4
100-51-6	Benzyl alcohol	U	3.06	ug/L	3.06	10.2
85-68-7	Butylbenzylphthalate	U	3.06	ug/L	3.06	10.2
218-01-9	Chrysene	U	0.306	ug/L	0.306	1.02
84-74-2	Di-n-butylphthalate	U	3.06	ug/L	3.06	10.2
117-84-0	Di-n-octylphthalate	U	3.06	ug/L	3.06	10.2
53-70-3	Dibenzo(a,h)anthracene	U	0.306	ug/L	0.306	1.02
132-64-9	Dibenzofuran	U	3.06	ug/L	3.06	10.2
84-66-2	Diethylphthalate	U	3.06	ug/L	3.06	10.2
131-11-3	Dimethylphthalate	U	3.06	ug/L	3.06	10.2
88-85-7	Dinoseb	U	3.06	ug/L	3.06	10.2
122-39-4	Diphenylamine	U	3.06	ug/L	3.06	10.2
206-44-0	Fluoranthene	U	0.306	ug/L	0.306	1.02
86-73-7	Fluorene	U	0.306	ug/L	0.306	1.02
118-74-1	Hexachlorobenzene	U	3.06	ug/L	3.06	10.2
87-68-3	Hexachlorobutadiene	U	3.06	ug/L	3.06	10.2
77-47-4	Hexachlorocyclopentadiene	U	3.06	ug/L	3.06	10.2
67-72-1	Hexachloroethane	U	3.06	ug/L	3.06	10.2
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.306	ug/L	0.306	1.02
78-59-1	Isophorone	U	3.57	ug/L	3.57	10.2
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.06	ug/L	3.06	10.2
924-16-3	N-Nitrosodi-n-butylamine	U	3.06	ug/L	3.06	10.2
55-18-5	N-Nitrosodiethylamine	U	3.06	ug/L	3.06	10.2
621-64-7	N-Nitrosodi-n-propylamine	U	3.06	ug/L	3.06	10.2
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.06	ug/L	3.06	10.2
91-20-3	Naphthalene	U	0.306	ug/L	0.306	1.02
98-95-3	Nitrobenzene	U	3.06	ug/L	3.06	10.2
608-93-5	Pentachlorobenzene	U	3.06	ug/L	3.06	10.2
87-86-5	Pentachlorophenol	U	3.06	ug/L	3.06	10.2
85-01-8	Phenanthrene	U	0.306	ug/L	0.306	1.02
108-95-2	Phenol	U	3.06	ug/L	3.06	10.2
129-00-0	Pyrene	U	0.306	ug/L	0.306	1.02
110-86-1	Pyridine	U	3.06	ug/L	3.06	10.2
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.06	ug/L	3.06	10.2
111-91-1	bis(2-Chloroethoxy)methane	U	3.06	ug/L	3.06	10.2
111-44-4	bis(2-Chloroethyl) ether	U	3.06	ug/L	3.06	10.2
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.06	ug/L	3.06	10.2

**Semi-Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-487
Lab Sample ID: 435410002

Date Collected: 10/16/2017 13:22
Date Received: 10/18/2017 09:00

Matrix: W

Client ID: CAMO-18-147652
Batch ID: 1711213
Run Date: 10/20/2017 21:54
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2023.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 980 mL
Column: DB-5ms

Project: ESHL00114
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.78	ug/L	3.78	10.2
99-09-2	3-Nitroaniline	U	3.06	ug/L	3.06	10.2
95-48-7	<i>m</i> -Nitroaniline o-Cresol	U	3.06	ug/L	3.06	10.2
88-74-4	2-Nitroaniline	U	3.06	ug/L	3.06	10.2
100-01-6	<i>o</i> -Nitroaniline 4-Nitroaniline <i>p</i> -Nitroaniline	U	3.06	ug/L	3.06	10.2

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	90.3	102	ug/L 89	(32%-124%)
2-Fluorobiphenyl	39.9	51.0	ug/L 78	(32%-112%)
2-Fluorophenol	43.6	102	ug/L 43	(15%-88%)
Nitrobenzene-d5	37.5	51.0	ug/L 73	(36%-115%)
Phenol-d5	29.2	102	ug/L 29	(15%-91%)
p-Terphenyl-d14	40.8	51.0	ug/L 80	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000080-05-7	Phenol, 4,4'-(1-methylethylidene)b	13.449	8.27	ug/L	93	NJ
	unknown	22.93	7.64	ug/L	0	J

Quality Control Summary

**Semi-Volatile
Surrogate Recovery Report**

Page 1 of 1

SDG Number: 2018-487**Matrix Type: LIQUID**

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203900839	MB for batch 1711212	43	29	70	71	82	80
1203900840	LCS for batch 1711212	42	29	70	68	94	86
435410002	CAMO-18-147652	43	29	73	78	89	80
1203900841	CAMO-18-147649MS	61	49	77	80	97	98
1203900842	CAMO-18-147649MSD	59	47	72	77	96	82

Surrogate**Acceptance Limits**

2FP	= 2-Fluorophenol	(15%-88%)
PHL	= Phenol-d5	(15%-91%)
NBZ	= Nitrobenzene-d5	(36%-115%)
FBP	= 2-Fluorobiphenyl	(32%-112%)
TBP	= 2,4,6-Tribromophenol	(32%-124%)
TPH	= p-Terphenyl-d14	(36%-121%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1711212

Matrix: WATER

Lab Sample ID 1203900840

Instrument: MSD5.I

Analysis Date: 10/20/2017 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
62-75-9	LCS N-Methyl-N-nitrosomethylamine	50.0	0.0	20.3	41	30-88
110-86-1	LCS Pyridine	50.0	0.0	16.3	33	27-89
62-53-3	LCS Aniline	50.0	0.0	37.5	75	49-112
108-95-2	LCS Phenol	50.0	0.0	15.2	30	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	36.1	72	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	36.8	74	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	27.3	55	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	27.9	56	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	29.5	59	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)ether	50.0	0.0	29.1	58	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	36.8	74	44-102
95-48-7	LCS o-Cresol	50.0	0.0	34.4	69	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	35.2	70	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	36.2	72	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	26.8	54	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	37.8	76	53-115
78-59-1	LCS Isophorone	50.0	0.0	37.2	74	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	39.7	79	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	36.1	72	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	39.2	78	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	41.8	84	53-109
65-85-0	LCS Benzoic acid	100	0.0	32.2	32	21-74

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1711212

Matrix: WATER

Lab Sample ID 1203900840

Instrument: MSD5.I

Analysis Date: 10/20/2017 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	LCS 4-Chloroaniline	50.0	0.0	51.4	103	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	27.3	55	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	41.6	83	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	35.5	71	42-103
91-20-3	LCS Naphthalene	50.0	0.0	34.9	70	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	37.9	76	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	21.3	43	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	42.1	84	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	43.6	87	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	35.7	71	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	37.2	74	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	53.0	106	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	47.5	95	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	47.0	94	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	46.9	94	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	41.6	83	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	43.2	86	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	36.8	74	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	43.0	86	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	48.4	97	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	45.7	91	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	11.9	24	15-137

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1711212

Matrix: WATER

Lab Sample ID 1203900840

Instrument: MSD5.I

Analysis Date: 10/20/2017 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	LCS Fluorene	50.0	0.0	41.6	83	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	45.0	90	52-121
100-01-6	LCS 4-Nitroaniline	50.0	0.0	49.8	100	44-137
	<i>p</i> -Nitroaniline					
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	44.8	90	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	38.2	76	55-113
122-66-7	LCS Azobenzene	50.0	0.0	35.6	71	53-115
	<i>1,2-Diphenylhydrazine</i>					
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	41.9	84	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	40.8	82	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	49.9	100	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	43.1	86	55-110
120-12-7	LCS Anthracene	50.0	0.0	41.9	84	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	44.6	89	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	46.2	92	54-118
129-00-0	LCS Pyrene	50.0	0.0	40.6	81	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	39.2	78	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	38.6	77	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	44.0	88	57-112
218-01-9	LCS Chrysene	50.0	0.0	45.0	90	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	38.1	76	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	42.9	86	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	42.1	84	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	44.2	88	40-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1711212

Matrix: WATER

Lab Sample ID 1203900840

Instrument: MSD5.I

Analysis Date: 10/20/2017 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	LCS Indeno(1,2,3-cd)pyrene	50.0	0.0	56.1	112	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	55.7	111	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	56.0	112	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	22.9	46	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	42.0	84	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	36.2	72	44-102
1912-24-9	LCS Atrazine	50.0	0.0	49.3	99	60-131
92-87-5	LCS Benzidine	100	0.0	62.0	62	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	49.7	99	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	32.2	64	39-99

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Matrix Spike

Client ID: CAMO-18-147649MS

Matrix: W

Lab Sample ID 1203900841

Instrument: MSD5.I

Analysis Date: 10/20/2017 22:55

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
62-75-9	MS N-Methyl-N-nitrosomethylamine	111	0.00 U	66.0	59	25-106
110-86-1	MS Pyridine	111	0.00 U	48.2	43	24-93
62-53-3	MS Aniline	111	0.00 U	83.3	75	37-113
108-95-2	MS Phenol	111	0.00 U	57.9	52	23-82
111-44-4	MS bis(2-Chloroethyl) ether	111	0.00 U	94.1	85	39-114
95-57-8	MS 2-Chlorophenol	111	0.00 U	94.2	85	37-108
541-73-1	MS 1,3-Dichlorobenzene	111	0.00 U	80.6	73	27-97
106-46-7	MS 1,4-Dichlorobenzene	111	0.00 U	80.1	72	28-97
95-50-1	MS 1,2-Dichlorobenzene	111	0.00 U	82.0	74	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)ether	111	0.00 U	70.3	63	32-127
100-51-6	MS Benzyl alcohol	111	0.00 U	95.0	86	37-116
95-48-7	MS o-Cresol	111	0.00 U	87.9	79	34-109
65794-96-9	MS m,p-Cresols	111	0.00 U	99.5	90	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	111	0.00 U	83.0	75	42-118
67-72-1	MS Hexachloroethane	111	0.00 U	77.0	69	29-94
98-95-3	MS Nitrobenzene	111	0.00 U	89.9	81	38-123
78-59-1	MS Isophorone	111	0.00 U	87.4	79	43-120
88-75-5	MS 2-Nitrophenol	111	0.00 U	96.4	87	39-115
105-67-9	MS 2,4-Dimethylphenol	111	0.00 U	84.3	76	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	111	0.00 U	94.2	85	42-118
120-83-2	MS 2,4-Dichlorophenol	111	0.00 U	101	91	40-111
65-85-0	MS Benzoic acid	222	0.00 U	133	60	17-95

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Client ID: CAMO-18-147649MS

Lab Sample ID 1203900841

Instrument: MSD5.I

Analyst: JMB3

Inj. Vol: 1 uL

Sample Type: Matrix Spike

Matrix: W

Analysis Date: 10/20/2017 22:55

Dilution: 1

Prep Batch ID: 1711212

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	111	0.00 U	122	109	44-138
87-68-3	MS Hexachlorobutadiene	111	0.00 U	83.2	75	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	111	0.00 U	103	93	41-122
91-57-6	MS 2-Methylnaphthalene	111	0.00 U	90.2	81	29-109
91-20-3	MS Naphthalene	111	0.00 U	91.0	82	31-108
90-12-0	MS 1-Methylnaphthalene	111	0.00 U	93.3	84	33-112
77-47-4	MS Hexachlorocyclopentadiene	111	0.00 U	68.0	61	26-79
88-06-2	MS 2,4,6-Trichlorophenol	111	0.00 U	99.8	90	39-124
95-95-4	MS 2,4,5-Trichlorophenol	111	0.00 U	100	90	42-120
91-58-7	MS 2-Chloronaphthalene	111	0.00 U	86.8	78	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	111	0.00 U	87.6	79	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	111	0.00 U	127	114	42-144
131-11-3	MS Dimethylphthalate	111	0.00 U	110	99	45-128
606-20-2	MS 2,6-Dinitrotoluene	111	0.00 U	109	98	46-124
121-14-2	MS 2,4-Dinitrotoluene	111	0.00 U	110	99	45-125
208-96-8	MS Acenaphthylene	111	0.00 U	98.0	88	35-120
83-32-9	MS Acenaphthene	111	0.00 U	104	94	35-117
51-28-5	MS 2,4-Dinitrophenol	111	0.00 U	87.9	79	27-122
132-64-9	MS Dibenzofuran	111	0.00 U	101	91	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	111	0.00 U	114	103	40-128
84-66-2	MS Diethylphthalate	111	0.00 U	106	96	43-127
100-02-7	MS 4-Nitrophenol	111	0.00 U	53.5	48	17-85

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Matrix Spike

Client ID: CAMO-18-147649MS

Matrix: W

Lab Sample ID 1203900841

Instrument: MSD5.I

Analysis Date: 10/20/2017 22:55

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS Fluorene	111	0.00 U	95.7	86	39-117
7005-72-3	MS 4-Chlorophenylphenylether	111	0.00 U	108	98	39-121
100-01-6	MS 4-Nitroaniline	111	0.00 U	113	101	30-133
534-52-1	MS 2-Methyl-4,6-dinitrophenol	111	0.00 U	110	99	32-126
122-39-4	MS Diphenylamine	111	0.00 U	90.9	82	37-118
122-66-7	MS Azobenzene	111	0.00 U	83.3	75	38-120
101-55-3	MS 4-Bromophenylphenylether	111	0.00 U	102	91	39-121
118-74-1	MS Hexachlorobenzene	111	0.00 U	104	94	40-118
87-86-5	MS Pentachlorophenol	111	0.00 U	120	108	35-121
85-01-8	MS Phenanthrene	111	0.00 U	101	91	40-115
120-12-7	MS Anthracene	111	0.00 U	98.1	88	38-120
84-74-2	MS Di-n-butylphthalate	111	0.00 U	100	90	41-128
206-44-0	MS Fluoranthene	111	0.00 U	105	95	41-119
129-00-0	MS Pyrene	111	0.00 U	101	91	35-128
85-68-7	MS Butylbenzylphthalate	111	0.00 U	93.7	84	40-129
117-81-7	MS bis(2-Ethylhexyl)phthalate	111	0.00 U	90.0	81	38-131
56-55-3	MS Benzo(a)anthracene	111	0.00 U	105	94	39-120
218-01-9	MS Chrysene	111	0.00 U	106	96	41-124
117-84-0	MS Di-n-octylphthalate	111	0.00 U	87.7	79	37-134
205-99-2	MS Benzo(b)fluoranthene	111	0.00 U	102	92	31-122
207-08-9	MS Benzo(k)fluoranthene	111	0.00 U	99.9	90	33-123
50-32-8	MS Benzo(a)pyrene	111	0.00 U	102	92	32-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Matrix Spike

Client ID: CAMO-18-147649MS

Matrix: W

Lab Sample ID 1203900841

Instrument: MSD5.I

Analysis Date: 10/20/2017 22:55

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	MS Indeno(1,2,3-cd)pyrene	111	0.00 U	125	113	27-121
53-70-3	MS Dibenzo(a,h)anthracene	111	0.00 U	123	111	30-125
191-24-2	MS Benzo(ghi)perylene	111	0.00 U	123	111	24-126
123-91-1	MS 1,4-Dioxane	111	0.00 U	85.0	77	24-110
930-55-2	MS N-Nitrosopyrrolidine	111	0.00 U	97.9	88	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	111	0.00 U	91.8	83	32-101
1912-24-9	MS Atrazine	111	0.00 U	113	102	42-129
92-87-5	MS Benzidine	222	0.00 U	58.3	26	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	111	0.00 U	118	106	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	111	0.00 U	89.4	80	26-102

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-147649MSD

Matrix: W

Lab Sample ID 1203900842

Instrument: MSD5.I

Analysis Date: 10/20/2017 23:25

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits	
62-75-9	MSD N-Methyl-N-nitrosomethylamine	111	0.00	U	64.9	58	25-106	2	0-30
110-86-1	MSD Pyridine	111	0.00	U	35.2	32	24-93	31 *	0-30
62-53-3	MSD Aniline	111	0.00	U	76.6	69	37-113	8	0-30
108-95-2	MSD Phenol	111	0.00	U	55.1	50	23-82	5	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	111	0.00	U	79.9	72	39-114	16	0-30
95-57-8	MSD 2-Chlorophenol	111	0.00	U	84.1	76	37-108	11	0-30
541-73-1	MSD 1,3-Dichlorobenzene	111	0.00	U	66.8	60	27-97	19	0-30
106-46-7	MSD 1,4-Dichlorobenzene	111	0.00	U	70.0	63	28-97	13	0-30
95-50-1	MSD 1,2-Dichlorobenzene	111	0.00	U	72.4	65	28-99	12	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)ether	111	0.00	U	63.2	57	32-127	11	0-30
100-51-6	MSD Benzyl alcohol	111	0.00	U	89.5	81	37-116	6	0-30
95-48-7	MSD o-Cresol	111	0.00	U	84.1	76	34-109	4	0-30
65794-96-9	MSD m,p-Cresols	111	0.00	U	92.6	83	36-120	7	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine N-Nitrosodipropylamine	111	0.00	U	75.0	67	42-118	10	0-30
67-72-1	MSD Hexachloroethane	111	0.00	U	63.2	57	29-94	20	0-30
98-95-3	MSD Nitrobenzene	111	0.00	U	82.4	74	38-123	9	0-30
78-59-1	MSD Isophorone	111	0.00	U	81.8	74	43-120	7	0-30
88-75-5	MSD 2-Nitrophenol	111	0.00	U	90.6	82	39-115	6	0-30
105-67-9	MSD 2,4-Dimethylphenol	111	0.00	U	77.1	69	39-107	9	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	111	0.00	U	85.9	77	42-118	9	0-30
120-83-2	MSD 2,4-Dichlorophenol	111	0.00	U	92.5	83	40-111	9	0-30
65-85-0	MSD Benzoic acid	222	0.00	U	134	60	17-95	1	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-147649MSD

Matrix: W

Lab Sample ID 1203900842

Instrument: MSD5.I

Analysis Date: 10/20/2017 23:25

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
106-47-8	MSD 4-Chloroaniline	111	0.00	U 120	108	44-138	1	0-30
87-68-3	MSD Hexachlorobutadiene	111	0.00	U 71.3	64	26-98	15	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	111	0.00	U 96.9	87	41-122	6	0-30
91-57-6	MSD 2-Methylnaphthalene	111	0.00	U 82.6	74	29-109	9	0-30
91-20-3	MSD Naphthalene	111	0.00	U 82.5	74	31-108	10	0-30
90-12-0	MSD 1-Methylnaphthalene	111	0.00	U 83.9	76	33-112	11	0-30
77-47-4	MSD Hexachlorocyclopentadiene	111	0.00	U 65.3	59	26-79	4	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	111	0.00	U 92.9	84	39-124	7	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	111	0.00	U 97.8	88	42-120	3	0-30
91-58-7	MSD 2-Chloronaphthalene	111	0.00	U 81.0	73	29-113	7	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	111	0.00	U 85.8	77	41-121	2	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	111	0.00	U 125	112	42-144	1	0-30
131-11-3	MSD Dimethylphthalate	111	0.00	U 105	94	45-128	5	0-30
606-20-2	MSD 2,6-Dinitrotoluene	111	0.00	U 104	93	46-124	5	0-30
121-14-2	MSD 2,4-Dinitrotoluene	111	0.00	U 106	96	45-125	3	0-30
208-96-8	MSD Acenaphthylene	111	0.00	U 91.8	83	35-120	6	0-30
83-32-9	MSD Acenaphthene	111	0.00	U 96.0	86	35-117	8	0-30
51-28-5	MSD 2,4-Dinitrophenol	111	0.00	U 89.0	80	27-122	1	0-30
132-64-9	MSD Dibenzofuran	111	0.00	U 94.7	85	38-113	6	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	111	0.00	U 110	99	40-128	3	0-30
84-66-2	MSD Diethylphthalate	111	0.00	U 98.9	89	43-127	7	0-30
100-02-7	MSD 4-Nitrophenol	111	0.00	U 58.4	53	17-85	9	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-147649MSD

Matrix: W

Lab Sample ID 1203900842

Instrument: MSD5.I

Analysis Date: 10/20/2017 23:25

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
86-73-7	MSD Fluorene	111	0.00 U	91.3	82	39-117	5	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	111	0.00 U	99.6	90	39-121	9	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	111	0.00 U	117	106	30-133	4	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	111	0.00 U	103	92	32-126	7	0-30
122-39-4	MSD Diphenylamine	111	0.00 U	84.6	76	37-118	7	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	111	0.00 U	76.1	69	38-120	9	0-30
101-55-3	MSD 4-Bromophenylphenylether	111	0.00 U	91.9	83	39-121	10	0-30
118-74-1	MSD Hexachlorobenzene	111	0.00 U	95.6	86	40-118	9	0-30
87-86-5	MSD Pentachlorophenol	111	0.00 U	118	106	35-121	2	0-30
85-01-8	MSD Phenanthrene	111	0.00 U	94.3	85	40-115	7	0-30
120-12-7	MSD Anthracene	111	0.00 U	92.4	83	38-120	6	0-30
84-74-2	MSD Di-n-butylphthalate	111	0.00 U	96.2	87	41-128	4	0-30
206-44-0	MSD Fluoranthene	111	0.00 U	105	95	41-119	0	0-30
129-00-0	MSD Pyrene	111	0.00 U	77.4	70	35-128	27	0-30
85-68-7	MSD Butylbenzylphthalate	111	0.00 U	81.2	73	40-129	14	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	111	0.00 U	83.2	75	38-131	8	0-30
56-55-3	MSD Benzo(a)anthracene	111	0.00 U	97.8	88	39-120	7	0-30
218-01-9	MSD Chrysene	111	0.00 U	98.6	89	41-124	8	0-30
117-84-0	MSD Di-n-octylphthalate	111	0.00 U	89.0	80	37-134	1	0-30
205-99-2	MSD Benzo(b)fluoranthene	111	0.00 U	96.6	87	31-122	5	0-30
207-08-9	MSD Benzo(k)fluoranthene	111	0.00 U	96.2	87	33-123	4	0-30
50-32-8	MSD Benzo(a)pyrene	111	0.00 U	97.7	88	32-118	4	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-487

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-147649MSD

Matrix: W

Lab Sample ID 1203900842

Instrument: MSD5.I

Analysis Date: 10/20/2017 23:25

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1711212

Inj. Vol: 1 uL

Batch ID: 1711213

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	Acceptance RPD %	Acceptance Limits
193-39-5	MSD Indeno(1,2,3-cd)pyrene	111	0.00	U 120	108	27-121	5	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	111	0.00	U 117	105	30-125	5	0-30
191-24-2	MSD Benzo(ghi)perylene	111	0.00	U 116	105	24-126	6	0-30
123-91-1	MSD 1,4-Dioxane	111	0.00	U 73.0	66	24-110	15	0-30
930-55-2	MSD N-Nitrosopyrrolidine	111	0.00	U 95.6	86	47-119	2	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	111	0.00	U 83.5	75	32-101	9	0-30
1912-24-9	MSD Atrazine	111	0.00	U 112	101	42-129	1	0-30
92-87-5	MSD Benzidine	222	0.00	U 73.0	33	15-130	22	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	111	0.00	U 123	111	34-124	5	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	111	0.00	U 79.1	71	26-102	12	0-30

Method Blank Summary

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SDG Number:	2018-487	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1711212	Instrument ID:	MSD5.I	Data File:	s102017.B\s5j2013.D
Lab Sample ID:	1203900839	Prep Date:	10/20/2017 09:30	Analyzed:	10/20/17 16:49
Column:	DB-5ms				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1711212	1203900840	s102017.B\s5j2014.D	10/20/17	1719
02 CAMO-18-147652	435410002	s102017.B\s5j2023.D	10/20/17	2154
03 CAMO-18-147649MS	1203900841	s102017.B\s5j2025.D	10/20/17	2255
04 CAMO-18-147649MSD	1203900842	s102017.B\s5j2026.D	10/20/17	2325

Quality Control Data

**Semi-Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-487
Lab Sample ID: 1203900839
Client Sample: QC for batch 1711212
Client ID: MB for batch 1711212
Batch ID: 1711213
Run Date: 10/20/2017 16:49
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2013.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 1000 mL
Column: DB-5ms

Matrix: WATER
Project: QC
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.00	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene	U	3.00	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
122-66-7	Azobenzene	U	3.00	ug/L	3.00	10.0
541-73-1	<i>1,2-Diphenylhydrazine</i> 1,3-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
123-91-1	1,4-Dioxane	U	3.00	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene	U	0.300	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.00	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol	U	3.00	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol	U	3.00	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol	U	3.00	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol	U	3.00	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol	U	5.00	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene	U	3.00	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene	U	3.00	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene	U	0.410	ug/L	0.410	1.00
95-57-8	2-Chlorophenol	U	3.00	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.00	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene	U	0.300	ug/L	0.300	1.00
88-75-5	2-Nitrophenol	U	3.00	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine	U	3.00	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether	U	3.00	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol	U	3.00	ug/L	3.00	10.0
106-47-8	<i>4-Chloro-3-methylphenol</i> 4-Chloroaniline	U	3.30	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether	U	3.00	ug/L	3.00	10.0
100-02-7	4-Nitrophenol	U	3.00	ug/L	3.00	10.0
83-32-9	Acenaphthene	U	0.300	ug/L	0.300	1.00
208-96-8	Acenaphthylene	U	0.300	ug/L	0.300	1.00
62-53-3	Aniline	U	4.20	ug/L	4.20	10.0
120-12-7	Anthracene	U	0.300	ug/L	0.300	1.00
1912-24-9	Atrazine	U	3.00	ug/L	3.00	10.0
92-87-5	Benzidine	U	3.90	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene	U	0.300	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene	U	0.300	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene	U	0.300	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene	U	0.300	ug/L	0.300	1.00

**Semi-Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-487
Lab Sample ID: 1203900839
Client Sample: QC for batch 1711212
Client ID: MB for batch 1711212
Batch ID: 1711213
Run Date: 10/20/2017 16:49
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2013.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 1000 mL
Column: DB-5ms

Matrix: WATER
Project: QC
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.300	ug/L	0.300	1.00
65-85-0	Benzoic acid	U	6.00	ug/L	6.00	20.0
100-51-6	Benzyl alcohol	U	3.00	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate	U	3.00	ug/L	3.00	10.0
218-01-9	Chrysene	U	0.300	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate	U	3.00	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate	U	3.00	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene	U	0.300	ug/L	0.300	1.00
132-64-9	Dibenzofuran	U	3.00	ug/L	3.00	10.0
84-66-2	Diethylphthalate	U	3.00	ug/L	3.00	10.0
131-11-3	Dimethylphthalate	U	3.00	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine	U	3.00	ug/L	3.00	10.0
206-44-0	Fluoranthene	U	0.300	ug/L	0.300	1.00
86-73-7	Fluorene	U	0.300	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene	U	3.00	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene	U	3.00	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene	U	3.00	ug/L	3.00	10.0
67-72-1	Hexachloroethane	U	3.00	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.300	ug/L	0.300	1.00
78-59-1	Isophorone	U	3.50	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.00	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi-n-propylamine	U	3.00	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.00	ug/L	3.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
98-95-3	Nitrobenzene	U	3.00	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol	U	3.00	ug/L	3.00	10.0
85-01-8	Phenanthrene	U	0.300	ug/L	0.300	1.00
108-95-2	Phenol	U	3.00	ug/L	3.00	10.0
129-00-0	Pyrene	U	0.300	ug/L	0.300	1.00
110-86-1	Pyridine	U	3.00	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.00	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane	U	3.00	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether	U	3.00	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.00	ug/L	3.00	10.0

**Semi-Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-487
Lab Sample ID: 1203900839
Client Sample: QC for batch 1711212
Client ID: MB for batch 1711212
Batch ID: 1711213
Run Date: 10/20/2017 16:49
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2013.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 1000 mL
Column: DB-5ms

Matrix: WATER
Project: QC
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.70	ug/L	3.70	10.0
99-09-2	3-Nitroaniline	U	3.00	ug/L	3.00	10.0
95-48-7	<i>m</i> -Nitroaniline o-Cresol	U	3.00	ug/L	3.00	10.0
88-74-4	2-Nitroaniline	U	3.00	ug/L	3.00	10.0
100-01-6	<i>o</i> -Nitroaniline 4-Nitroaniline <i>p</i> -Nitroaniline	U	3.00	ug/L	3.00	10.0

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	82.4	100	ug/L	82 (32%-124%)
2-Fluorobiphenyl	35.7	50.0	ug/L	71 (32%-112%)
2-Fluorophenol	43.3	100	ug/L	43 (15%-88%)
Nitrobenzene-d5	35.1	50.0	ug/L	70 (36%-115%)
Phenol-d5	28.9	100	ug/L	29 (15%-91%)
p-Terphenyl-d14	40.0	50.0	ug/L	80 (36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
No Tentatively Identified Compounds Found				ug/L		

**Semi-Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-487
Lab Sample ID: 1203900840
Client Sample: QC for batch 1711212
Client ID: LCS for batch 1711212
Batch ID: 1711213
Run Date: 10/20/2017 17:19
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2014.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 1000 mL
Column: DB-5ms

Matrix: WATER
Project: QC
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		36.2	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		32.2	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		29.5	ug/L	3.00	10.0
122-66-7	Azobenzene		35.6	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		27.3	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		27.9	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		22.9	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		37.9	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		48.4	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		43.6	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		42.1	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		41.8	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		36.1	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		36.8	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		46.9	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		47.0	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		35.7	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		36.8	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		44.8	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		35.5	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		39.7	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		49.7	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		41.9	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		41.6	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		51.4	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		45.0	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		11.9	ug/L	3.00	10.0
83-32-9	Acenaphthene		43.2	ug/L	0.300	1.00
208-96-8	Acenaphthylene		41.6	ug/L	0.300	1.00
62-53-3	Aniline		37.5	ug/L	4.20	10.0
120-12-7	Anthracene		41.9	ug/L	0.300	1.00
1912-24-9	Atrazine		49.3	ug/L	3.00	10.0
92-87-5	Benzidine		62.0	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		44.0	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		44.2	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		42.9	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		56.0	ug/L	0.300	1.00

**Semi-Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-487
Lab Sample ID: 1203900840
Client Sample: QC for batch 1711212
Client ID: LCS for batch 1711212
Batch ID: 1711213
Run Date: 10/20/2017 17:19
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2014.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 1000 mL
Column: DB-5ms

Matrix: WATER
Project: QC
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		42.1	ug/L	0.300	1.00
65-85-0	Benzoic acid		32.2	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		36.8	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		39.2	ug/L	3.00	10.0
218-01-9	Chrysene		45.0	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		44.6	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		38.1	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		55.7	ug/L	0.300	1.00
132-64-9	Dibenzofuran		43.0	ug/L	3.00	10.0
84-66-2	Diethylphthalate		45.7	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		47.5	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		38.2	ug/L	3.00	10.0
206-44-0	Fluoranthene		46.2	ug/L	0.300	1.00
86-73-7	Fluorene		41.6	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		40.8	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		27.3	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		21.3	ug/L	3.00	10.0
67-72-1	Hexachloroethane		26.8	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		56.1	ug/L	0.300	1.00
78-59-1	Isophorone		37.2	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		20.3	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi-n-propylamine		36.2	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		42.0	ug/L	3.00	10.0
91-20-3	Naphthalene		34.9	ug/L	0.300	1.00
98-95-3	Nitrobenzene		37.8	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		49.9	ug/L	3.00	10.0
85-01-8	Phenanthrene		43.1	ug/L	0.300	1.00
108-95-2	Phenol		15.2	ug/L	3.00	10.0
129-00-0	Pyrene		40.6	ug/L	0.300	1.00
110-86-1	Pyridine		16.3	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		29.1	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		39.2	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		36.1	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		38.6	ug/L	3.00	10.0

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SDG Number: 2018-487	Matrix: WATER
Lab Sample ID: 1203900840	
Client Sample: QC for batch 1711212	Client: ARSL004
Client ID: LCS for batch 1711212	Method: SW846 3510C/8270D
Batch ID: 1711213	Inst: MSD5.I
Run Date: 10/20/2017 17:19	Analyst: JMB3
Prep Date: 10/20/2017 09:30	Aliquot: 1000 mL
Data File: s102017.B\s5j2014.D	Column: DB-5ms
	Project: QC
	SOP Ref: GL-OA-E-009
	Dilution: 1
	Inj. Vol: 1 uL
	Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		35.2	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		53.0	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		34.4	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		37.2	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		49.8	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	93.9	100	ug/L	94	(32%-124%)
2-Fluorobiphenyl	33.8	50.0	ug/L	68	(32%-112%)
2-Fluorophenol	42.2	100	ug/L	42	(15%-88%)
Nitrobenzene-d5	34.9	50.0	ug/L	70	(36%-115%)
Phenol-d5	28.8	100	ug/L	29	(15%-91%)
p-Terphenyl-d14	43.2	50.0	ug/L	86	(36%-121%)

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SDG Number: 2018-487
Lab Sample ID: 1203900841
Client Sample: QC for batch 1711212
Client ID: CAMO-18-147649MS
Batch ID: 1711213
Run Date: 10/20/2017 22:55
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2025.D

Date Collected: 10/16/2017 13:40
Date Received: 10/18/2017 09:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 450 mL
Column: DB-5ms

Matrix: W
Project: QC
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		91.8	ug/L	6.67	22.2
120-82-1	1,2,4-Trichlorobenzene		89.4	ug/L	6.67	22.2
95-50-1	1,2-Dichlorobenzene		82.0	ug/L	6.67	22.2
122-66-7	Azobenzene		83.3	ug/L	6.67	22.2
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		80.6	ug/L	6.67	22.2
106-46-7	1,4-Dichlorobenzene		80.1	ug/L	6.67	22.2
123-91-1	1,4-Dioxane		85.0	ug/L	6.67	22.2
90-12-0	1-Methylnaphthalene		93.3	ug/L	0.667	2.22
58-90-2	2,3,4,6-Tetrachlorophenol		114	ug/L	6.67	22.2
95-95-4	2,4,5-Trichlorophenol		100	ug/L	6.67	22.2
88-06-2	2,4,6-Trichlorophenol		99.8	ug/L	6.67	22.2
120-83-2	2,4-Dichlorophenol		101	ug/L	6.67	22.2
105-67-9	2,4-Dimethylphenol		84.3	ug/L	6.67	22.2
51-28-5	2,4-Dinitrophenol		87.9	ug/L	11.1	44.4
121-14-2	2,4-Dinitrotoluene		110	ug/L	6.67	22.2
606-20-2	2,6-Dinitrotoluene		109	ug/L	6.67	22.2
91-58-7	2-Chloronaphthalene		86.8	ug/L	0.911	2.22
95-57-8	2-Chlorophenol		94.2	ug/L	6.67	22.2
534-52-1	2-Methyl-4,6-dinitrophenol		110	ug/L	6.67	22.2
91-57-6	2-Methylnaphthalene		90.2	ug/L	0.667	2.22
88-75-5	2-Nitrophenol		96.4	ug/L	6.67	22.2
91-94-1	3,3'-Dichlorobenzidine		118	ug/L	6.67	22.2
101-55-3	4-Bromophenylphenylether		102	ug/L	6.67	22.2
59-50-7	Parachlorometa cresol		103	ug/L	6.67	22.2
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		122	ug/L	7.33	22.2
7005-72-3	4-Chlorophenylphenylether		108	ug/L	6.67	22.2
100-02-7	4-Nitrophenol		53.5	ug/L	6.67	22.2
83-32-9	Acenaphthene		104	ug/L	0.667	2.22
208-96-8	Acenaphthylene		98.0	ug/L	0.667	2.22
62-53-3	Aniline		83.3	ug/L	9.33	22.2
120-12-7	Anthracene		98.1	ug/L	0.667	2.22
1912-24-9	Atrazine		113	ug/L	6.67	22.2
92-87-5	Benzidine		58.3	ug/L	8.67	22.2
56-55-3	Benzo(a)anthracene		105	ug/L	0.667	2.22
50-32-8	Benzo(a)pyrene		102	ug/L	0.667	2.22
205-99-2	Benzo(b)fluoranthene		102	ug/L	0.667	2.22
191-24-2	Benzo(ghi)perylene		123	ug/L	0.667	2.22

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SDG Number: 2018-487
Lab Sample ID: 1203900841
Client Sample: QC for batch 1711212
Client ID: CAMO-18-147649MS
Batch ID: 1711213
Run Date: 10/20/2017 22:55
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2025.D

Date Collected: 10/16/2017 13:40
Date Received: 10/18/2017 09:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 450 mL
Column: DB-5ms

Matrix: W
Project: QC
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		99.9	ug/L	0.667	2.22
65-85-0	Benzoic acid		133	ug/L	13.3	44.4
100-51-6	Benzyl alcohol		95.0	ug/L	6.67	22.2
85-68-7	Butylbenzylphthalate		93.7	ug/L	6.67	22.2
218-01-9	Chrysene		106	ug/L	0.667	2.22
84-74-2	Di-n-butylphthalate		100	ug/L	6.67	22.2
117-84-0	Di-n-octylphthalate		87.7	ug/L	6.67	22.2
53-70-3	Dibenzo(a,h)anthracene		123	ug/L	0.667	2.22
132-64-9	Dibenzofuran		101	ug/L	6.67	22.2
84-66-2	Diethylphthalate		106	ug/L	6.67	22.2
131-11-3	Dimethylphthalate		110	ug/L	6.67	22.2
88-85-7	Dinoseb	U	6.67	ug/L	6.67	22.2
122-39-4	Diphenylamine		90.9	ug/L	6.67	22.2
206-44-0	Fluoranthene		105	ug/L	0.667	2.22
86-73-7	Fluorene		95.7	ug/L	0.667	2.22
118-74-1	Hexachlorobenzene		104	ug/L	6.67	22.2
87-68-3	Hexachlorobutadiene		83.2	ug/L	6.67	22.2
77-47-4	Hexachlorocyclopentadiene		68.0	ug/L	6.67	22.2
67-72-1	Hexachloroethane		77.0	ug/L	6.67	22.2
193-39-5	Indeno(1,2,3-cd)pyrene		125	ug/L	0.667	2.22
78-59-1	Isophorone		87.4	ug/L	7.78	22.2
62-75-9	N-Methyl-N-nitrosomethylamine		66.0	ug/L	6.67	22.2
924-16-3	N-Nitrosodi-n-butylamine	U	6.67	ug/L	6.67	22.2
55-18-5	N-Nitrosodiethylamine	U	6.67	ug/L	6.67	22.2
621-64-7	N-Nitrosodi-n-propylamine		83.0	ug/L	6.67	22.2
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		97.9	ug/L	6.67	22.2
91-20-3	Naphthalene		91.0	ug/L	0.667	2.22
98-95-3	Nitrobenzene		89.9	ug/L	6.67	22.2
608-93-5	Pentachlorobenzene	U	6.67	ug/L	6.67	22.2
87-86-5	Pentachlorophenol		120	ug/L	6.67	22.2
85-01-8	Phenanthrene		101	ug/L	0.667	2.22
108-95-2	Phenol		57.9	ug/L	6.67	22.2
129-00-0	Pyrene		101	ug/L	0.667	2.22
110-86-1	Pyridine		48.2	ug/L	6.67	22.2
108-60-1	bis(2-Chloro-1-methylethyl)ether		70.3	ug/L	6.67	22.2
111-91-1	bis(2-Chloroethoxy)methane		94.2	ug/L	6.67	22.2
111-44-4	bis(2-Chloroethyl) ether		94.1	ug/L	6.67	22.2
117-81-7	bis(2-Ethylhexyl)phthalate		90.0	ug/L	6.67	22.2

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SDG Number: 2018-487	Date Collected: 10/16/2017 13:40	Matrix: W
Lab Sample ID: 1203900841	Date Received: 10/18/2017 09:00	
Client Sample: QC for batch 1711212	Client: ARSL004	Project: QC
Client ID: CAMO-18-147649MS	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1711213	Inst: MSD5.I	Dilution: 1
Run Date: 10/20/2017 22:55	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 10/20/2017 09:30	Aliquot: 450 mL	Final Volume: 1 mL
Data File: s102017.B\s5j2025.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		99.5	ug/L	8.22	22.2
99-09-2	3-Nitroaniline		127	ug/L	6.67	22.2
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol		87.9	ug/L	6.67	22.2
88-74-4	2-Nitroaniline		87.6	ug/L	6.67	22.2
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline		113	ug/L	6.67	22.2
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	215	222	ug/L	97	(32%-124%)
2-Fluorobiphenyl	89.0	111	ug/L	80	(32%-112%)
2-Fluorophenol	136	222	ug/L	61	(15%-88%)
Nitrobenzene-d5	85.4	111	ug/L	77	(36%-115%)
Phenol-d5	110	222	ug/L	49	(15%-91%)
p-Terphenyl-d14	109	111	ug/L	98	(36%-121%)

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SDG Number: 2018-487
Lab Sample ID: 1203900842
Client Sample: QC for batch 1711212
Client ID: CAMO-18-147649MSD
Batch ID: 1711213
Run Date: 10/20/2017 23:25
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2026.D

Date Collected: 10/16/2017 13:40
Date Received: 10/18/2017 09:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 450 mL
Column: DB-5ms

Matrix: W
Project: QC
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		83.5	ug/L	6.67	22.2
120-82-1	1,2,4-Trichlorobenzene		79.1	ug/L	6.67	22.2
95-50-1	1,2-Dichlorobenzene		72.4	ug/L	6.67	22.2
122-66-7	Azobenzene		76.1	ug/L	6.67	22.2
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		66.8	ug/L	6.67	22.2
106-46-7	1,4-Dichlorobenzene		70.0	ug/L	6.67	22.2
123-91-1	1,4-Dioxane		73.0	ug/L	6.67	22.2
90-12-0	1-Methylnaphthalene		83.9	ug/L	0.667	2.22
58-90-2	2,3,4,6-Tetrachlorophenol		110	ug/L	6.67	22.2
95-95-4	2,4,5-Trichlorophenol		97.8	ug/L	6.67	22.2
88-06-2	2,4,6-Trichlorophenol		92.9	ug/L	6.67	22.2
120-83-2	2,4-Dichlorophenol		92.5	ug/L	6.67	22.2
105-67-9	2,4-Dimethylphenol		77.1	ug/L	6.67	22.2
51-28-5	2,4-Dinitrophenol		89.0	ug/L	11.1	44.4
121-14-2	2,4-Dinitrotoluene		106	ug/L	6.67	22.2
606-20-2	2,6-Dinitrotoluene		104	ug/L	6.67	22.2
91-58-7	2-Chloronaphthalene		81.0	ug/L	0.911	2.22
95-57-8	2-Chlorophenol		84.1	ug/L	6.67	22.2
534-52-1	2-Methyl-4,6-dinitrophenol		103	ug/L	6.67	22.2
91-57-6	2-Methylnaphthalene		82.6	ug/L	0.667	2.22
88-75-5	2-Nitrophenol		90.6	ug/L	6.67	22.2
91-94-1	3,3'-Dichlorobenzidine		123	ug/L	6.67	22.2
101-55-3	4-Bromophenylphenylether		91.9	ug/L	6.67	22.2
59-50-7	Parachlorometa cresol		96.9	ug/L	6.67	22.2
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		120	ug/L	7.33	22.2
7005-72-3	4-Chlorophenylphenylether		99.6	ug/L	6.67	22.2
100-02-7	4-Nitrophenol		58.4	ug/L	6.67	22.2
83-32-9	Acenaphthene		96.0	ug/L	0.667	2.22
208-96-8	Acenaphthylene		91.8	ug/L	0.667	2.22
62-53-3	Aniline		76.6	ug/L	9.33	22.2
120-12-7	Anthracene		92.4	ug/L	0.667	2.22
1912-24-9	Atrazine		112	ug/L	6.67	22.2
92-87-5	Benzidine		73.0	ug/L	8.67	22.2
56-55-3	Benzo(a)anthracene		97.8	ug/L	0.667	2.22
50-32-8	Benzo(a)pyrene		97.7	ug/L	0.667	2.22
205-99-2	Benzo(b)fluoranthene		96.6	ug/L	0.667	2.22
191-24-2	Benzo(ghi)perylene		116	ug/L	0.667	2.22

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SDG Number: 2018-487
Lab Sample ID: 1203900842
Client Sample: QC for batch 1711212
Client ID: CAMO-18-147649MSD
Batch ID: 1711213
Run Date: 10/20/2017 23:25
Prep Date: 10/20/2017 09:30
Data File: s102017.B\s5j2026.D

Date Collected: 10/16/2017 13:40
Date Received: 10/18/2017 09:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 450 mL
Column: DB-5ms

Matrix: W
Project: QC
SOP Ref: GL-OA-E-009
Dilution: 1
Inj. Vol: 1 uL
Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		96.2	ug/L	0.667	2.22
65-85-0	Benzoic acid		134	ug/L	13.3	44.4
100-51-6	Benzyl alcohol		89.5	ug/L	6.67	22.2
85-68-7	Butylbenzylphthalate		81.2	ug/L	6.67	22.2
218-01-9	Chrysene		98.6	ug/L	0.667	2.22
84-74-2	Di-n-butylphthalate		96.2	ug/L	6.67	22.2
117-84-0	Di-n-octylphthalate		89.0	ug/L	6.67	22.2
53-70-3	Dibenzo(a,h)anthracene		117	ug/L	0.667	2.22
132-64-9	Dibenzofuran		94.7	ug/L	6.67	22.2
84-66-2	Diethylphthalate		98.9	ug/L	6.67	22.2
131-11-3	Dimethylphthalate		105	ug/L	6.67	22.2
88-85-7	Dinoseb	U	6.67	ug/L	6.67	22.2
122-39-4	Diphenylamine		84.6	ug/L	6.67	22.2
206-44-0	Fluoranthene		105	ug/L	0.667	2.22
86-73-7	Fluorene		91.3	ug/L	0.667	2.22
118-74-1	Hexachlorobenzene		95.6	ug/L	6.67	22.2
87-68-3	Hexachlorobutadiene		71.3	ug/L	6.67	22.2
77-47-4	Hexachlorocyclopentadiene		65.3	ug/L	6.67	22.2
67-72-1	Hexachloroethane		63.2	ug/L	6.67	22.2
193-39-5	Indeno(1,2,3-cd)pyrene		120	ug/L	0.667	2.22
78-59-1	Isophorone		81.8	ug/L	7.78	22.2
62-75-9	N-Methyl-N-nitrosomethylamine		64.9	ug/L	6.67	22.2
924-16-3	N-Nitrosodi-n-butylamine	U	6.67	ug/L	6.67	22.2
55-18-5	N-Nitrosodiethylamine	U	6.67	ug/L	6.67	22.2
621-64-7	N-Nitrosodi-n-propylamine		75.0	ug/L	6.67	22.2
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		95.6	ug/L	6.67	22.2
91-20-3	Naphthalene		82.5	ug/L	0.667	2.22
98-95-3	Nitrobenzene		82.4	ug/L	6.67	22.2
608-93-5	Pentachlorobenzene	U	6.67	ug/L	6.67	22.2
87-86-5	Pentachlorophenol		118	ug/L	6.67	22.2
85-01-8	Phenanthrene		94.3	ug/L	0.667	2.22
108-95-2	Phenol		55.1	ug/L	6.67	22.2
129-00-0	Pyrene		77.4	ug/L	0.667	2.22
110-86-1	Pyridine		35.2	ug/L	6.67	22.2
108-60-1	bis(2-Chloro-1-methylethyl)ether		63.2	ug/L	6.67	22.2
111-91-1	bis(2-Chloroethoxy)methane		85.9	ug/L	6.67	22.2
111-44-4	bis(2-Chloroethyl) ether		79.9	ug/L	6.67	22.2
117-81-7	bis(2-Ethylhexyl)phthalate		83.2	ug/L	6.67	22.2

**Semi-Volatile
Certificate of Analysis
Sample Summary**

Page 3 of 3

SDG Number: 2018-487	Date Collected: 10/16/2017 13:40	Matrix: W
Lab Sample ID: 1203900842	Date Received: 10/18/2017 09:00	
Client Sample: QC for batch 1711212	Client: ARSL004	Project: QC
Client ID: CAMO-18-147649MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1711213	Inst: MSD5.I	Dilution: 1
Run Date: 10/20/2017 23:25	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 10/20/2017 09:30	Aliquot: 450 mL	Final Volume: 1 mL
Data File: s102017.B\s5j2026.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		92.6	ug/L	8.22	22.2
99-09-2	3-Nitroaniline		125	ug/L	6.67	22.2
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol		84.1	ug/L	6.67	22.2
88-74-4	2-Nitroaniline		85.8	ug/L	6.67	22.2
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline		117	ug/L	6.67	22.2
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	214	222	ug/L	96	(32%-124%)
2-Fluorobiphenyl	85.7	111	ug/L	77	(32%-112%)
2-Fluorophenol	130	222	ug/L	59	(15%-88%)
Nitrobenzene-d5	80.4	111	ug/L	72	(36%-115%)
Phenol-d5	104	222	ug/L	47	(15%-91%)
p-Terphenyl-d14	90.6	111	ug/L	82	(36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-487
Work Order #: 435410**

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: SW-846:6850

Prep Method: SW-846:6850

Analytical Batch Number: 1711756

Prep Batch Number: 1711753

Sample Analysis

Sample ID	Client ID
435410001	435410001 (CAMO-18-147637)
1203902046	Interference Check Sample (ICS)
1203902042	Method Blank (MB)
1203902043	Laboratory Control Sample (LCS)
1203902044	435429001(CAMO-18-147634) Matrix Spike (MS)
1203902045	435429001(CAMO-18-147634) 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# 14.

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 standard(s) (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.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Interference Check Sample (ICS)

The ICS spike recoveries met the acceptance criteria.

QC Sample Designation

Client sample 435429001 (CAMO-18-147634) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

In sample 1203902045 (MSD) there was a low recovery of Perchlorate-101 at 59%. The acceptance range is 75-125%. The failure in the MSD was either due to the background concentration in the parent sample, 435429001 (CAMO-18-147634), or anomalies in the extraction process. The LCS and MS were within the acceptance ranges.

Sample	Analyte	Value
1203902045 (CAMO-18-147634MSD)	Perchlorate-101	59* (75%-125%)

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard Area Acceptance

The internal 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 DOD QSM 5.0, has been used. In addition to the isotopic ratio, the presence of Perchlorate in the samples associated with this data package have been confirmed using the relative retention criteria stated above, not the absolute retention time.

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Manual Integrations

Manual integrations were not required for any data file associated with this SDG.

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 internally corrected for using Perchlorate-O (18).

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 a Micromass Quattro Ultima Mass Spectrometer/Mass Spectrometer. It is designated as LCMSMS #2. 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

The LC-MS/MS Perchlorate analysis was performed on a Quatro Ultima LC/MS/MS.

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

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-487 GEL Work Order: 435410

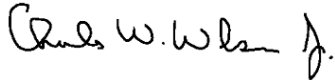
The Qualifiers in this report are defined as follows:

- * 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, MDC 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: Charles Wilson

Date: 25 OCT 2017

Title: Analyst II

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1711753Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-147637Date Received: 18-OCT-17GEL Job No (SDG): 2018-487GEL Sample ID: 435410001Date Filtered: 23-OCT-17Injection 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	0.366	ug/L		1	23-OCT-17 22:53	per1023029a
	Perchlorate Isotope Ratio			3.03			1	23-OCT-17 22:53	per1023029a
14797-73-0	Perchlorate-101	.05	.2	0.364	ug/L		1	23-OCT-17 22:53	per1023029a
	Perchlorate-O(18)			0.422	ug/L		1	23-OCT-17 22:53	per1023029a

^ 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): 2018-487

Extract Batch Code: 1711753

Date Filtered: 23-OCT-17

Matrix: WATER

Sample ID: 1203902043

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.212	ug/L	106		85 - 115
Perchlorate Isotope Ratio		3.22				-
Perchlorate-101	0.200	.198	ug/L	99		85 - 115
Perchlorate-O(18)		.413	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): 2018-487

Extract Batch Code: 1711753

Date Extracted: 23-OCT-17

GEL MS/PS ID: 1203902044

Client ID: CAMO-18-147634

GEL MSD/PSD ID: 1203902045

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	0.287	ug/L	0.494	103	.489	101	1	30	75 - 125
Perchlorate Isotope Ratio	0	2.79		3.06		3.45		12		-
Perchlorate-101	0.200	0.310	ug/L	0.486	88	.427	59 *	13	30	75 - 125
Perchlorate-O(18)	0	0.408	ug/L	0.391		.408		4		-

^ 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: 1711753Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 23-OCT-17GEL Job No (SDG): 2018-487GEL Sample ID: 1203902042Date Filtered: 23-OCT-17Injection 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	23-OCT-17 21:30	per1023022a
	Perchlorate Isotope Ratio						1	23-OCT-17 21:30	per1023022a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	23-OCT-17 21:30	per1023022a
	Perchlorate-O(18)			0.365	ug/L		1	23-OCT-17 21:30	per1023022a

^ 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: 1711753Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 23-OCT-17GEL Job No (SDG): 2018-487GEL Sample ID: 1203902043Date Filtered: 23-OCT-17Injection 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	0.212	ug/L		1	23-OCT-17 22:18	per1023026a
	Perchlorate Isotope Ratio			3.22			1	23-OCT-17 22:18	per1023026a
14797-73-0	Perchlorate-101	.05	.2	0.198	ug/L	J	1	23-OCT-17 22:18	per1023026a
	Perchlorate-O(18)			0.413	ug/L		1	23-OCT-17 22:18	per1023026a

^ 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: STORM WATERExtraction Batch ID: 1711753Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-487GEL Sample ID: 1203902046Date Filtered: 23-OCT-17Injection 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	0.236	ug/L		1	23-OCT-17 22:30	per1023027a
	Perchlorate Isotope Ratio			3.35			1	23-OCT-17 22:30	per1023027a
14797-73-0	Perchlorate-101	.05	.2	0.212	ug/L		1	23-OCT-17 22:30	per1023027a
	Perchlorate-O(18)			0.415	ug/L		1	23-OCT-17 22:30	per1023027a

^ 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: 1711753Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-147634MSDate Received: 18-OCT-17GEL Job No (SDG): 2018-487GEL Sample ID: 1203902044Date Filtered: 23-OCT-17Injection 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	0.494	ug/L		1	23-OCT-17 23:29	per1023032a
	Perchlorate Isotope Ratio			3.06			1	23-OCT-17 23:29	per1023032a
14797-73-0	Perchlorate-101	.05	.2	0.486	ug/L		1	23-OCT-17 23:29	per1023032a
	Perchlorate-O(18)			0.391	ug/L		1	23-OCT-17 23:29	per1023032a

^ 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: 1711753Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-147634MSDDate Received: 18-OCT-17GEL Job No (SDG): 2018-487GEL Sample ID: 1203902045Date Filtered: 23-OCT-17Injection 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	0.489	ug/L		1	23-OCT-17 23:41	per1023033a
	Perchlorate Isotope Ratio			3.45			1	23-OCT-17 23:41	per1023033a
14797-73-0	Perchlorate-101	.05	.2	0.427	ug/L		1	23-OCT-17 23:41	per1023033a
	Perchlorate-O(18)			0.408	ug/L		1	23-OCT-17 23:41	per1023033a

^ 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
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-487
Work Order #: 435410

Sample ID	Client ID
435410001	CAMO-18-147637
435410002	CAMO-18-147652
1203899600	Method Blank (MB) ICP
1203899601	Laboratory Control Sample (LCS)
1203899604	435429001(CAMO-18-147634L) Serial Dilution (SD)
1203899602	435429001(CAMO-18-147634D) Sample Duplicate (DUP)
1203899603	435429001(CAMO-18-147634S) Matrix Spike (MS)
1203899622	Method Blank (MB) ICP-MS
1203899623	Laboratory Control Sample (LCS)
1203899626	435429001(CAMO-18-147634L) Serial Dilution (SD)
1203899624	435429001(CAMO-18-147634D) Sample Duplicate (DUP)
1203899625	435429001(CAMO-18-147634S) Matrix Spike (MS)
1203910681	Method Blank (MB) CVAA
1203910682	Laboratory Control Sample (LCS)
1203910685	435410001(CAMO-18-147637L) Serial Dilution (SD)
1203910683	435410001(CAMO-18-147637D) Sample Duplicate (DUP)
1203910684	435410001(CAMO-18-147637S) Matrix Spike (MS)

Sample Analysis

Samples 435410001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1710686, 1710695, 1715243 and 1718402
Prep Batch :	1710685, 1710694 and 1715242
Standard Operating Procedures:	GL-MA-E-013 REV# 30, GL-MA-E-006 REV# 14, GL-MA-E-014 REV# 32, GL-MA-E-010 REV# 36 and GL-GC-E-107 REV# 10
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
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 an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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.

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 350X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of zinc. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 435410001 (CAMO-18-147637)-ICP.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria. For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Continuing Calibration Blanks (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 Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

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: 435429001 (CAMO-18-147634)-ICP and ICP-MS and 435410001 (CAMO-18-147637)-CVAA.

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes.

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 reporting 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. The relative percent differences (RPD) between the sample and its duplicate (DUP) were within acceptable limits for all applicable analytes.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 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. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

Analyte	Sample	Value
Sodium	1203899604 (CAMO-18-147634SDILT)	10.1 *(0%-10%)

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology. Holding time is measured by comparison of the date and time of sample collection to the date and time of sample preparation and analysis. 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

The samples in this SDG did not require dilutions.

Preparation Information

The samples in this SDG were not diluted and were prepared 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.

Additional Comments

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.

GEL LABORATORIES LLC

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

Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-487 GEL Work Order: 435410

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC 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: Nik-Cole Elmore

Date: 14 NOV 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-487**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435410001**BASIS:** As Received**DATE COLLECTED** 16-OCT-17**CLIENT ID:** CAMO-18-147637**LEVEL:** Low**DATE RECEIVED** 18-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/06/17 12:02	110617W5-5	1715243

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-487

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 435410001

BASIS: As Received

DATE COLLECTED 16-OCT-17

CLIENT ID: CAMO-18-147637

LEVEL: Low

DATE RECEIVED 18-OCT-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	11/06/17 21:14	110617-1	1710686
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/28/17 22:54	171028-3	1710695
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/28/17 22:54	171028-3	1710695
7440-39-3	Barium	29.3	ug/L		1	5	5	1	P	HSC	11/06/17 21:14	110617-1	1710686
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/06/17 21:14	110617-1	1710686
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/06/17 21:14	110617-1	1710686
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/28/17 22:54	171028-3	1710695
7440-70-2	Calcium	12100	ug/L		50	200	200	1	P	HSC	11/08/17 16:56	110817-2	1710686
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/29/17 13:17	171029-4	1710695
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/06/17 21:14	110617-1	1710686
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/06/17 21:14	110617-1	1710686
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/06/17 21:14	110617-1	1710686
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/28/17 22:54	171028-3	1710695
7439-95-4	Magnesium	3600	ug/L		110	300	300	1	P	HSC	11/06/17 21:14	110617-1	1710686
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/06/17 21:14	110617-1	1710686
7439-98-7	Molybdenum	1.43	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/28/17 22:54	171028-3	1710695
7440-02-0	Nickel	0.954	ug/L	J	0.6	2	2	1	MS	BAJ	10/29/17 13:17	171029-4	1710695
7440-09-7	Potassium	1460	ug/L		50	150	150	1	P	HSC	11/08/17 16:56	110817-2	1710686
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/28/17 22:54	171028-3	1710695
7631-86-9	Silica	64900	ug/L		53	213	213	1	P	HSC	11/06/17 21:14	110617-1	1710686
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/28/17 22:54	171028-3	1710695
7440-23-5	Sodium	10100	ug/L		100	300	300	1	P	HSC	11/08/17 16:56	110817-2	1710686
7440-24-6	Strontium	47.2	ug/L		1	5	5	1	P	HSC	11/06/17 21:14	110617-1	1710686
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/28/17 22:54	171028-3	1710695
7440-31-5	Tin	3.67	ug/L	J	2.5	10	10	1	P	HSC	11/06/17 21:14	110617-1	1710686
7440-61-1	Uranium	0.329	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/28/17 22:54	171028-3	1710695
7440-62-2	Vanadium	4.35	ug/L	J	1	5	5	1	P	HSC	11/06/17 21:14	110617-1	1710686
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/08/17 16:56	110817-2	1710686

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-487**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 435410001**BASIS:** As Received**DATE COLLECTED** 16-OCT-17**CLIENT ID:** CAMO-18-147637**LEVEL:** Low**DATE RECEIVED** 18-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	45.1	mg/L		0.453	1.24	1.24	1		TXT1	11/13/17 11:23		1718402

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1710686	1710685	SW846 3005A	50	mL	50	mL	10/18/17	JXM8
1710695	1710694	SW846 3005A	50	mL	50	mL	10/18/17	JXM8
1715243	1715242	EPA 245.1/245.2 Prep	20	mL	20	mL	11/02/17	AXS5

***Analytical Methods:**

P SW846 3005A/6010C
MS SW846 3005A/6020A
AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-487**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435410002**BASIS:** As Received**DATE COLLECTED** 16-OCT-17**CLIENT ID:** CAMO-18-147652**LEVEL:** Low**DATE RECEIVED** 18-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/06/17 12:10	110617W5-5	1715243

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1715243	1715242	EPA 245.1/245.2 Prep	20	mL	20	mL	11/02/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2018-487
Contract: ESHL00114
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>
1203899600	Aluminum	68	ug/L	+/-200	U	P	68	200
	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
	Barium	1	ug/L	+/-5	U	P	1	5
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	160	ug/L	+/-300	J	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	-4.58	ug/L	+/-10	J	P	3.3	10
1203899622	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203910681	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

***Analytical Methods:**

P SW846 3005A/6010C
MS SW846 3005A/6020A
AV EPA 245.1/245.2

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-487

Client ID: CAMO-18-147634S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 435429001

Spike ID: 1203899603

<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	4820		68	U	5000	96.3		P
Barium	ug/L	75-125	497		13.9		500	96.7		P
Beryllium	ug/L	75-125	486		1	U	500	97.2		P
Boron	ug/L	75-125	514		15	U	500	100		P
Calcium	ug/L	75-125	16000		10900		5000	101		P
Cobalt	ug/L	75-125	492		1	U	500	98.4		P
Copper	ug/L	75-125	498		3	U	500	99.3		P
Iron	ug/L	75-125	4650		30	U	5000	93		P
Magnesium	ug/L	75-125	7850		2930		5000	98.4		P
Manganese	ug/L	75-125	486		2.97	J	500	96.6		P
Potassium	ug/L	75-125	6510		1560		5000	98.8		P
Silica	ug/L		75800		65900		10700	92.7	N/A	P
Sodium	ug/L	75-125	13200		8810		5000	88.4		P
Strontium	ug/L	75-125	487		40.7		500	89.3		P
Tin	ug/L	75-125	487		2.5	U	500	97		P
Vanadium	ug/L	75-125	491		4.63	J	500	97.3		P
Zinc	ug/L	75-125	465		3.3	U	500	92.7		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-487 Client ID CAMO-18-147634S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 435429001 Spike ID: 1203899625

<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	49		1	U	50	97.6		MS
Arsenic	ug/L	75-125	49.6		2	U	50	95.7		MS
Cadmium	ug/L	75-125	49.7		0.3	U	50	99.3		MS
Chromium	ug/L	75-125	56.9		3	U	50	108		MS
Lead	ug/L	75-125	49		0.5	U	50	97.9		MS
Molybdenum	ug/L	75-125	51.9		1.13		50	102		MS
Nickel	ug/L	75-125	51.3		0.6	U	50	102		MS
Selenium	ug/L	75-125	49.8		2	U	50	98.8		MS
Silver	ug/L	75-125	50.8		0.3	U	50	102		MS
Thallium	ug/L	75-125	46.8		0.6	U	50	93.7		MS
Uranium	ug/L	75-125	47.9		0.288		50	95.1		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-487

Client ID: CAMO-18-147637S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 435410001

Spike ID: 1203910684

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	1.88		0.067	U	2	94.2		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-487

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-18-147634D

Matrix: WATER

Level: Low

Sample ID: 435429001

Duplicate ID: 1203899602

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-5	13.9		13.6		1.68		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	10900		11000		1.08		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	2930		2900		1.06		P
Manganese	ug/L	+/-10	2.97 J		3.03 J		1.96		P
Potassium	ug/L	+/-20%	1560		1560		.0384		P
Silica	ug/L	+/-20%	65900		66400		.759		P
Sodium	ug/L	+/-20%	8810		9190		4.23		P
Strontium	ug/L	+/-20%	40.7		39.5		2.99		P
Tin	ug/L		2.5 U		2.65 J		200		P
Vanadium	ug/L	+/-5	4.63 J		4.8 J		3.57		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-487

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-18-147634D

Matrix: WATER

Level: Low

Sample ID: 435429001

Duplicate ID: 1203899624

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		2 U		2 U				MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3.01 J		200		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.13		1.16		2.62		MS
Nickel	ug/L		0.6 U		0.6 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.288		0.306		6.06		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-487**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAMO-18-147637D**Matrix:** WATER**Level:** Low**Sample ID:** 435410001**Duplicate ID:** 1203910683**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. 2018-487

Contract: ESHL00114

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>
1203899601								
	Aluminum	ug/L	5000	4930		98.6	80-120	P
	Barium	ug/L	500	487		97.5	80-120	P
	Beryllium	ug/L	500	482		96.3	80-120	P
	Boron	ug/L	500	493		98.7	80-120	P
	Calcium	ug/L	5000	4890		97.8	80-120	P
	Cobalt	ug/L	500	497		99.4	80-120	P
	Copper	ug/L	500	490		98	80-120	P
	Iron	ug/L	5000	4650		92.9	80-120	P
	Magnesium	ug/L	5000	5000		99.9	80-120	P
	Manganese	ug/L	500	489		97.8	80-120	P
	Potassium	ug/L	5000	4790		95.9	80-120	P
	Silica	ug/L	10700	9810		91.7	80-120	P
	Sodium	ug/L	5000	4750		95	80-120	P
	Strontium	ug/L	500	453		90.5	80-120	P
	Tin	ug/L	500	483		96.5	80-120	P
	Vanadium	ug/L	500	487		97.3	80-120	P
	Zinc	ug/L	500	461		92.1	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-487

Contract: ESHL00114

Aqueous LCS Source: Inorganic Ventures

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>
1203899623								
	Antimony	ug/L	50	50.5		101	80-120	MS
	Arsenic	ug/L	50	49.3		98.6	80-120	MS
	Cadmium	ug/L	50	51.3		103	80-120	MS
	Chromium	ug/L	50	49.7		99.4	80-120	MS
	Lead	ug/L	50	50.4		101	80-120	MS
	Molybdenum	ug/L	50	50.1		100	80-120	MS
	Nickel	ug/L	50	49.4		98.7	80-120	MS
	Selenium	ug/L	50	51.5		103	80-120	MS
	Silver	ug/L	50	50.6		101	80-120	MS
	Thallium	ug/L	50	47.6		95.3	80-120	MS
	Uranium	ug/L	50	47.4		94.7	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-487

Contract: ESHL00114

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>
1203910682	Mercury	ug/L	2	1.98		98.8	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-487

Client ID: CAMO-18-147634L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 435429001

Serial Dilution ID: 1203899604

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	13.9		14.5	J	4.337			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	10900		11000		1.333		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	2930		2970		1.153			P
Manganese	2.97	J	10	U	13.519			P
Potassium	1560		1400		10.727			P
Silica	65900		67200		2.007		10	P
Sodium	8810		9700		10.061	E	10	P
Strontium	40.7		40.6		.189			P
Tin	2.5	U	12.5	U				P
Vanadium	4.63	J	5	U	23.212			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-487

Client ID: CAMO-18-147634L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 435429001

Serial Dilution ID: 1203899626

<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	2	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.13		1.07	J	5.669			MS
Nickel	.6	U	3	U				MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.288		.34	J	18.056			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-487 **Client ID:** CAMO-18-147637L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 435410001 **Serial Dilution ID:** 1203910685

<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
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-487
Work Order #: 435410**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1710507

Method: SW 9060 Total Organic Carbon

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW-846:9060:

Sample ID	Client ID
435410002	CAMO-18-147652
1203899112	Method Blank (MB)
1203899113	Laboratory Control Sample (LCS)
1203899114	434394002(CAWR-18-147311) Sample Duplicate (DUP)
1203899115	435199004(CAWR-18-147315) Sample Duplicate (DUP)
1203899116	434394002(CAWR-18-147311) Post Spike (PS)
1203899117	435199004(CAWR-18-147315) 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# 15.

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 1030W 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 Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 434394002 (CAWR-18-147311) and 435199004 (CAWR-18-147315) were selected for QC analysis.

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

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

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**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:	Cyanide and Total		
Analytical Batch:	1710429	Method:	WSP-CN(T)
Prep Batch :	1710428	Method:	EPA 335.4

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 335.4 1993:

Sample ID	Client ID
435410002	CAMO-18-147652
1203898892	Method Blank (MB)
1203898893	Laboratory Control Sample (LCS)
1203899436	435410002(CAMO-18-147652) Sample Duplicate (DUP)
1203899437	435410002(CAMO-18-147652) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 20.

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 Flow Injection analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

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.

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 Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435410002 (CAMO-18-147652) was selected for QC analysis.

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

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

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

Sample 435410002 (CAMO-18-147652) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information**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: 1711016

Method: WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
435410001	CAMO-18-147637
1203900346	Method Blank (MB)
1203900347	Laboratory Control Sample (LCS)
1203900349	435410001(CAMO-18-147637) Sample Duplicate (DUP)
1203900351	435410001(CAMO-18-147637) 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-086 REV# 25.

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 Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435410001 (CAMO-18-147637) was selected for QC analysis.

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

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

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

Manual Integrations

Samples 1203900349 (CAMO-18-147637DUP) and 435410001 (CAMO-18-147637) were manually integrated to correctly position the baseline as set in the calibration standards.

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:	1711720	Method:	NH3
Prep Batch :	1711719	Method:	EPA 350.1 Prep

Sample Analysis

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

Sample ID	Client ID
435410001	CAMO-18-147637
1203901946	Method Blank (MB)
1203901947	Laboratory Control Sample (LCS)
1203901948	435719002(WST15-18-148149) Sample Duplicate (DUP)
1203901952	435719002(WST15-18-148149) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435719002 (WST15-18-148149) was selected for QC analysis.

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

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

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**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:	1711716	Method:	TKN
Prep Batch :	1711713	Method:	EPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
435410002	CAMO-18-147652
1203901924	Method Blank (MB)
1203901925	Laboratory Control Sample (LCS)
1203901926	435719002(WST15-18-148149) Sample Duplicate (DUP)
1203901927	435719002(WST15-18-148149) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-104 REV# 14.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435719002 (WST15-18-148149) was selected for QC analysis.

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

The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity.

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203901927 (WST15-18-148149MS)	119* (90%-110%)

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

Sample1203901924 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

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: 1710548

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
435410001	CAMO-18-147637
1203899212	Method Blank (MB)
1203899213	Laboratory Control Sample (LCS)
1203899901	435429001(CAMO-18-147634) Sample Duplicate (DUP)
1203899904	435429001(CAMO-18-147634) Post Spike (PS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 9.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435429001 (CAMO-18-147634) was selected for QC analysis.

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

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

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

Sample 435410001 (CAMO-18-147637) was re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

Miscellaneous Information**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:	1712663	Method:	PO4
Prep Batch :	1712662	Method:	EPA 365.4 Prep

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 365.4 1974:

Sample ID	Client ID
435410001	CAMO-18-147637
1203904074	Method Blank (MB)
1203904075	Laboratory Control Sample (LCS)
1203904076	435429001(CAMO-18-147634) Sample Duplicate (DUP)
1203904077	435429001(CAMO-18-147634) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-103 REV# 10.

Preparation/Analytical Method Verification

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

Calibration Information

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

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 Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435429001 (CAMO-18-147634) was selected for QC analysis.

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

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

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

Sample1203904074 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will

always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1711939

Method: TDS

Sample Analysis

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

Sample ID	Client ID
435410001	CAMO-18-147637
1203902605	Method Blank (MB)
1203902606	Laboratory Control Sample (LCS)
1203902608	435410001(CAMO-18-147637) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-001 REV# 15.

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 Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Consecutive Weight Checks

All consecutive weight checks were met.

Quality Control (QC) Designation

Sample 435410001 (CAMO-18-147637) was selected for QC analysis.

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:

Analyte	Sample	Value
Total Dissolved Solids	1203902608 (CAMO-18-147637DUP)	8.48* (0%-5%)

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

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: Specific Conductivity

Analytical Batch: 1713570

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
435410001	CAMO-18-147637
1203906355	Laboratory Control Sample (LCS)
1203906356	435410001(CAMO-18-147637) Sample Duplicate (DUP)
1203906357	435722001(WST15-17-148253) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-009 REV# 15.

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 and Ion analysis was performed on a Orion 160 Conductivity Meter.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 435410001 (CAMO-18-147637) and 435722001 (WST15-17-148253) were selected for QC analysis.

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

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: 1713318 **Method:** PH

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 150.1 1982:

Sample ID	Client ID
435410001	CAMO-18-147637
1203905765	Laboratory Control Sample (LCS)
1203905766	435410001(CAMO-18-147637) Sample Duplicate (DUP)
1203905767	435429001(CAMO-18-147634) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-008 REV# 22.

Preparation/Analytical Method Verification

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

Calibration Information

The Titration and Ion analysis was performed on a Thermo Orion Star A111. Immediates

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 435410001 (CAMO-18-147637) and 435429001 (CAMO-18-147634) were selected for QC analysis.

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

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1203905766 (CAMO-18-147637DUP)	pH	Received 18-OCT-17, out of holding 16-OCT-17
1203905767 (CAMO-18-147634DUP)	pH	Received 18-OCT-17, out of holding 16-OCT-17
435410001 (CAMO-18-147637)	pH	Received 18-OCT-17, out of holding 16-OCT-17

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

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: 1713308 **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
435410001	CAMO-18-147637
1203905729	Laboratory Control Sample (LCS)
1203905732	435410001(CAMO-18-147637) Sample Duplicate (DUP)
1203905734	435410001(CAMO-18-147637) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 13.

Preparation/Analytical Method Verification

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

Calibration Information

The Titration and Ion analysis was performed on a Electronic bottle-top buret.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435410001 (CAMO-18-147637) was selected for QC analysis.

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

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Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-487 GEL Work Order: 435410


The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC 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: Aubrey Kingsbury

Date: 10 NOV 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 10, 2017

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client SDG: 2018-487

Client Sample ID: CAMO-18-147637
Sample ID: 435410001
Matrix: W
Collect Date: 16-OCT-17 13:22
Receive Date: 18-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	JXH5	10/19/17	1530	1711016	1
Chloride		2.68	0.067	0.200	mg/L		1					
Fluoride		0.234	0.033	0.100	mg/L		1					
Sulfate		3.11	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	U	ND	0.017	0.050	mg/L	1.00	1	KLP1	10/24/17	0848	1711720	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.620	0.017	0.050	mg/L		1	KLP1	10/19/17	1316	1710548	3
PO4 "As Received"												
Phosphorus, Total as P		0.0638	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1045	1712663	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		123	3.40	14.3	mg/L			KLP1	10/23/17	1455	1711939	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		62.5	1.45	4.00	mg/L			RXB5	10/27/17	1623	1713308	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		151	1.00	1.00	umhos/cm		1	VH1	11/07/17	1526	1713570	7
PH "As Received"												
pH at Temp 11.0C	H	7.50	0.010	0.100	SU		1	RXB5	10/27/17	1623	1713318	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	10/24/17	0800	1711719
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	10/25/17	1300	1712662

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 10, 2017

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client SDG: 2018-487

Client Sample ID: CAMO-18-147637
Sample ID: 435410001

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
The following Analytical Methods were performed:												
Method	Description					Analyst Comments						
1	EPA:300.0											
2	EPA:350.1											
3	EPA:353.2											
4	EPA 365.4 1974											
5	EPA:160.1											
6	EPA:310.1											
7	EPA:120.1											
8	EPA 150.1 1982											

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 10, 2017

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-487

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-147652

Project: ESHL00114

Sample ID: 435410002

Client ID: ARSL004

Matrix: W

Collect Date: 16-OCT-17 13:22

Receive Date: 18-OCT-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	10/21/17	0428	1710507	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	10/23/17	1014	1710429	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	10/25/17	1228	1711716	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/23/17	0855	1710428
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	10/25/17	1000	1711713

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:351.2	

Notes:

Column headers are defined as follows:

DF: Dilution Factor

Lc/LC: Critical Level

DL: Detection Limit

PF: Prep Factor

MDA: Minimum Detectable Activity

RL: Reporting Limit

MDC: Minimum Detectable Concentration

SQL: Sample Quantitation Limit

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: November 10, 2017

Page 1 of 6

Los Alamos National Laboratory
TA-00, SM1237, Rm104C
Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 435410

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1710507										
QC1203899114	434394002	DUP									
Total Organic Carbon Average		3.63		3.50	mg/L	3.39	^	(+/-1.00)	TSM	10/20/17	16:22
QC1203899115	435199004	DUP									
Total Organic Carbon Average	J	0.750	J	0.732	mg/L	2.43	^	(+/-1.00)		10/21/17	00:10
QC1203899113	LCS										
Total Organic Carbon Average	10.0			10.5	mg/L			105 (80%-120%)		10/20/17	14:37
QC1203899112	MB										
Total Organic Carbon Average			U	ND	mg/L					10/20/17	14:25
QC1203899116	434394002	PS									
Total Organic Carbon Average	10.0	3.63		14.4	mg/L			107 (75%-125%)		10/20/17	17:09
QC1203899117	435199004	PS									
Total Organic Carbon Average	10.0	J	0.750	12.2	mg/L			115 (75%-125%)		10/21/17	00:57
Flow Injection Analysis											
Batch	1710429										
QC1203899436	435410002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	10/23/17	09:33
QC1203898893	LCS										
Cyanide, Total	50.0			48.3	ug/L			96.6 (90%-110%)		10/23/17	09:15
QC1203898892	MB										
Cyanide, Total			U	ND	ug/L					10/23/17	09:14
QC1203899437	435410002	MS									
Cyanide, Total	100	U	ND	98.3	ug/L			98.3 (90%-110%)		10/23/17	09:34

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QC Summary

Workorder: 435410

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1711016										
QC1203900349	435410001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		JXH5	10/19/17	15:59
Chloride			2.68		2.68	mg/L	0.127	(0%-20%)			
Fluoride			0.234		0.254	mg/L	8.16 ^	(+/-0.100)			
Sulfate			3.11		3.07	mg/L	1.01	(0%-20%)			
QC1203900347	LCS										
Bromide		1.25			1.22	mg/L	97.7	(80%-120%)		10/19/17	13:34
Chloride		5.00			4.79	mg/L	95.9	(80%-120%)			
Fluoride		2.50			2.50	mg/L	100	(80%-120%)			
Sulfate		10.0			9.73	mg/L	97.3	(80%-120%)			
QC1203900346	MB										
Bromide			U		ND	mg/L				10/19/17	13:06
Chloride			U		ND	mg/L					
Fluoride			U		ND	mg/L					
Sulfate			U		ND	mg/L					
QC1203900351	435410001	PS									
Bromide		1.25	U		1.25	mg/L	96	(75%-125%)		10/19/17	16:28
Chloride		5.00		2.68	7.92	mg/L	105	(75%-125%)			

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QC Summary

Workorder: 435410

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1711016										
Fluoride	2.50	0.234		2.94	mg/L		108	(75%-125%)	JXH5	10/19/17	16:28
Sulfate	10.0	3.11		13.3	mg/L		102	(75%-125%)			
Nutrient Analysis											
Batch	1710548										
QC1203899901	435429001	DUP									
Nitrogen, Nitrate/Nitrite		0.345		0.344	mg/L	0.29		(0%-20%)	KLP1	10/19/17	13:27
QC1203899213	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.03	mg/L		103	(90%-110%)		10/19/17	12:25
QC1203899212	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					10/19/17	12:23
QC1203899904	435429001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.345		1.36	mg/L		102	(90%-110%)		10/19/17	13:29
Batch	1711716										
QC1203901926	435719002	DUP									
Nitrogen, Total Kjeldahl		1.39		1.31	mg/L	5.93		(0%-20%)	KLP1	10/25/17	12:52
QC1203901925	LCS										
Nitrogen, Total Kjeldahl	1.00			1.03	mg/L		103	(90%-110%)		10/25/17	12:25
QC1203901924	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					10/25/17	12:37
QC1203901927	435719002	MS									
Nitrogen, Total Kjeldahl	1.00	1.39		2.58	mg/L		119 *	(90%-110%)		10/25/17	12:53
Batch	1711720										
QC1203901948	435719002	DUP									
Nitrogen, Ammonia		0.120		0.161	mg/L	29.2 ^		(+/-0.050)	KLP1	10/24/17	09:03

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QC Summary

Workorder: 435410

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1711720										
QC1203901947	LCS										
Nitrogen, Ammonia	1.00			1.03	mg/L		103	(90%-110%)	KLP1	10/24/17	08:34
QC1203901946	MB										
Nitrogen, Ammonia			U	ND	mg/L					10/24/17	08:34
QC1203901952	435719002	MS									
Nitrogen, Ammonia	1.00	0.120		1.19	mg/L		107	(90%-110%)		10/24/17	09:04
Batch	1712663										
QC1203904076	435429001	DUP									
Phosphorus, Total as P		0.0679		0.0691	mg/L	1.75	^	(+/-0.050)	KLP1	10/26/17	10:46
QC1203904075	LCS										
Phosphorus, Total as P	1.00			1.12	mg/L		112	(80%-124%)		10/26/17	10:44
QC1203904074	MB										
Phosphorus, Total as P			J	0.036	mg/L					10/26/17	11:09
QC1203904077	435429001	MS									
Phosphorus, Total as P	1.00	0.0679		1.28	mg/L		121	(63%-139%)		10/26/17	10:47
Solids Analysis											
Batch	1711939										
QC1203902608	435410001	DUP									
Total Dissolved Solids		123		113	mg/L	8.48*		(0%-5%)	KLP1	10/23/17	14:55
QC1203902606	LCS										
Total Dissolved Solids	300			289	mg/L		96.2	(95%-105%)		10/23/17	14:55
QC1203902605	MB										
Total Dissolved Solids			U	ND	mg/L					10/23/17	14:55

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QC Summary

Workorder: 435410

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1713308										
QC1203905732	435410001	DUP									
Alkalinity, Total as CaCO3		62.5		62.3	mg/L	0.32		(0%-20%)	RXB5	10/27/17	16:26
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203905729	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		10/27/17	16:07
QC1203905734	435410001	MS									
Alkalinity, Total as CaCO3	100	62.5		163	mg/L		101	(80%-120%)		10/27/17	16:27
Batch	1713318										
QC1203905766	435410001	DUP									
pH	H	7.50	H	7.51	SU	0.133		(0%-5%)	RXB5	10/27/17	16:24
QC1203905767	435429001	DUP									
pH	H	8.12	H	8.15	SU	0.369		(0%-5%)		10/27/17	16:28
QC1203905765	LCS										
pH	7.00			7.01	SU		100	(99%-101%)		10/27/17	16:07
Batch	1713570										
QC1203906356	435410001	DUP									
Conductivity		151		152	umhos/cm	0.397		(0%-10%)	VH1	11/07/17	15:28
QC1203906357	435722001	DUP									
Conductivity		167		166	umhos/cm	0.3		(0%-10%)		11/07/17	15:54
QC1203906355	LCS										
Conductivity	1410			1410	umhos/cm		99.4	(95%-105%)		11/07/17	15:19

Notes:

- < Result is less than value reported
- > Result is greater than value reported

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QC Summary

Workorder: 435410

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
B	The target analyte was detected in the associated blank.										
E	General Chemistry--Concentration of the target analyte exceeds the instrument calibration range										
H	Analytical holding time was exceeded										
J	Value is estimated										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
d	5-day BOD--The 2:1 depletion requirement was not met for this sample										
e	5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes										
h	Preparation or preservation holding time was exceeded										

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

^ 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.

Radiological Analysis

Case Narrative

**Radiochemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-487
Work Order #: 435410**

Method/Analysis Information

Product: Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1711133

Sample ID	Client ID
435410002	CAMO-18-147652
1203900607	Method Blank (MB)
1203900609	Laboratory Control Sample (LCS)
1203900608	435410002(CAMO-18-147652) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 26.

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. The initial Calibration was performed in October 2017.

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 1203900607 (MB) and 1203900609 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 435410002 (CAMO-18-147652). The QC was from ARSL work order 435410.

Duplication Criteria between QC Sample and Duplicate Sample

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: ISOPU

Analytical Method: HASL-300:ISOPU

Analytical Batch Number: 1711134

Sample ID	Client ID
435410002	CAMO-18-147652
1203900610	Method Blank (MB)
1203900612	Laboratory Control Sample (LCS)
1203900611	435410002(CAMO-18-147652) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 26.

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. The initial Calibration was performed in October 2017.

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 1203900610 (MB) and 1203900612 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank (See Below) result is greater than 1.65 times the CSU but less than the MDC.

Sample	Analyte	Value
1203900610 (MB)	Plutonium-238	Blank result > 1.65 CSU

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 435410002 (CAMO-18-147652). The QC was from ARSL work order 435410.

Duplication Criteria between QC Sample and Duplicate Sample

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	IsoU
Analytical Method:	HASL-300:ISOU
Analytical Batch Number:	1711135

Sample ID	Client ID
435410002	CAMO-18-147652
1203900613	Method Blank (MB)
1203900615	Laboratory Control Sample (LCS)
1203900614	435410002(CAMO-18-147652) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 26.

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. The initial Calibration was performed in October 2017.

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 1203900613 (MB) and 1203900615 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank (See Below) result is greater than 1.65 times the CSU but less than the MDC.

Sample	Analyte	Value
1203900613 (MB)	Uranium-233/234 and Uranium-238	Blank result > 1.65 CSU

Blank Decision Level

The blank (See Below) result is greater than the decision level but less than the MDC.

Sample	Analyte	Value
1203900613 (MB)	Uranium-233/234	Blank result > DL

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 435410002 (CAMO-18-147652). The QC was from ARSL work order 435410.

Duplication Criteria between QC Sample and Duplicate Sample

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

RDL Met

The method RDL has been met.

Technical Information:

Holding Time

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

Sample 1203900613 (MB) was recounted due to a suspected false positive. The recount is reported.

Miscellaneous Information:

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Gammascpec
Analytical Method:	EPA:901.1
Analytical Batch Number:	1711850

Sample ID	Client ID
435410002	CAMO-18-147652
1203902340	Method Blank (MB)
1203902342	Laboratory Control Sample (LCS)
1203902341	435410002(CAMO-18-147652) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 27.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. The initial Calibrations were performed in July 2017 and September 2017.

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.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 435410002 (CAMO-18-147652). The QC was from ARSL work order 435410.

Duplication Criteria between QC Sample and Duplicate Sample

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

RDL Met

The method RDL has been met.

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.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GFPC, Sr90, liquid

Analytical Method: EPA:905.0

Analytical Batch Number: 1714181

Sample ID	Client ID
435410002	CAMO-18-147652
1203907990	Method Blank (MB)
1203907993	Laboratory Control Sample (LCS)
1203907991	435560005(CAPA-18-147591) Sample Duplicate (DUP)
1203907992	435560005(CAPA-18-147591) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 19.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in April 2016.

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 1203907990 (MB) and 1203907993 (LCS) were changed to 1.0 per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 435560005 (CAPA-18-147591). The QC was from ARSL work order 435560.

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between QC Sample and Duplicate Sample

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

Sample 435410002 (CAMO-18-147652) was recounted due to results more negative than the three sigma TPU. The second count is reported.

Miscellaneous Information:**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

The matrix spike, 1203907992 (CAPA-18-147591MS), aliquot was reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	WSP-GrossA/B
Analytical Method:	EPA 900.0/SW846 9310
Analytical Batch Number:	1714187

Sample ID	Client ID
435410002	CAMO-18-147652
1203907999	Method Blank (MB)
1203908003	Laboratory Control Sample (LCS)
1203908000	435566006(CAMO-18-147684) Sample Duplicate (DUP)
1203908001	435566006(CAMO-18-147684) Matrix Spike (MS)
1203908002	435566006(CAMO-18-147684) 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-RAD-A-001 REV# 19.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in December 2016.

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 1203907999 (MB) and 1203908003 (LCS) were changed to 1.0 per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 435566006 (CAMO-18-147684). The QC was from ARSL work order 435566.

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between MS and MSD

The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) met the duplication acceptance criteria.

Duplication Criteria between QC Sample and Duplicate Sample

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Gross Alpha/Beta Preparation Information

None of the samples have been flamed.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

The matrix spike and matrix spike duplicate, 1203908001 (CAMO-18-147684MS) and 1203908002 (CAMO-18-147684MSD), aliquots were reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: WSP-GrossA/B
Analytical Method: EPA 900.0/SW846 9310
Analytical Batch Number: 1717894

Sample ID	Client ID
435410002	CAMO-18-147652
1203917214	Method Blank (MB)
1203917218	Laboratory Control Sample (LCS)
1203917215	435429002(CAMO-18-147649) Sample Duplicate (DUP)
1203917216	435429002(CAMO-18-147649) Matrix Spike (MS)
1203917217	435429002(CAMO-18-147649) 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-RAD-A-001 REV# 19.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. The initial Calibration was performed in December 2016.

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 1203917214 (MB) and 1203917218 (LCS) were changed to 1.0 per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank (See Below) result is greater than 1.65 times the CSU but less than the MDC.

Sample	Analyte	Value
1203917214 (MB)	ALPHA	Blank result > 1.65 CSU

Blank Decision Level

The blank (See Below) result is greater than the decision level but less than the MDC.

Sample	Analyte	Value
1203917214 (MB)	ALPHA	Blank result > DL

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 435429002 (CAMO-18-147649). The QC was from ARSL work order 435429.

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between MS and MSD

The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) met the duplication acceptance criteria.

Duplication Criteria between QC Sample and Duplicate Sample

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

Samples were re-prepped due to low recovery. The re-analysis is being reported.

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.

Recounts

Sample 1203917217 (CAMO-18-147649MSD) was recounted due to low recovery. The recount is reported.

Sample 1203917215 (CAMO-18-147649DUP) was recounted due to high relative percent difference/relative error ratio. The recount is reported.

Miscellaneous Information:

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

The matrix spike and matrix spike duplicate, 1203917216 (CAMO-18-147649MS) and 1203917217 (CAMO-18-147649MSD), aliquots were reduced to conserve sample volume.

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.

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Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-487 GEL Work Order: 435410

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:



Name: Kate Gellatly

Date: 14 NOV 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: November 14, 2017

Client Sample ID: CAMO-18-147652
Sample ID: 435410002
Matrix: W
Collect Date: 16-OCT-17
Receive Date: 18-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

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

Alphaspec Am241 Liquid "As Received"

Americium-241	U	-0.00227	+/-0.00752	0.0398	0.0168	+/-0.00752	0.050	pCi/L			HAKB	10/24/17	1011	1711133	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.0131	+/-0.00814	0.0377	0.0159	+/-0.00817	0.050	pCi/L			HAKB	10/24/17	1010	1711134	2
Plutonium-239/240	U	0.0087	+/-0.00754	0.0489	0.0215	+/-0.00755	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.384	+/-0.0329	0.0557	0.0243	+/-0.0379	1.00	pCi/L			HAKB	10/24/17	1020	1711135	3
Uranium-235/236		0.146	+/-0.0232	0.0593	0.0252	+/-0.0243	1.00	pCi/L							
Uranium-238		0.210	+/-0.025	0.0538	0.0234	+/-0.027	0.500	pCi/L							

Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	0.321	+/-1.15	4.33	1.90	+/-1.15	8.00	pCi/L			MXR1	11/03/17	1241	1711850	4
Cobalt-60	U	0.479	+/-0.935	4.10	1.65	+/-0.941	8.00	pCi/L							
Neptunium-237	U	-2.02	+/-2.10	7.43	3.36	+/-2.15		pCi/L							
Potassium-40	U	10.7	+/-14.6	45.3	18.7	+/-14.6		pCi/L							
Sodium-22	U	0.534	+/-1.00	4.30	1.76	+/-1.01		pCi/L							

Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	0.111	+/-0.126	0.448	0.189	+/-0.126	0.500	pCi/L			LXB3	11/09/17	1525	1714181	5
<i>WSP-GrossA/B "As Received"</i>															
Beta		4.28	+/-0.660	1.81	0.848	+/-0.749	3.00	pCi/L			AXH4	11/08/17	1207	1714187	6
Alpha	U	0.503	+/-0.677	2.64	0.946	+/-0.678	3.00	pCi/L			AXH4	11/11/17	1412	1717894	7

The following Analytical Methods were performed

Method	Description
1	HASL-300:AM-241
2	HASL-300:ISOPU
3	HASL-300:ISOU
4	EPA:901.1
5	EPA:905.0
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"	1711133	77.5	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1711134	86.6	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1711135	73.5	(50%-105%)

GEL LABORATORIES LLC

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Certificate of Analysis

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-147652

Sample ID: 435410002

Project: ESHL00114

Client ID: ARSL004

Report Date: November 14, 2017

Parameter	Qualifier	Result Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Strontium Carrier		GFPC, Sr90, liquid "As Received"						1714181	95.5	(50%-105%)				

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

Quality Control Summary

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QC Summary

Report Date: November 14, 2017

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Client : Los Alamos National Laboratory
TA-00, SM1237, Rm104C

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 435410

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1711133										
QC1203900608	435410002	DUP									
Americium-241	U	-0.00227	U	0.00197	pCi/L	0.151		(0-1)	HAKB	10/24/17	10:11
	Uncert:	+/-0.00752		+/-0.00653							
	TPU:	+/-0.00752		+/-0.00653							
**Americium-243 Tracer	2.62	2.03		2.25	pCi/L		86	(50%-105%)			
	Uncert:	+/-0.0778		+/-0.0719							
	TPU:	+/-0.141		+/-0.134							
QC1203900609	LCS										
Americium-241	1.97			1.99	pCi/L		101	(80%-120%)	HAKB	10/24/17	10:11
	Uncert:			+/-0.0568							
	TPU:			+/-0.103							
**Americium-243 Tracer	2.10			1.87	pCi/L		89.1	(50%-105%)			
	Uncert:			+/-0.0581							
	TPU:			+/-0.108							
QC1203900607	MB										
Americium-241			U	-0.0087	pCi/L				HAKB	10/24/17	10:11
	Uncert:			+/-0.00754							
	TPU:			+/-0.00754							
**Americium-243 Tracer	2.10			1.53	pCi/L		73.1	(50%-105%)			
	Uncert:			+/-0.0675							
	TPU:			+/-0.119							
Batch	1711134										
QC1203900611	435410002	DUP									
Plutonium-238	U	0.0131	U	0.00216	pCi/L	0.457		(0-1)	HAKB	10/24/17	10:10
	Uncert:	+/-0.00814		+/-0.00374							
	TPU:	+/-0.00817		+/-0.00374							
Plutonium-239/240	U	0.0087	U	-0.0173	pCi/L	0.802		(0-1)			
	Uncert:	+/-0.00754		+/-0.00864							
	TPU:	+/-0.00755		+/-0.00864							
**Plutonium-242 Tracer	2.47	2.14		1.82	pCi/L		73.9	(50%-105%)			
	Uncert:	+/-0.0736		+/-0.0732							
	TPU:	+/-0.150		+/-0.150							
QC1203900612	LCS										
Plutonium-238			U	0.00954	pCi/L			(80%-120%)	HAKB	10/24/17	10:10
	Uncert:			+/-0.00636							
	TPU:			+/-0.00638							
Plutonium-239/240	1.98			1.83	pCi/L		92.5	(80%-120%)			
	Uncert:			+/-0.0542							
	TPU:			+/-0.110							
**Plutonium-242 Tracer	1.97			1.71	pCi/L		86.8	(50%-105%)			
	Uncert:			+/-0.0562							
	TPU:			+/-0.118							

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1711134										
QC1203900610	MB										
Plutonium-238			U	0.013	pCi/L				HAKB	10/24/17	10:10
				Uncert: +/-0.0075							
				TPU: +/-0.00753							
Plutonium-239/240			U	0.00	pCi/L						
				Uncert: +/-0.0075							
				TPU: +/-0.0075							
**Plutonium-242 Tracer	1.97			1.19	pCi/L		60.3	(50%-105%)			
				Uncert: +/-0.066							
				TPU: +/-0.127							
Batch	1711135										
QC1203900614	435410002 DUP										
Uranium-234		0.384		0.418	pCi/L	0.214		(0-1)	HAKB	10/24/17	10:20
		Uncert: +/-0.0329		+/-0.036							
		TPU: +/-0.0379		+/-0.0416							
Uranium-235/236		0.146		0.122	pCi/L	0.265		(0-1)			
		Uncert: +/-0.0232		+/-0.0211							
		TPU: +/-0.0243		+/-0.0219							
Uranium-238		0.210		0.240	pCi/L	0.258		(0-1)			
		Uncert: +/-0.025		+/-0.0272							
		TPU: +/-0.027		+/-0.0296							
**Uranium-232 Tracer	2.62	1.93		1.69	pCi/L		64.5	(50%-105%)			
		Uncert: +/-0.0841		+/-0.0865							
		TPU: +/-0.154		+/-0.156							
QC1203900615	LCS										
Uranium-234				2.92	pCi/L				HAKB	10/24/17	10:20
		Uncert: +/-0.0752		+/-0.0752							
		TPU: +/-0.160		+/-0.160							
Uranium-235/236				0.299	pCi/L						
		Uncert: +/-0.0274		+/-0.0274							
		TPU: +/-0.031		+/-0.031							
Uranium-238	2.70			3.03	pCi/L		112	(80%-120%)			
		Uncert: +/-0.0763		+/-0.0763							
		TPU: +/-0.165		+/-0.165							
**Uranium-232 Tracer	2.10			1.53	pCi/L		73	(50%-105%)			
		Uncert: +/-0.0649		+/-0.0649							
		TPU: +/-0.120		+/-0.120							
QC1203900613	MB										
Uranium-234			U	0.0616	pCi/L				HAKB	10/26/17	08:57
		Uncert: +/-0.0284		+/-0.0284							
		TPU: +/-0.0287		+/-0.0287							
Uranium-235/236			U	0.0179	pCi/L						
		Uncert: +/-0.0156		+/-0.0156							
		TPU: +/-0.0156		+/-0.0156							
Uranium-238			U	0.0251	pCi/L						
		Uncert: +/-0.0147		+/-0.0147							
		TPU: +/-0.0148		+/-0.0148							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1711135										
**Uranium-232 Tracer	2.10			1.70	pCi/L		81.1	(50%-105%)			
	Uncert:			+/-0.106							
	TPU:			+/-0.169							
Rad Gamma Spec											
Batch	1711850										
QC1203902341	435410002	DUP									
Cesium-137	U	0.321	U	-0.252	pCi/L	0.106		(0-1)	MXR1	11/07/17	11:43
	Uncert:	+/-1.15		+/-1.54							
	TPU:	+/-1.15		+/-1.54							
Cobalt-60	U	0.479	U	-1.74	pCi/L	0.437		(0-1)			
	Uncert:	+/-0.935		+/-1.55							
	TPU:	+/-0.941		+/-1.60							
Neptunium-237	U	-2.02	U	0.208	pCi/L	0.245		(0-1)			
	Uncert:	+/-2.10		+/-2.40							
	TPU:	+/-2.15		+/-2.40							
Potassium-40	U	10.7	U	20.6	pCi/L	0.107		(0-1)			
	Uncert:	+/-14.6		+/-31.7							
	TPU:	+/-14.6		+/-31.7							
Sodium-22	U	0.534	U	-0.493	pCi/L	0.245		(0-1)			
	Uncert:	+/-1.00		+/-1.08							
	TPU:	+/-1.01		+/-1.08							
QC1203902342	LCS										
Americium-241	34300			37000	pCi/L		108	(80%-120%)	MXR1	11/03/17	15:07
	Uncert:			+/-822							
	TPU:			+/-1940							
Cesium-137	13000			13400	pCi/L		103	(80%-120%)			
	Uncert:			+/-180							
	TPU:			+/-587							
Cobalt-60	11300			11700	pCi/L		103	(80%-120%)			
	Uncert:			+/-191							
	TPU:			+/-557							
Neptunium-237			U	74.3	pCi/L						
	Uncert:			+/-62.8							
	TPU:			+/-65.2							
Potassium-40			U	12.6	pCi/L						
	Uncert:			+/-95.7							
	TPU:			+/-95.7							
Sodium-22			U	5.12	pCi/L						
	Uncert:			+/-17.1							
	TPU:			+/-17.1							
QC1203902340	MB										
Cesium-137			U	-1.1	pCi/L				MXR1	11/07/17	11:02
	Uncert:			+/-1.11							
	TPU:			+/-1.14							
Cobalt-60			U	0.669	pCi/L						
	Uncert:			+/-1.21							

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Parname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
Batch	1711850										
Neptunium-237	TPU:			+/-1.22							
			U	0.0266	pCi/L						
	Uncert:			+/-2.12							
Potassium-40	TPU:			+/-2.12							
			U	2.19	pCi/L						
	Uncert:			+/-16.9							
Sodium-22	TPU:			+/-16.9							
			U	-1.23	pCi/L						
	Uncert:			+/-0.990							
	TPU:			+/-1.03							
Rad Gas Flow											
Batch	1714181										
QC1203907991	435560005	DUP									
Strontium-90	U	-0.00159	U	0.159	pCi/L	0.316		(0-1)	LXB3	11/09/17	11:11
	Uncert:	+/-0.121		+/-0.132							
	TPU:	+/-0.121		+/-0.133							
**Strontium Carrier	7.85	7.40		6.70	mg		85.4	(50%-105%)			
QC1203907993	LCS										
Strontium-90	23.7			24.2	pCi/L		102	(80%-120%)	LXB3	11/09/17	11:12
	Uncert:			+/-0.628							
	TPU:			+/-2.04							
**Strontium Carrier	7.85			6.80	mg		86.6	(50%-105%)			
QC1203907990	MB										
Strontium-90			U	0.029	pCi/L				LXB3	11/09/17	11:11
	Uncert:			+/-0.0611							
	TPU:			+/-0.0612							
**Strontium Carrier	7.85			7.20	mg		91.7	(50%-105%)			
QC1203907992	435560005	MS									
Strontium-90	237	U	-0.00159	219	pCi/L		92.3	(75%-125%)	LXB3	11/09/17	11:11
	Uncert:		+/-0.121	+/-5.81							
	TPU:		+/-0.121	+/-19.5							
**Strontium Carrier	7.85	7.40		7.20	mg		91.7	(50%-105%)			
Batch	1714187										
QC1203908000	435566006	DUP									
Beta		2.50		3.54	pCi/L	0.345		(0-1)	AXH4	11/08/17	12:08
	Uncert:	+/-0.679		+/-0.737							
	TPU:	+/-0.712		+/-0.796							
QC1203908003	LCS										
Beta	47.4			41.0	pCi/L		86.4	(80%-120%)	AXH4	11/08/17	12:08
	Uncert:			+/-0.792							
	TPU:			+/-3.48							
QC1203907999	MB										
Beta			U	0.0293	pCi/L				AXH4	11/08/17	12:15
	Uncert:			+/-0.0943							
	TPU:			+/-0.0943							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1714187										
QC1203908001	435566006 MS										
Beta	1900	2.50		1730	pCi/L		90.9	(75%-125%)	AXH4	11/08/17	12:08
	Uncert:	+/-0.679		+/-33.1							
	TPU:	+/-0.712		+/-147							
QC1203908002	435566006 MSD										
Beta	1900	2.50		1750	pCi/L	0.0486	92.4	(0-1)	AXH4	11/08/17	12:08
	Uncert:	+/-0.679		+/-32.5							
	TPU:	+/-0.712		+/-148							
Batch	1717894										
QC1203917215	435429002 DUP										
Alpha	U	0.329	U	0.405	pCi/L	0.0299		(0-1)	AXH4	11/13/17	06:30
	Uncert:	+/-0.698		+/-0.563							
	TPU:	+/-0.698		+/-0.564							
QC1203917218	LCS										
Alpha	12.1			12.8	pCi/L		106	(80%-120%)	AXH4	11/11/17	14:12
	Uncert:			+/-0.585							
	TPU:			+/-1.21							
QC1203917214	MB										
Alpha			U	0.253	pCi/L				AXH4	11/11/17	14:11
	Uncert:			+/-0.126							
	TPU:			+/-0.128							
QC1203917216	435429002 MS										
Alpha	483	U	0.329	478	pCi/L		98.9	(75%-125%)	AXH4	11/11/17	14:11
	Uncert:		+/-0.698	+/-23.5							
	TPU:		+/-0.698	+/-46.2							
QC1203917217	435429002 MSD										
Alpha	483	U	0.329	472	pCi/L	0.0342	97.6	(0-1)	AXH4	11/13/17	07:51
	Uncert:		+/-0.698	+/-26.8							
	TPU:		+/-0.698	+/-47.9							

Notes:

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

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMP Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.

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QC Summary

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
N1	See case narrative									
ND	Analyte concentration is not detected above the detection limit									
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.									
R	Sample results are rejected									
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.									
UI	Gamma Spectroscopy--Uncertain identification									
UJ	Gamma Spectroscopy--Uncertain identification									
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.									
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.									
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.									
h	Preparation or preservation holding time was exceeded									

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

** 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.