

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:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148059

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1133		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-33 S1		FIELD PREP:	F	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:		↓	EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
↓	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
↓	WSP-N15/O18- NO3	40 mL Glass	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	_____	HH:MM	Discharge Rate	_____	Dissolved Oxygen	_____
Groundwater Elevation	_____		Oxidation-Reduction Potential	_____	Period Purge Volume	_____
pH	_____		Purge Volume	_____	Specific Conductance	_____
Temperature	_____		Total Volume Pumped	_____	Turbidity	_____

11/7/17

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

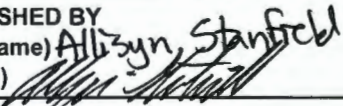
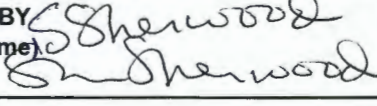
EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148059

WORK ORDER:

COLLECTED BY (PRINT): T. Bonham, K. Tow

RELINQUISHED BY (Printed Name) Allizyn, Stanford (Signature) 	Date/Time 11/7/17 1335	RECEIVED BY (Printed Name) S. Sherwood (Signature) 	Date/Time 11/7/17 1335
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148060

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1246		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-33 S2		FIELD PREP:	F	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP-CR52/53	1 LITER POLY	1	ICE	↓	↓
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE	↓	↓
	WSP-N15/O18- NO3	40 mL Glass	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	_____	HH:MM	_____	Discharge Rate	_____	Dissolved Oxygen	_____
Groundwater Elevation	_____			Oxidation/Reduction Potential	_____	Period Purge Volume	_____
pH	_____			Purge Volume	_____	Specific Conductance	_____
Temperature	_____			Total Volume Pumped	_____	Turbidity	_____

11/7/17

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

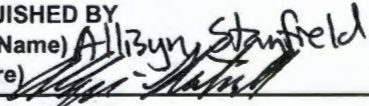
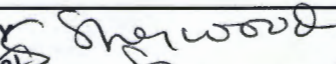
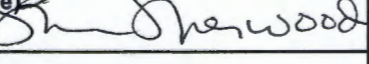
EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148060

WORK ORDER:

COLLECTED BY (PRINT): T. Bonham, K. Tow

RELINQUISHED BY (Printed Name) Allizyn Stanfield (Signature) 	Date/Time 11/7/17 1335	RECEIVED BY  (Printed Name) Sherwood (Signature) 	Date/Time 11/7/17 1335
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148075

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1133		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-33 S1		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
↓	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 40 ft. from running diesel generator

LOCATION COMMENTS: Windy while sampling

FIELD PARAMETERS:

Sample Time	1133	HH:MM	Discharge Rate	3.15	Dissolved Oxygen	5.34
Groundwater Elevation	5858.56		Oxidation-Reduction Potential	242.2	Period Purge Volume	15.75
pH	7.63		Purge Volume	220.50	Specific Conductance	24142.9
Temperature	20.6		Total Volume Pumped	280.35	Turbidity	0.28

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

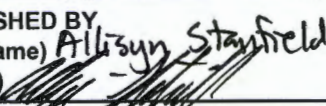
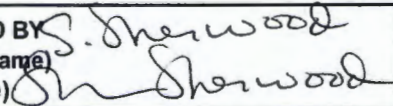
EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148075

WORK ORDER:

COLLECTED BY (PRINT): T. Bonham, K. Tow

RELINQUISHED BY (Printed Name) Allison Stanfield (Signature) 	Date/Time 11/7/17 1335	RECEIVED BY S. Sherwood (Printed Name) (Signature) 	Date/Time 11/7/17 1335
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148076

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1246		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-33 S2		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	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		

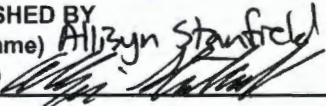
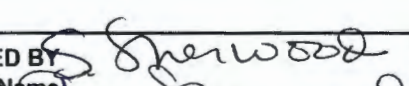
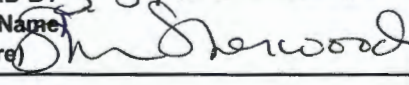
SAMPLE COMMENTS: Sampled 40ft. from running diesel generator

LOCATION COMMENTS: Breezy while sampling

FIELD PARAMETERS:

Sample Time	1246	HH:MM	Discharge Rate	2.91	Dissolved Oxygen	6.54
Groundwater Elevation	5826.52		Oxidation-Reduction Potential	245.8	Period Purge Volume	14.55
pH	7.76		Purge Volume	122.22	Specific Conductance	139.0
Temperature	20.8		Total Volume Pumped	180.42	Turbidity	0.36

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CAMO-18-148076**WORK ORDER:****COLLECTED BY (PRINT):** T. Bonham, K. Tow

RELINQUISHED BY (Printed Name) Allizyn Stanfield (Signature) 	Date/Time 11/7/17 1335	RECEIVED BY  (Printed Name) S. Sherwood (Signature) 	Date/Time 11/7/17 1335
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148098

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1133		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-33 S1		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

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

SAMPLE COMMENTS: Seal broken on FTB; SMD staff OK'ed for use

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	HH:MM	Discharge Rate	Dissolved Oxygen
Groundwater Elevation		Oxidation-Reduction Potential	Period Purge Volume
pH		Purge Volume	Specific Conductance
Temperature		Total Volume Pumped	Turbidity

COLLECTED BY (PRINT): T. Bonham, K. Tow

RELINQUISHED BY (Printed Name) Allison Stanfield (Signature)	Date/Time 11/7/17 1335	RECEIVED BY (Printed Name) S. Sherwood (Signature)	Date/Time 11/7/17 1335
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

EVENT NAME: Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1

SAMPLE ID: CAMO-18-148099

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/7/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1246		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-33 S2		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FTB	
TOP DEPTH:	↓		SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	11/7/17	HCL	Y	NA

SAMPLE COMMENTS: Seal broken on FTB, but SMD staff OK'ed them for use

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	HH:MM	Discharge Rate	Dissolved Oxygen
Groundwater Elevation		Oxidation-Reduction Potential	Period Purge Volume
pH		Purge Volume	Specific Conductance
Temperature		Total Volume Pumped	Turbidity

COLLECTED BY (PRINT): T. Bonham, K. Tow

RELINQUISHED BY (Printed Name) Allizon Stanfield (Signature)	Date/Time 11/7/17 1335	RECEIVED BY (Printed Name) Sherwood (Signature)	Date/Time 11/7/17 1335
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

2018-787

TEST - Explosives		YES	NO
Samples collected from a WFO area?			<input checked="" type="checkbox"/>
Field Test for Explosives Results		YES	NO
Spot test shows presence of explosives residues. If YES - Do not ship.		<input checked="" type="checkbox"/>	

TEST - Chemical Preservation		YES	NO
Samples are chemically preserved?		<input checked="" type="checkbox"/>	
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.		<input checked="" type="checkbox"/>	

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				<input checked="" type="checkbox"/>
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		<input checked="" type="checkbox"/>
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?		<input checked="" type="checkbox"/>	
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 		<input checked="" type="checkbox"/>
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.			<input checked="" type="checkbox"/>
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.			<input checked="" type="checkbox"/>

TEST - AK	YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.			<input checked="" type="checkbox"/>
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.			<input checked="" type="checkbox"/>

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 Montoya	11/8/17
(Signature)	3w

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) MATT ENGLERT	11-8-17
(Signature)	1500

DATA VALIDATION REPORT

Chain Of Custody No. 2018-787

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
437515	EPA:120.1	2				
437515	EPA:150.1	2				
437515	EPA:160.1	2				
437515	EPA:170.0	4		2		
437515	EPA:245.2	4				
437515	EPA:300.0	2				
437515	EPA:310.1	2				
437515	EPA:335.4	2				
437515	EPA:350.1	2				
437515	EPA:351.2	2				
437515	EPA:353.2	2				
437515	EPA:365.4	2				
437515	EPA:900	2				
437515	EPA:901.1	2				
437515	EPA:905.0	2				
437515	HASL-300:AM-241	2				
437515	HASL-300:ISOPU	2				
437515	HASL-300:ISOU	2				
437515	SM:A2340B	2				
437515	SW-846:6010C	2				
437515	SW-846:6020	2				
437515	SW-846:6850	2				
437515	SW-846:8260B	2		2		
437515	SW-846:8270D	2				
437515	SW-846:9060	2				

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
437515	EPA:120.1	1719019	1719019	2										1				1			
437515	EPA:150.1	1717607	1717607	2										1				1			
437515	EPA:160.1	1718225	1718225	2					1					1				1			
437515	EPA:170.0	NA	NA	4		2															
437515	EPA:245.2	1721931	1721929	4					1	1				1				1			
437515	EPA:300.0	1718519	1718519	2					1					1				1			
437515	EPA:310.1	1717604	1717604	2						1				1				1			
437515	EPA:335.4	1717583	1717580	2					1	1	1			1				1			
437515	EPA:350.1	1717818	1717815	2					1	1				1				1			
437515	EPA:351.2	1717811	1717809	2					1	1				1				1			
437515	EPA:353.2	1717805	1717805	2					1					1				1			
437515	EPA:365.4	1717814	1717812	2					1	1				1				1			
437515	EPA:900	1720050	1720050	2					1	1	1			1				1			
437515	EPA:901.1	1717887	1717887	2					1					1				1			
437515	EPA:905.0	1720044	1720044	2					1	1				1				1			
437515	HASL-300:AM-241	1718541	1718541	2					1					1				1			
437515	HASL-300:ISOPU	1718543	1718543	1					1					1				1			
437515	HASL-300:ISOPU	1722422	1722422	1					1					1	1						
437515	HASL-300:ISOU	1718546	1718546	2					1					1				1			
437515	SM:A2340B	1723855	1723855	2																	
437515	SW-846:6010C	1717707	1717706	2					1	1				1				1			
437515	SW-846:6020	1717723	1717722	2					1	1				1				1			
437515	SW-846:6850	1718030	1718029	2					1	1	1			1							
437515	SW-846:8260B	1720463	1720463	2		2			2					4							
437515	SW-846:8270D	1717963	1717962	2					1	1	1			1							
437515	SW-846:9060	1717030	1717030	2					1					1				1			

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-18-148059	437515001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-148060	437515004	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-148114	1203920149	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203920147	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-148059	437515001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-148060	1203916417	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-148060	437515004	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203916416	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-148059	1203918114	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-148059	437515001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-148060	437515004	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203918112	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203918111	MB	1	0	0	0
EPA:170.0	VOC	CAMO-18-148059	437515001	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148060	437515004	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148075	437515002	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148076	437515005	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148098	437515003	FTB	1	0	0	0
EPA:170.0	VOC	CAMO-18-148099	437515006	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148059	1203927662	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148059	1203927663	MS	0	0	1	0
EPA:245.2	INORGANIC	CAMO-18-148059	437515001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148060	437515004	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148075	437515002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148076	437515005	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203927529	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203927528	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-148059	437515001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-148060	1203918855	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-148060	437515004	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203918854	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203918853	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148059	437515001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148060	1203916409	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148060	1203916411	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148060	437515004	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203916407	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAMO-18-148075	437515002	REG	1	0	0	0
EPA:335.4	INORGANIC	CAMO-18-148076	437515005	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203916358	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
EPA:335.4	INORGANIC	MB	1203916357	MB	1	0	0	0
EPA:335.4	INORGANIC	WST05-17-147341	1203916359	DUP	1	0	0	0
EPA:335.4	INORGANIC	WST05-17-147341	1203916361	MS	0	0	1	0
EPA:335.4	INORGANIC	WST05-17-147341	1203916363	MSD	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-148059	437515001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-148060	437515004	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203916975	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203916974	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	WST05-17-147350	1203916976	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	WST05-17-147350	1203916977	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-148075	437515002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-148076	437515005	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CrIN6-18-148629	1203916956	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CrIN6-18-148629	1203916957	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203916955	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203916954	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-148059	437515001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-148060	437515004	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203916936	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203916935	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	WST05-17-147341	1203916938	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-148059	437515001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-148060	437515004	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CrIN6-18-148629	1203916966	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CrIN6-18-148629	1203916967	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203916965	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203916964	MB	1	0	0	0
EPA:900	RAD	CAMO-18-148075	437515002	REG	2	0	0	0
EPA:900	RAD	CAMO-18-148076	437515005	REG	2	0	0	0
EPA:900	RAD	CAMO-18-148117	1203922640	DUP	2	0	0	0
EPA:900	RAD	CAMO-18-148117	1203922641	MS	0	0	2	0
EPA:900	RAD	CAMO-18-148117	1203922642	MSD	0	0	2	0
EPA:900	RAD	LCS	1203922643	LCS	0	0	2	0
EPA:900	RAD	MB	1203922639	MB	2	0	0	0
EPA:901.1	RAD	CAMO-18-148075	1203917195	DUP	5	0	0	0
EPA:901.1	RAD	CAMO-18-148075	437515002	REG	5	0	0	0
EPA:901.1	RAD	CAMO-18-148076	437515005	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203917196	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203917194	MB	5	0	0	0
EPA:905.0	RAD	CAMO-18-148073	1203922620	DUP	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:905.0	RAD	CAMO-18-148073	1203922621	MS	0	0	1	0
EPA:905.0	RAD	CAMO-18-148075	437515002	REG	1	0	0	0
EPA:905.0	RAD	CAMO-18-148076	437515005	REG	1	0	0	0
EPA:905.0	RAD	LCS	1203922622	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203922619	MB	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-148075	437515002	REG	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-148076	437515005	REG	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-148111	1203918916	DUP	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203918917	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203918915	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-148075	437515002	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-148076	437515005	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-148111	1203918922	DUP	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203918923	LCS	0	0	1	0
HASL-300:ISOPU	RAD	LCS	1203928686	LCS	0	0	1	0
HASL-300:ISOPU	RAD	LCSD	1203928762	LCSD	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203918921	MB	2	0	0	0
HASL-300:ISOPU	RAD	MB	1203928684	MB	2	0	0	0
HASL-300:ISOU	RAD	CAMO-18-148075	437515002	REG	3	0	0	0
HASL-300:ISOU	RAD	CAMO-18-148076	437515005	REG	3	0	0	0
HASL-300:ISOU	RAD	CAMO-18-148111	1203918933	DUP	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203918934	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203918932	MB	3	0	0	0
SM:A2340B	INORGANIC	CAMO-18-148059	437515001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-18-148060	437515004	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-148059	1203916662	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-148059	1203916663	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAMO-18-148059	437515001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-148060	437515004	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203916661	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203916660	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-18-148059	1203916705	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-148059	1203916706	MS	0	0	11	0
SW-846:6020	INORGANIC	CAMO-18-148059	437515001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-148060	437515004	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203916704	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203916703	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148059	1203917598	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148059	1203917599	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148059	437515001	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
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148060	437515004	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203917597	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203917596	MB	1	0	0	0
SW-846:8260B	VOC	CAMO-18-148075	437515002	REG	80	3	0	0
SW-846:8260B	VOC	CAMO-18-148076	437515005	REG	80	3	0	0
SW-846:8260B	VOC	CAMO-18-148098	437515003	FTB	80	3	0	0
SW-846:8260B	VOC	CAMO-18-148099	437515006	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203923769	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203923770	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203925356	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203925357	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203923768	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203925355	MB	80	3	0	0
SW-846:8270D	SVOC	CAMO-18-148075	437515002	REG	80	6	0	0
SW-846:8270D	SVOC	CAMO-18-148076	437515005	REG	80	6	0	0
SW-846:8270D	SVOC	CASA-18-147999	1203917434	MS	0	6	76	0
SW-846:8270D	SVOC	CASA-18-147999	1203917435	MSD	0	6	76	0
SW-846:8270D	SVOC	LCS	1203917433	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203917432	MB	80	6	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-148075	437515002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-148076	437515005	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CrIN6-18-148628	1203916414	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203916272	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203916271	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

DATA VALIDATION REPORT

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	1203916660	METHOD BLANK	SW-846:6010C	W	Strontium	1.24	J	ug/L	5.00
MB	1203916703	METHOD BLANK	SW-846:6020	W	Chromium	3.14	J	ug/L	10.0
MB	1203916964	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.0291	J	mg/L	0.050
CAMO-18-148098	437515003	TRIP BLANK	EPA:170.0	W	Temperature	2		Deg C	
CAMO-18-148099	437515006	TRIP BLANK	EPA:170.0	W	Temperature	2		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-18-148059	1203916964	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0291	mg/L	0.0452	J	0.050	Y	5	100	Y
CAMO-18-148060	1203916964	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0291	mg/L	0.0447	J	0.050	Y	5	100	Y
CAMO-18-148059	1203916703	METHOD BLANK	SW-846:6020	Chromium	3.14	ug/L	5.88	J	10.0	Y	5	100	Y
CAMO-18-148060	1203916703	METHOD BLANK	SW-846:6020	Chromium	3.14	ug/L	6.4	J	10.0	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

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
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DATA VALIDATION REPORT

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
CAMO-18-148059	1203916663		SW-846:6010C	Silicon Dioxide	1717706	12-04-2017	W	57.2		125	75			
CAMO-18-148059	1203916663		SW-846:6010C	Silicon Dioxide	1717706	12-04-2017	W	57.2		125	75			

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

LCS Lab Sample	LCSD Lab	Analytical Method	Parameter Name	Lab Lot ID	Analysis	Sample Matrix	LCS Spike Recovery	LCSD Spike Recovery	Upper Limit	Lower Limit	Upper Rejection Limit	Lower Rejection Limit	RPD	RPD Limit
1203918934		HASL-300:ISOU	Uranium-232	1718546	11-26-2017	W	43.6		105	50		10		
1203917433		SW-846:8270D	Dinitrophenol[2,4-]	1717962	11-13-2017	W	30		122	34				
1203917433		SW-846:8270D	Hexachlorocyclopentadiene	1717962	11-13-2017	W	32		89	34				

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-18-148059	437515001	1203918114	EPA:160.1	Total Dissolved	W	160	126	mg/L	Y	Y	27.5	5

11. Any required reporting limits exceeded?

No.

DATA VALIDATION REPORT

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	Paramter 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-33 S1	2018-787	CAMO-18-148059	REG	INIT	INORGANIC	SW-846:6020	Chromium	J	U	I4	N	5.88	ug/L	5.88	ug/L			W	11/07/2017		1717723	VAL	Y
R-33 S1	2018-787	CAMO-18-148059	REG	INIT	INORGANIC	SW-846:6010C	Silicon Dioxide		J-	I6a	Y	76500	ug/L	76.5	mg/L			W	11/07/2017		1717707	VAL	Y
R-33 S1	2018-787	CAMO-18-148059	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus	J	U	I4	N	0.0452	mg/L	0.0452	mg/L			W	11/07/2017		1717814	VAL	Y
R-33 S2	2018-787	CAMO-18-148060	REG	INIT	INORGANIC	SW-846:6020	Chromium	J	U	I4	N	6.4	ug/L	6.4	ug/L			W	11/07/2017		1717723	VAL	Y
R-33 S2	2018-787	CAMO-18-148060	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus	J	U	I4	N	0.0447	mg/L	0.0447	mg/L			W	11/07/2017		1717814	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00694	pCi/L	0.00694	pCi/L	0.0309	0.00425	W	11/07/2017		1718541	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-0.436	pCi/L	-0.436	pCi/L	6.35	1.90	W	11/07/2017		1717887	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.632	pCi/L	0.632	pCi/L	6.46	1.57	W	11/07/2017		1717887	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	SVOC	SW-846:8270D	Dinitrophenol[2,4-]	U	UJ	SV12a	N	5.15	ug/L	5.15	ug/L			W	11/07/2017		1717963	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.981	pCi/L	0.981	pCi/L	2.41	0.709	W	11/07/2017		1720050	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	SVOC	SW-846:8270D	Hexachlorocyclopentadiene	U	UJ	SV12a	N	3.09	ug/L	3.09	ug/L			W	11/07/2017		1717963	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	1.17	pCi/L	1.17	pCi/L	9.97	2.65	W	11/07/2017		1717887	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.0147	pCi/L	0.0147	pCi/L	0.054	0.0116	W	11/07/2017		1718543	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.00732	pCi/L	0.00732	pCi/L	0.0772	0.0104	W	11/07/2017		1718543	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	47.1	pCi/L	47.1	pCi/L	55.9	21.5	W	11/07/2017		1717887	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	2.53	pCi/L	2.53	pCi/L	7.34	1.64	W	11/07/2017		1717887	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.0466	pCi/L	-0.0466	pCi/L	0.359	0.0887	W	11/07/2017		1720044	VAL	Y
R-33 S1	2018-787	CAMO-18-148075	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0412	pCi/L	0.0412	pCi/L	0.0597	0.0146	W	11/07/2017		1718546	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00198	pCi/L	0.00198	pCi/L	0.0352	0.00656	W	11/07/2017		1718541	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-0.254	pCi/L	-0.254	pCi/L	3.93	1.22	W	11/07/2017		1717887	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.435	pCi/L	0.435	pCi/L	6.20	1.59	W	11/07/2017		1717887	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	SVOC	SW-846:8270D	Dinitrophenol[2,4-]	U	UJ	SV12a	N	5.10	ug/L	5.10	ug/L			W	11/07/2017		1717963	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	-0.0395	pCi/L	-0.0395	pCi/L	2.83	0.677	W	11/07/2017		1720050	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	SVOC	SW-846:8270D	Hexachlorocyclopentadiene	U	UJ	SV12a	N	3.06	ug/L	3.06	ug/L			W	11/07/2017		1717963	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-1.48	pCi/L	-1.48	pCi/L	10.9	3.10	W	11/07/2017		1717887	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.00262	pCi/L	-0.00262	pCi/L	0.0387	0.00587	W	11/07/2017		1722422	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.00524	pCi/L	0.00524	pCi/L	0.0553	0.00829	W	11/07/2017		1722422	VAL	Y

DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Paramter 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-33 S2	2018-787	CAMO-18-148076	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	50.6	pCi/L	50.6	pCi/L	54.4	20.8	W	11/07/2017		1717887	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	0.658	pCi/L	0.658	pCi/L	6.34	1.61	W	11/07/2017		1717887	VAL	Y
R-33 S2	2018-787	CAMO-18-148076	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.0798	pCi/L	-0.0798	pCi/L	0.449	0.113	W	11/07/2017		1720044	VAL	Y

Reason Code

Description

I4

the sample result is =<5x the concentration of related analyte in the method blank.

I6a

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

J_LAB

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

NQ

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

R5

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

SV12a

The LCS percent recovery was < the LAL but >10%. Follow the external laboratory limits located within the associated data package.

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-18-148059	R-33 S1	REG	EPA:120.1	0	1
CAMO-18-148059	R-33 S1	REG	EPA:150.1	0	1
CAMO-18-148059	R-33 S1	REG	EPA:160.1	0	1
CAMO-18-148059	R-33 S1	REG	EPA:170.0	0	1
CAMO-18-148059	R-33 S1	REG	EPA:245.2	0	1
CAMO-18-148059	R-33 S1	REG	EPA:300.0	0	4
CAMO-18-148059	R-33 S1	REG	EPA:310.1	0	2
CAMO-18-148059	R-33 S1	REG	EPA:350.1	0	1
CAMO-18-148059	R-33 S1	REG	EPA:353.2	0	1
CAMO-18-148059	R-33 S1	REG	EPA:365.4	0	1
CAMO-18-148059	R-33 S1	REG	SM:A2340B	0	1
CAMO-18-148059	R-33 S1	REG	SW-846:6010C	0	17
CAMO-18-148059	R-33 S1	REG	SW-846:6020	0	11

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-148059	R-33 S1	REG	SW-846:6850	0	1
CAMO-18-148060	R-33 S2	REG	EPA:120.1	0	1
CAMO-18-148060	R-33 S2	REG	EPA:150.1	0	1
CAMO-18-148060	R-33 S2	REG	EPA:160.1	0	1
CAMO-18-148060	R-33 S2	REG	EPA:170.0	0	1
CAMO-18-148060	R-33 S2	REG	EPA:245.2	0	1
CAMO-18-148060	R-33 S2	REG	EPA:300.0	0	4
CAMO-18-148060	R-33 S2	REG	EPA:310.1	0	2
CAMO-18-148060	R-33 S2	REG	EPA:350.1	0	1
CAMO-18-148060	R-33 S2	REG	EPA:353.2	0	1
CAMO-18-148060	R-33 S2	REG	EPA:365.4	0	1
CAMO-18-148060	R-33 S2	REG	SM:A2340B	0	1
CAMO-18-148060	R-33 S2	REG	SW-846:6010C	0	17
CAMO-18-148060	R-33 S2	REG	SW-846:6020	0	11
CAMO-18-148060	R-33 S2	REG	SW-846:6850	0	1
CAMO-18-148075	R-33 S1	REG	EPA:170.0	0	1
CAMO-18-148075	R-33 S1	REG	EPA:245.2	0	1
CAMO-18-148075	R-33 S1	REG	EPA:335.4	0	1
CAMO-18-148075	R-33 S1	REG	EPA:351.2	0	1
CAMO-18-148075	R-33 S1	REG	EPA:900	0	2
CAMO-18-148075	R-33 S1	REG	EPA:901.1	0	5
CAMO-18-148075	R-33 S1	REG	EPA:905.0	0	1
CAMO-18-148075	R-33 S1	REG	HASL-300:AM-241	0	1
CAMO-18-148075	R-33 S1	REG	HASL-300:ISOPU	0	2
CAMO-18-148075	R-33 S1	REG	HASL-300:ISOU	0	3
CAMO-18-148075	R-33 S1	REG	SW-846:8260B	0	80
CAMO-18-148075	R-33 S1	REG	SW-846:8270D	0	80
CAMO-18-148075	R-33 S1	REG	SW-846:9060	0	1
CAMO-18-148076	R-33 S2	REG	EPA:170.0	0	1
CAMO-18-148076	R-33 S2	REG	EPA:245.2	0	1
CAMO-18-148076	R-33 S2	REG	EPA:335.4	0	1
CAMO-18-148076	R-33 S2	REG	EPA:351.2	0	1
CAMO-18-148076	R-33 S2	REG	EPA:900	0	2
CAMO-18-148076	R-33 S2	REG	EPA:901.1	0	5
CAMO-18-148076	R-33 S2	REG	EPA:905.0	0	1
CAMO-18-148076	R-33 S2	REG	HASL-300:AM-241	0	1
CAMO-18-148076	R-33 S2	REG	HASL-300:ISOPU	0	2

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-148076	R-33 S2	REG	HASL-300:ISOU	0	3
CAMO-18-148076	R-33 S2	REG	SW-846:8260B	0	80
CAMO-18-148076	R-33 S2	REG	SW-846:8270D	0	80
CAMO-18-148076	R-33 S2	REG	SW-846:9060	0	1
CAMO-18-148098	R-33 S1	FTB	EPA:170.0	0	1
CAMO-18-148098	R-33 S1	FTB	SW-846:8260B	0	80
CAMO-18-148099	R-33 S2	FTB	EPA:170.0	0	1
CAMO-18-148099	R-33 S2	FTB	SW-846:8260B	0	80



December 05, 2017

gel.com

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

Re: LANL- WQH Water Samples
Work Order: 437515
SDG: 2018-787

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on November 09, 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,

Valerie Davis
Project Manager

Chain of Custody: 2018-787
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 437515
SDG: 2018-787

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 437515
SDG # : 2018-787**

December 05, 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 November 09, 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>
437515001	CAMO-18-148059
437515002	CAMO-18-148075
437515003	CAMO-18-148098
437515004	CAMO-18-148060
437515005	CAMO-18-148076
437515006	CAMO-18-148099

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.

Valerie Davis

Valerie Davis
Project Manager

List of current GEL Certifications as of 05 December 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

General Engineering

Charleston SC

Chain of Custody/Analysis Request

COC/Lab Request #:

2018-787

437519

Page 1 of 1

Client Contact:

Lab Agreement #:

Project Number:

Analysis Turnaround Time:

24 Hour -

7 Days -

14 Days -

21 Days -

28 Days -

Other -

Site Name:

Los Alamos National Laboratory

Field Sample ID

Sample Date

Sample Time

Sample Matrix

MSGP-Hg

WSP-8260B-VOA

WSP-8270C-SVOA

WSP-All Metals

WSP-CN(T)

WSP-GENINORG+PerChlorate

WSP-GrossA/B

WSP-NH3+NO3/NO2+PO4

WSP-RAD

WSP-TKN+TOC

1

2

2

1

1

1

1

1

1

1

Rad Screening Info:

Location

Method

Lab Reporting Limit Type:

Method Detection Limit

Special Instructions:

Relinquished by:

Relinquished by:

Relinquished by:

Print Name:

Print Name:

Print Name:

Date/Time:

Date/Time:

Date/Time:

Received by:

Received by:

Received by:

Print Name:

Print Name:

Print Name:

Date/Time:

Date/Time:

Date/Time:



Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: ESHC		SDG/AR/COC/Work Order: U37815	
Received By: ZKW		Date Received: 11/9/17	
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 5908 1783 1581-2c 5908 1783 1489-16c (rchem) 5908 1783 1592-2c 5908 1783 1607-2c 5908 1783 1560-3c 5908 1783 1589-16c 5908 1783 1548-2c 5908 1783 1570-4c 5908 1783 1618-2c 5908 1783 1537-6c	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <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?	Yes <input type="checkbox"/> No <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: <u>Ice Pack</u> Dry ice <u>None</u> Other: <u>See Below</u> *all temperatures are recorded in Celsius
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: <u>-148628 Split and preserve 25/11/17</u> If Preservation added, Lot#: <u>171004</u>
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 <input type="checkbox"/> No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> 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: <u>See Below</u>
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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):

* We rec'd WSTLA-17-148762 and -148764 not on COC, we did not receive -148755 and -148753

Tracking #'s Continued:
 5908 1783 1490-14c rchem
 5908 1783 1478-16c rchem

PM (or PMA) review: Initials KWJH Date 11/9/17 Page 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
LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE:
ACTWGT: 37.0
CAD: 0014176

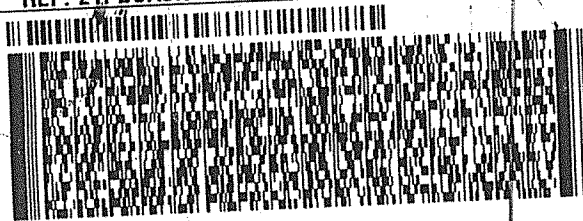
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TO **VALERIE DAVIS**
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 558-8171

REF: 21PDOASRGW04BAGWEO



FedEx
Express



1 of 3

TRK#
0201

5908 1783 1478

MASTER

X7 RBWA

THU - 09 NOV 10:30/
PRIORITY OVERNIGHT

29407

SC-US CHS

Part # 156140V-434 RIT2 06/15 83



Part # 16302

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

SHIP DATE: 08NOV17
ACTWGT: 47.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

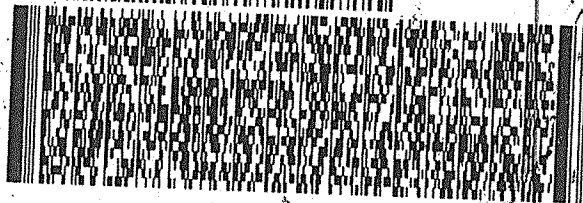
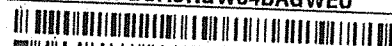
BILL SENDER

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

CHARLESTON SC 29407

(843) 556-8171

REF: 21PDOASRGW04BAGWEO



3 of 3

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0263

Mstr# 5908 1783 1478

0201

THU - 09 NOV 10:30/
PRIORITY OVERNIGHT

X7 RBWA

29407

SC-US CHS

Part # 156143V-434 RIT2 06/15



ORIGIN TO: 3000 000-5586
KEITH GREENE
LOS ALAMOS NATL LAB
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 08NOV17
ACTWGT: 54.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

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

CHARLESTON SC 29407

(843) 666-8171

REF: 21PDOASRGW04BAGWEO

16



FedEx
Express



2 of 3

MPS# 5908 1783 1489
0263

Mstr# 5908 1783 1478

0201

THU - 09 NOV 10:30/
PRIORITY OVERNIGHT

X7 RBWA

29407

SC-US CHS



Part # 156148V-434 RIT2 06/15

302

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 08NOV17
ACTWGT: 22.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

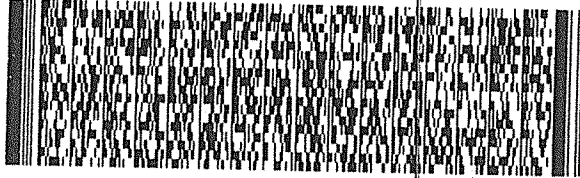
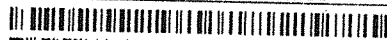
VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 2LEROASRCH08BFQCC0

Zc



FedEx
Express



1 of 2

TRK# 5908 1783 1607
0201

MASTER

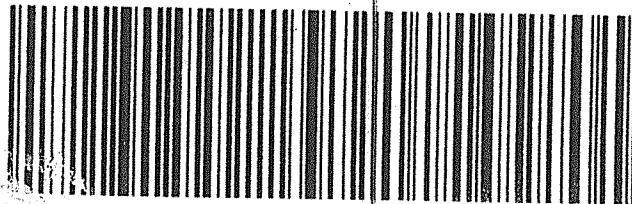
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THU - 09 NOV 10:30/
PRIORITY OVERNIGHT

29407

SC-US CHS

Part # 156146V-434 RIT2 06/15 23



TH GREENE
ALAMOS NATL LAB.
10 BLDG 1237 DPU 03
ALAMOS, NM 87545
UNITED STATES US

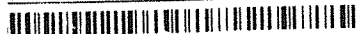
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BILL SENDER

VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171
REF: 21PD0AXPAW017A000



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Express



1 of 2
TRK# 5908 1783 1537
0201
MASTER

X7 RBWA

29407
SC-US CHS

THU - 09 NOV 10:30
PRIORITY OVERNIGHT



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: 08NOV17
ACTWGT: 57.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

4

CHARLESTON SC 29407

(843) 556-8171
REF: 21PD0AXPAW017A000



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Express



1 of 2
TRK# 5908 1783 1570
0201
MASTER

X7 RBWA

29407
SC-US CHS

THU - 09 NOV 10:30
PRIORITY OVERNIGHT



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

ACTWGT: 48.0 LB
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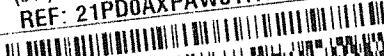
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TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

2

CHARLESTON SC 29407

(843) 556-8171
REF: 21PD0AXPAW017A000



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Express



2 of 2
MPS# 5908 1783 1581
0263
Mstr# 5908 1783 1570
0201

X7 RBWA

29407
SC-US CHS

THU - 09 NOV 10:30
PRIORITY OVERNIGHT



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: 08NOV
ACTWGT: 51.0 LB
CAD: 0014176/CA

BILL SENDER

VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

6

CHARLESTON SC 29407

(843) 556-8171
REF: 21PD0AXPAW017A000



FedEx
Express



1 of 2
TRK# 5908 1783 1559
0201
MASTER

X7 RBWA

29407
SC-US CHS

THU - 09 NOV 10:30
PRIORITY OVERNIGHT



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: 08NOV17
ACTWGT: 45.0 LB MAN
CAD: 0014176/CAFE2916

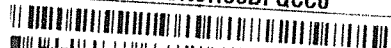
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TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 2LEROASRCH08BFQCC0



FedEx
Express



2 of 2

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263

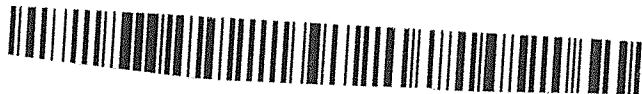
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PRIORITY OVERNIGHT

0201

X7 RBWA

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: 08NOV17
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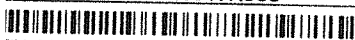
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TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0AXPAW017A000



FedEx
Express



2 of 2

S# 5908 1783 1548
13

Mstr# 5908 1783 1537

THU - 09 NOV 10:30
PRIORITY OVERNIGHT

0201

X7 RBWA

29407
SC-US CHS

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

SHIP DATE: 08NOV17
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CAD: 0014176/CAFE2916

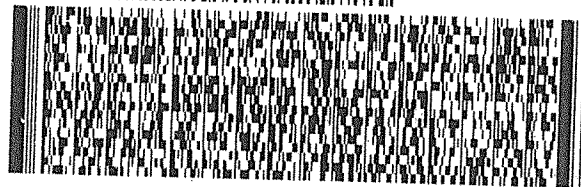
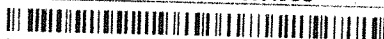
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0AXPAW017A000



FedEx
Express



TRK# 5908 1783 1592
0201

THU - 09 NOV 10:30
PRIORITY OVERNIGHT

X7 RBWA

29407
SC-US CHS

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

SHIP DATE: 08NOV17
ACTWGT: 48.0 LB MAN
CAD: 0014176/CAFE2916

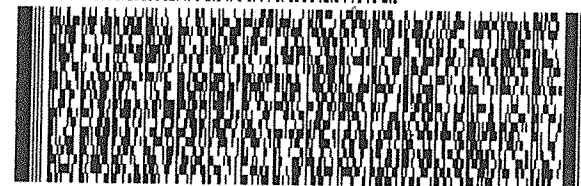
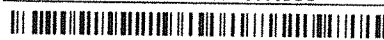
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0AXPAW017A000



FedEx
Express



2 of 2

MPS# 5908 1783 1560
0263

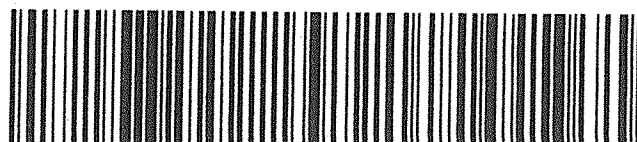
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THU - 09 NOV 10:30
PRIORITY OVERNIGHT

0201

X7 RBWA

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 #: 2018-787
Work Order #: 437515**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch
Number: 1720463

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
437515002	CAMO-18-148075
437515003	CAMO-18-148098
437515005	CAMO-18-148076
437515006	CAMO-18-148099
1203923768	Method Blank (MB)
1203923769	Laboratory Control Sample (LCS)
1203923770	Laboratory Control Sample (LCS)
1203923771	437515002(CAMO-18-148075) Post Spike (PS)
1203923772	437515002(CAMO-18-148075) Post Spike (PS)
1203923773	437515002(CAMO-18-148075) Post Spike Duplicate (PSD)
1203923774	437515002(CAMO-18-148075) Post Spike Duplicate (PSD)
1203925355	Method Blank (MB)
1203925356	Laboratory Control Sample (LCS)
1203925357	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

The blanks analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 437515002 (CAMO-18-148075) was designated for spike analysis.

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the required acceptance limits.

Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information

Holding Time Specifications

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 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
VOA1.I	Hewlett Packard 5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	RTX-624	Restek, 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: 2018-787 GEL Work Order: 437515

The Qualifiers in this report are defined as follows:

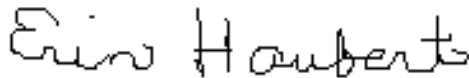
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.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

Date: 05 DEC 2017

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-787
Lab Sample ID: 437515002

Date Collected: 11/07/2017 11:33
Date Received: 11/09/2017 09:00

Matrix: W

Client ID: CAMO-18-148075
Batch ID: 1720463
Run Date: 11/19/2017 10:39
Prep Date: 11/19/2017 10:39
Data File: 111817V1\11643.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

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

Page 2 of 3

SDG Number: 2018-787

Lab Sample ID: 437515002

Date Collected: 11/07/2017 11:33

Date Received: 11/09/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1720463

Inst: VOA1.I

Dilution: 1

Run Date: 11/19/2017 10:39

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 11/19/2017 10:39

Data File: 111817V1\11643.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: 2018-787

Lab Sample ID: 437515002

Date Collected: 11/07/2017 11:33

Date Received: 11/09/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAMO-18-148075

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1720463

Inst: VOA1.I

Dilution: 1

Run Date: 11/19/2017 10:39

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 11/19/2017 10:39

Column: DB-624

Data File: 111817V1\111643.D

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	49.0	50.0	ug/L 98	(71%-134%)
Bromofluorobenzene	60.7	50.0	ug/L 121	(70%-131%)
Toluene-d8	45.6	50.0	ug/L 91	(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

Page 1 of 3

SDG Number: 2018-787

Lab Sample ID: 437515003

Date Collected: 11/07/2017 11:33

Date Received: 11/09/2017 09:00

Matrix: W

Client ID: CAMO-18-148098

Batch ID: 1720463

Run Date: 11/19/2017 06:18

Prep Date: 11/19/2017 06:18

Data File: 111817V1\11634.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

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

Page 2 of 3

SDG Number: 2018-787

Lab Sample ID: 437515003

Date Collected: 11/07/2017 11:33

Date Received: 11/09/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1720463

Inst: VOA1.I

Dilution: 1

Run Date: 11/19/2017 06:18

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 11/19/2017 06:18

Data File: 111817V1\11634.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: 2018-787

Lab Sample ID: 437515003

Date Collected: 11/07/2017 11:33

Date Received: 11/09/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1720463

Inst: VOA1.I

Dilution: 1

Run Date: 11/19/2017 06:18

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 11/19/2017 06:18

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	46.3	50.0	ug/L 93	(71%-134%)
Bromofluorobenzene	58.4	50.0	ug/L 117	(70%-131%)
Toluene-d8	46.3	50.0	ug/L 93	(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

Page 1 of 3

SDG Number: 2018-787

Lab Sample ID: 437515005

Date Collected: 11/07/2017 12:46

Date Received: 11/09/2017 09:00

Matrix: W

Client ID: CAMO-18-148076

Batch ID: 1720463

Run Date: 11/19/2017 11:08

Prep Date: 11/19/2017 11:08

Data File: 111817V1\11644.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

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

Page 2 of 3

SDG Number: 2018-787

Lab Sample ID: 437515005

Date Collected: 11/07/2017 12:46

Date Received: 11/09/2017 09:00

Matrix: W

Client ID: CAMO-18-148076

Batch ID: 1720463

Run Date: 11/19/2017 11:08

Prep Date: 11/19/2017 11:08

Data File: 111817V1\11644.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

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: 2018-787

Lab Sample ID: 437515005

Date Collected: 11/07/2017 12:46

Date Received: 11/09/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAMO-18-148076

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1720463

Inst: VOA1.I

Dilution: 1

Run Date: 11/19/2017 11:08

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 11/19/2017 11:08

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	49.5	50.0	ug/L 99	(71%-134%)
Bromofluorobenzene	60.1	50.0	ug/L 120	(70%-131%)
Toluene-d8	45.1	50.0	ug/L 90	(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

Page 1 of 3

SDG Number: 2018-787
Lab Sample ID: 437515006

Date Collected: 11/07/2017 12:46
Date Received: 11/09/2017 09:00

Matrix: W

Client ID: CAMO-18-148099
Batch ID: 1720463
Run Date: 11/19/2017 06:47
Prep Date: 11/19/2017 06:47
Data File: 111817V1\11635.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

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

Page 2 of 3

SDG Number: 2018-787

Lab Sample ID: 437515006

Date Collected: 11/07/2017 12:46

Date Received: 11/09/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1720463

Inst: VOA1.I

Dilution: 1

Run Date: 11/19/2017 06:47

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 11/19/2017 06:47

Data File: 111817V1\11635.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: 2018-787

Lab Sample ID: 437515006

Date Collected: 11/07/2017 12:46

Date Received: 11/09/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1720463

Inst: VOA1.I

Dilution: 1

Run Date: 11/19/2017 06:47

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 11/19/2017 06:47

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	48.0	50.0	ug/L 96	(71%-134%)
Bromofluorobenzene	59.4	50.0	ug/L 119	(70%-131%)
Toluene-d8	46.2	50.0	ug/L 92	(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: 2018-787**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203923769	LCS for batch 1720463	90	93	105
1203923770	LCS for batch 1720463	89	91	109
1203923768	MB for batch 1720463	88	91	112
437515003	CAMO-18-148098	93	93	117
437515006	CAMO-18-148099	96	92	119
437515002	CAMO-18-148075	98	91	121
437515005	CAMO-18-148076	99	90	120
1203925356	LCS for batch 1720463	93	90	106
1203925357	LCS for batch 1720463	89	90	109
1203925355	MB for batch 1720463	90	92	113
1203923771	CAMO-18-148075PS	93	91	105
1203923773	CAMO-18-148075PSD	89	91	105
1203923772	CAMO-18-148075PS	89	90	108
1203923774	CAMO-18-148075PSD	89	91	109

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: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1720463

Matrix: WATER

Lab Sample ID 1203923769

Instrument: VOA1.I

Analysis Date: 11/19/2017 03:24

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	96.4	96	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1260	100	61-125
67-64-1	LCS Acetone	250	0.0	201	80	48-157
74-88-4	LCS Iodomethane	250	0.0	251	101	72-128
75-15-0	LCS Carbon disulfide	250	0.0	241	96	69-138
108-05-4	LCS Vinyl acetate	250	0.0	252	101	67-125
78-93-3	LCS 2-Butanone	250	0.0	214	86	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	234	93	66-124
591-78-6	LCS 2-Hexanone	250	0.0	202	81	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	50.3	101	40-160
74-87-3	LCS Chloromethane	50.0	0.0	51.7	103	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	50.4	101	65-137
74-83-9	LCS Bromomethane	50.0	0.0	52.3	105	63-137
75-00-3	LCS Chloroethane	50.0	0.0	46.8	94	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	46.4	93	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	53.6	107	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	51.7	103	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	53.6	107	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	58.3	117	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	53.0	106	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	53.1	106	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	54.5	109	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1720463

Matrix: WATER

Lab Sample ID 1203923769

Instrument: VOA1.I

Analysis Date: 11/19/2017 03:24

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	51.1	102	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	54.1	108	76-125
67-66-3	LCS Chloroform	50.0	0.0	52.7	105	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	50.5	101	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	49.6	99	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	50.6	101	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	55.1	110	74-122
71-43-2	LCS Benzene	50.0	0.0	49.8	100	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	52.5	105	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	52.4	105	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	55.4	111	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	55.2	110	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	55.9	112	78-131
108-88-3	LCS Toluene	50.0	0.0	47.7	95	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	55.8	112	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	51.2	102	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	51.5	103	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	46.6	93	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	54.9	110	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	54.1	108	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	49.0	98	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	48.2	96	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1720463

Matrix: WATER

Lab Sample ID 1203923769

Instrument: VOA1.I

Analysis Date: 11/19/2017 03:24

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	50.7	101	74-126
100-42-5	LCS Styrene	50.0	0.0	51.7	103	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	47.5	95	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	49.1	98	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	51.7	103	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	48.6	97	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	45.1	90	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	47.8	96	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	47.3	95	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	47.3	95	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	49.1	98	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	48.3	97	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	47.4	95	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	48.5	97	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	45.8	92	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	46.4	93	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	48.3	97	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	48.5	97	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	51.6	103	72-136
91-20-3	LCS Naphthalene	50.0	0.0	52.6	105	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	52.5	105	70-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1720463

Matrix: WATER

Lab Sample ID 1203923769

Instrument: VOA1.I

Analysis Date: 11/19/2017 03:24

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	54.6	109	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	54.2	108	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	48.7	97	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5510	110	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1720463

Matrix: WATER

Lab Sample ID 1203923770

Instrument: VOA1.I

Analysis Date: 11/19/2017 04:22

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	214	86	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	198	79	61-148
107-05-1	LCS	Allyl chloride	250	0.0	220	88	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	232	93	65-122
107-12-0	LCS	Propionitrile	250	0.0	223	89	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	229	92	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	233	93	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	213	85	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2400	96	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	42.4	85	66-147

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-787

Sample Type: Post Spike

Client ID: CAMO-18-148075PS

Matrix: W

Lab Sample ID 1203923771

Instrument: VOA1.I

Analysis Date: 11/19/2017 19:27

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	101	101	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1230	99	56-131
67-64-1	PS Acetone	250	0.00 U	118	47	25-155
74-88-4	PS Iodomethane	250	0.00 U	257	103	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	256	103	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	251	100	48-133
78-93-3	PS 2-Butanone	250	0.00 U	161	64	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	241	96	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	190	76	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	58.6	117	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	51.7	103	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	53.7	107	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	55.7	111	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	47.3	95	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	55.3	111	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	50.2	100	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	55.8	112	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	52.7	105	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	54.3	109	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	56.5	113	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	53.9	108	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	55.1	110	69-127

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-787

Sample Type: Post Spike

Client ID: CAMO-18-148075PS

Matrix: W

Lab Sample ID 1203923771

Instrument: VOA1.I

Analysis Date: 11/19/2017 19:27

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	56.9	114	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	53.7	107	71-130
67-66-3	PS Chloroform	50.0	0.00 U	55.5	111	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	55.9	112	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	55.0	110	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	60.0	120	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	60.6	121	69-130
71-43-2	PS Benzene	50.0	0.00 U	52.0	104	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	57.1	114	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	52.9	106	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	57.6	115	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	58.8	118	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	55.9	112	70-134
108-88-3	PS Toluene	50.0	0.00 U	49.1	98	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	56.2	112	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	51.4	103	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	51.1	102	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	50.5	101	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	56.6	113	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	54.0	108	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	49.6	99	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	51.5	103	61-130

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Post Spike

Client ID: CAMO-18-148075PS

Matrix: W

Lab Sample ID 1203923771

Instrument: VOA1.I

Analysis Date: 11/19/2017 19:27

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	52.8	106	62-131
100-42-5	PS Styrene	50.0	0.00 U	52.6	105	59-135
75-25-2	PS Bromoform	50.0	0.00 U	54.2	108	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	48.8	98	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	47.7	95	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	50.1	100	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	47.9	96	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	47.7	95	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	49.4	99	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	47.7	95	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	47.6	95	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	50.9	102	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	49.6	99	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	49.7	99	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	50.8	102	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	46.0	92	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	46.4	93	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	50.9	102	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	46.8	94	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	52.0	104	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	50.4	101	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	50.8	102	52-135

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-787

Sample Type: Post Spike

Client ID: CAMO-18-148075PS

Matrix: W

Lab Sample ID 1203923771

Instrument: VOA1.I

Analysis Date: 11/19/2017 19:27

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	53.9	108	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	55.8	112	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	47.9	96	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	5450	109	60-140

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148075PSD

Matrix: W

Lab Sample ID 1203923773

Instrument: VOA1.I

Analysis Date: 11/19/2017 19:56

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	102	102	59-132	1	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1180	95	56-131	4	0-20
67-64-1	PSD Acetone	250	0.00 U	110	44	25-155	7	0-20
74-88-4	PSD Iodomethane	250	0.00 U	258	103	66-133	1	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	256	102	61-141	0	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	241	96	48-133	4	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	149	60	25-143	7	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	226	90	61-127	6	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	176	70	33-138	8	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	60.3	121	33-164	3	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	54.2	108	53-139	5	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	55.5	111	58-140	3	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	57.0	114	59-146	2	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	49.3	99	65-129	4	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	55.9	112	65-141	1	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	51.2	102	69-127	2	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	55.5	111	59-130	0	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	53.4	107	62-123	1	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	54.3	109	69-132	0	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	56.3	113	65-127	0	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	54.7	109	67-127	1	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	55.5	111	69-127	1	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148075PSD

Matrix: W

Lab Sample ID 1203923773

Instrument: VOA1.I

Analysis Date: 11/19/2017 19:56

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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 56.5	113	66-137	1	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 53.6	107	71-130	0	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 54.3	109	71-129	2	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 54.9	110	69-139	2	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 54.2	108	67-130	1	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 57.9	116	66-143	3	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 57.3	115	69-130	6	0-20
71-43-2	PSD Benzene	50.0	0.00	U 51.6	103	66-125	1	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 56.1	112	65-131	2	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 53.4	107	67-127	1	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 55.2	110	72-129	4	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 56.9	114	70-138	3	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 55.0	110	70-134	2	0-20
108-88-3	PSD Toluene	50.0	0.00	U 48.5	97	60-126	1	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 55.5	111	69-135	1	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 50.9	102	66-125	1	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 50.2	100	67-124	2	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 50.4	101	60-130	0	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 55.6	111	68-143	2	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 52.4	105	71-127	3	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 49.4	99	64-124	1	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 50.7	101	61-130	2	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148075PSD

Matrix: W

Lab Sample ID 1203923773

Instrument: VOA1.I

Analysis Date: 11/19/2017 19:56

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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 51.7	103	62-131	2	0-20
100-42-5	PSD Styrene	50.0	0.00	U 51.4	103	59-135	2	0-20
75-25-2	PSD Bromoform	50.0	0.00	U 53.1	106	64-138	2	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00	U 49.4	99	55-133	1	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00	U 46.3	93	62-129	3	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00	U 49.2	98	70-124	2	0-20
108-86-1	PSD Bromobenzene	50.0	0.00	U 48.5	97	62-124	1	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00	U 48.8	98	50-133	2	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00	U 50.3	101	53-135	2	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00	U 49.0	98	56-128	3	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00	U 48.2	96	53-130	1	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00	U 53.1	106	55-135	4	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00	U 50.1	100	53-132	1	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00	U 50.7	101	50-138	2	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00	U 52.0	104	49-138	2	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00	U 46.9	94	56-126	2	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00	U 47.1	94	55-125	2	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00	U 51.8	104	43-142	2	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00	U 45.9	92	62-141	2	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00	U 54.7	109	40-147	5	0-20
91-20-3	PSD Naphthalene	50.0	0.00	U 51.3	103	62-134	2	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00	U 51.6	103	52-135	2	0-20

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-787

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148075PSD

Matrix: W

Lab Sample ID 1203923773

Instrument: VOA1.I

Analysis Date: 11/19/2017 19:56

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	54.7	109	50-133	1	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	54.8	110	71-133	2	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	48.4	97	60-125	1	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	5140	103	60-140	6	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Post Spike

Client ID: CAMO-18-148075PS

Matrix: W

Lab Sample ID 1203923772

Instrument: VOA1.I

Analysis Date: 11/19/2017 20:25

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	212	85	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00	U	245	98	57-149
107-05-1	PS	Allyl chloride	250	0.00	U	236	95	54-128
107-13-1	PS	Acrylonitrile	250	0.00	U	231	93	59-129
107-12-0	PS	Propionitrile	250	0.00	U	222	89	58-131
126-98-7	PS	Methacrylonitrile	250	0.00	U	232	93	59-134
80-62-6	PS	Methyl methacrylate	250	0.00	U	235	94	62-135
97-63-2	PS	Ethyl methacrylate	250	0.00	U	215	86	60-136
78-83-1	PS	Isobutyl alcohol	2500	0.00	U	2370	95	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00	U	48.8	98	63-146

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 2

SDG Number: 2018-787

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148075PSD

Matrix: W

Lab Sample ID 1203923774

Instrument: VOA1.I

Analysis Date: 11/19/2017 20:54

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD	Acrolein	250	0.00	U	215	86	49-141	1	0-20
76-13-1	PSD	Trichlorotrifluoroethane	250	0.00	U	256	102	57-149	4	0-20
107-05-1	PSD	Allyl chloride	250	0.00	U	243	97	54-128	3	0-20
107-13-1	PSD	Acrylonitrile	250	0.00	U	231	92	59-129	0	0-20
107-12-0	PSD	Propionitrile	250	0.00	U	225	90	58-131	1	0-20
126-98-7	PSD	Methacrylonitrile	250	0.00	U	233	93	59-134	1	0-20
80-62-6	PSD	Methyl methacrylate	250	0.00	U	236	94	62-135	1	0-20
97-63-2	PSD	Ethyl methacrylate	250	0.00	U	215	86	60-136	0	0-20
78-83-1	PSD	Isobutyl alcohol	2500	0.00	U	2420	97	60-143	2	0-20
126-99-8	PSD	2-Chloro-1,3-butadiene	50.0	0.00	U	49.3	99	63-146	1	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1720463

Matrix: WATER

Lab Sample ID 1203925356

Instrument: VOA1.I

Analysis Date: 11/19/2017 15:07

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	101	101	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1190	95	61-125
67-64-1	LCS Acetone	250	0.0	270	108	48-157
74-88-4	LCS Iodomethane	250	0.0	255	102	72-128
75-15-0	LCS Carbon disulfide	250	0.0	253	101	69-138
108-05-4	LCS Vinyl acetate	250	0.0	261	104	67-125
78-93-3	LCS 2-Butanone	250	0.0	275	110	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	238	95	66-124
591-78-6	LCS 2-Hexanone	250	0.0	267	107	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	62.9	126	40-160
74-87-3	LCS Chloromethane	50.0	0.0	56.2	112	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	56.7	113	65-137
74-83-9	LCS Bromomethane	50.0	0.0	56.7	113	63-137
75-00-3	LCS Chloroethane	50.0	0.0	51.0	102	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	57.3	115	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	52.6	105	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	56.5	113	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	52.7	105	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	54.1	108	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	55.7	111	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	54.6	109	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	54.3	109	75-123

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1720463

Matrix: WATER

Lab Sample ID 1203925356

Instrument: VOA1.I

Analysis Date: 11/19/2017 15:07

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	59.7	119	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	52.2	104	76-125
67-66-3	LCS Chloroform	50.0	0.0	54.8	110	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	56.6	113	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	55.1	110	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	59.3	119	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	57.4	115	74-122
71-43-2	LCS Benzene	50.0	0.0	51.3	103	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	56.2	112	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	52.0	104	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	55.2	110	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	57.4	115	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	56.8	114	78-131
108-88-3	LCS Toluene	50.0	0.0	48.5	97	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	55.5	111	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	49.3	99	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	49.2	98	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	50.5	101	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	54.4	109	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	51.7	103	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	48.7	97	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	51.1	102	73-125

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1720463

Matrix: WATER

Lab Sample ID 1203925356

Instrument: VOA1.I

Analysis Date: 11/19/2017 15:07

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	51.7	103	74-126
100-42-5	LCS Styrene	50.0	0.0	51.4	103	72-130
75-25-2	LCS Bromoform	50.0	0.0	54.1	108	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	50.8	102	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	51.1	102	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	49.1	98	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	49.6	99	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	50.9	102	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	49.4	99	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	49.1	98	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	52.6	105	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	51.3	103	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	51.2	102	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	53.0	106	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	47.4	95	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	47.8	96	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	53.9	108	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	46.8	94	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	57.6	115	72-136
91-20-3	LCS Naphthalene	50.0	0.0	50.7	101	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	53.1	106	70-130

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1720463

Matrix: WATER

Lab Sample ID 1203925356

Instrument: VOA1.I

Analysis Date: 11/19/2017 15:07

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	58.7	117	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	54.6	109	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	49.1	98	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5210	104	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1720463

Matrix: WATER

Lab Sample ID 1203925357

Instrument: VOA1.I

Analysis Date: 11/19/2017 16:34

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1720463

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	213	85	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	226	90	61-148
107-05-1	LCS	Allyl chloride	250	0.0	229	92	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	226	91	65-122
107-12-0	LCS	Propionitrile	250	0.0	219	88	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	229	91	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	231	92	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	210	84	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2340	94	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	46.1	92	66-147

Method Blank Summary

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SDG Number:	2018-787	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1720463	Instrument ID:	VOA1.I	Data File:	111817V1\11631A.D
Lab Sample ID:	1203923768	Prep Date:	11/19/2017 04:51	Analyzed:	11/19/17 04:51
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 1720463	1203923769	111817V1\11628A.D	11/19/17	0324
02 LCS for batch 1720463	1203923770	111817V1\11630A.D	11/19/17	0422
03 CAMO-18-148098	437515003	111817V1\11634.D	11/19/17	0618
04 CAMO-18-148099	437515006	111817V1\11635.D	11/19/17	0647
05 CAMO-18-148075	437515002	111817V1\11643.D	11/19/17	1039
06 CAMO-18-148076	437515005	111817V1\11644.D	11/19/17	1108

Method Blank Summary

Page 1 of 1

SDG Number:	2018-787	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1720463	Instrument ID:	VOA1.I	Data File:	111917V1\11707A.D
Lab Sample ID:	1203925355	Prep Date:	11/19/2017 17:03	Analyzed:	11/19/17 17:03
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
08 LCS for batch 1720463	1203925356	111917V1\11703A.D	11/19/17	1507
09 LCS for batch 1720463	1203925357	111917V1\11706A.D	11/19/17	1634
10 CAMO-18-148075PS	1203923771	111917V1\11712.D	11/19/17	1927
11 CAMO-18-148075PSD	1203923773	111917V1\11713.D	11/19/17	1956
12 CAMO-18-148075PS	1203923772	111917V1\11714.D	11/19/17	2025
13 CAMO-18-148075PSD	1203923774	111917V1\11715.D	11/19/17	2054

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-787

Lab Sample ID: 1203923768

Client Sample: QC for batch 1720463

Client ID: MB for batch 1720463

Batch ID: 1720463

Run Date: 11/19/2017 04:51

Prep Date: 11/19/2017 04:51

Data File: 111817V1\11631A.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

Project: QC

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: 2018-787
Lab Sample ID: 1203923768
Client Sample: QC for batch 1720463
Client ID: MB for batch 1720463
Batch ID: 1720463
Run Date: 11/19/2017 04:51
Prep Date: 11/19/2017 04:51
Data File: 111817V1\11631A.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

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

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SDG Number:	2018-787	Matrix:	WATER
Lab Sample ID:	1203923768		
Client Sample:	QC for batch 1720463	Client:	ARSL004
Client ID:	MB for batch 1720463	Method:	SW-846:8260B
Batch ID:	1720463	Inst:	VOA1.I
Run Date:	11/19/2017 04:51	Analyst:	PXY1
Prep Date:	11/19/2017 04:51		
Data File:	111817V1\11631A.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	44.1	50.0	ug/L 88	(71%-134%)
Bromofluorobenzene	56.0	50.0	ug/L 112	(70%-131%)
Toluene-d8	45.5	50.0	ug/L 91	(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**

Page 1 of 3

SDG Number: 2018-787

Lab Sample ID: 1203923769

Client Sample: QC for batch 1720463

Client ID: LCS for batch 1720463

Batch ID: 1720463

Run Date: 11/19/2017 03:24

Prep Date: 11/19/2017 03:24

Data File: 111817V1\11628A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

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		54.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		50.5	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		49.1	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		51.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		53.1	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		51.7	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		49.6	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		52.5	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		51.7	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		54.6	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		48.3	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		48.5	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		54.1	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		48.7	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		55.1	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		47.8	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		45.8	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		51.5	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.4	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		51.1	ug/L	0.300	1.00
78-93-3	2-Butanone		214	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		47.3	ug/L	0.300	1.00
591-78-6	2-Hexanone		202	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		47.3	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		48.5	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		234	ug/L	1.50	5.00
67-64-1	Acetone		201	ug/L	1.50	10.0
75-05-8	Acetonitrile		1260	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		49.8	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.6	ug/L	0.300	1.00
74-97-5	Bromochloromethane		54.1	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		55.2	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: 2018-787
Lab Sample ID: 1203923769
Client Sample: QC for batch 1720463
Client ID: LCS for batch 1720463
Batch ID: 1720463
Run Date: 11/19/2017 03:24
Prep Date: 11/19/2017 03:24
Data File: 111817V1\11628A.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

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		52.3	ug/L	0.300	1.00
75-15-0	Carbon disulfide		241	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		50.6	ug/L	0.300	1.00
108-90-7	Chlorobenzene		49.0	ug/L	0.300	1.00
75-00-3	Chloroethane		46.8	ug/L	0.300	1.00
67-66-3	Chloroform		52.7	ug/L	0.300	1.00
74-87-3	Chloromethane		51.7	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		54.9	ug/L	0.300	1.00
74-95-3	Dibromomethane		55.4	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		50.3	ug/L	0.300	1.00
60-29-7	Ethyl ether		53.6	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		48.2	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		51.6	ug/L	0.300	1.00
74-88-4	Iodomethane		251	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		47.5	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		53.6	ug/L	1.00	10.0
91-20-3	Naphthalene		52.6	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		51.7	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.6	ug/L	0.300	1.00
108-88-3	Toluene		47.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		52.5	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		46.4	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		252	ug/L	1.50	5.00
75-01-4	Vinyl chloride		50.4	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		54.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		55.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		96.4	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5510	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		48.3	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		45.1	ug/L	0.300	1.00
95-47-6	o-Xylene		50.7	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		47.4	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number:	2018-787	Matrix:	WATER
Lab Sample ID:	1203923769		
Client Sample:	QC for batch 1720463	Client:	ARSL004
Client ID:	LCS for batch 1720463	Method:	SW-846:8260B
Batch ID:	1720463	Inst:	VOA1.I
Run Date:	11/19/2017 03:24	Analyst:	PXY1
Prep Date:	11/19/2017 03:24		
Data File:	111817V1\11628A.D	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
1634-04-4	tert-Butyl methyl ether		58.3	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		49.1	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		53.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		55.8	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	45.0	50.0	ug/L	90	(71%-134%)
Bromofluorobenzene	52.4	50.0	ug/L	105	(70%-131%)
Toluene-d8	46.3	50.0	ug/L	93	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-787

Lab Sample ID: 1203923770

Client Sample: QC for batch 1720463

Client ID: LCS for batch 1720463

Batch ID: 1720463

Run Date: 11/19/2017 04:22

Prep Date: 11/19/2017 04:22

Data File: 111817V1\11630A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

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		42.4	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		214	ug/L	1.50	5.00
107-13-1	Acrylonitrile		232	ug/L	1.50	5.00
107-05-1	Allyl chloride		220	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: 2018-787
Lab Sample ID: 1203923770
Client Sample: QC for batch 1720463
Client ID: LCS for batch 1720463
Batch ID: 1720463
Run Date: 11/19/2017 04:22
Prep Date: 11/19/2017 04:22
Data File: 111817V1\11630A.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

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		213	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		2400	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		233	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		223	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		198	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:	2018-787	Matrix:	WATER
Lab Sample ID:	1203923770		
Client Sample:	QC for batch 1720463	Client:	ARSL004
Client ID:	LCS for batch 1720463	Method:	SW-846:8260B
Batch ID:	1720463	Inst:	VOA1.I
Run Date:	11/19/2017 04:22	Analyst:	PXY1
Prep Date:	11/19/2017 04:22	Purge Vol:	5 mL
Data File:	111817V1\11630A.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	44.3	50.0	ug/L 89	(71%-134%)
Bromofluorobenzene	54.3	50.0	ug/L 109	(70%-131%)
Toluene-d8	45.3	50.0	ug/L 91	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-787	Date Collected: 11/07/2017 11:33	Matrix: W
Lab Sample ID: 1203923771	Date Received: 11/09/2017 09:00	
Client Sample: QC for batch 1720463	Client: ARSL004	Project: QC
Client ID: CAMO-18-148075PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1720463	Inst: VOA1.I	Dilution: 1
Run Date: 11/19/2017 19:27	Analyst: PXY1	Purge Vol: 5 mL
Prep Date: 11/19/2017 19:27		
Data File: 111917V1\111712.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		55.8	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		55.9	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.7	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		51.4	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		53.9	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		55.8	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		55.0	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		50.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		50.1	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		53.9	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		49.6	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		46.8	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		54.0	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		47.9	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		60.6	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		52.9	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		49.4	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		46.0	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		51.1	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.4	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		56.9	ug/L	0.300	1.00
78-93-3	2-Butanone		161	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		47.7	ug/L	0.300	1.00
591-78-6	2-Hexanone		190	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		47.6	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		50.8	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		241	ug/L	1.50	5.00
67-64-1	Acetone		118	ug/L	1.50	10.0
75-05-8	Acetonitrile		1230	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		52.0	ug/L	0.300	1.00
108-86-1	Bromobenzene		47.9	ug/L	0.300	1.00
74-97-5	Bromochloromethane		53.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		58.8	ug/L	0.300	1.00
75-25-2	Bromoform		54.2	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-787	Date Collected: 11/07/2017 11:33	Matrix: W
Lab Sample ID: 1203923771	Date Received: 11/09/2017 09:00	
Client Sample: QC for batch 1720463	Client: ARSL004	Project: QC
Client ID: CAMO-18-148075PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1720463	Inst: VOA1.I	Dilution: 1
Run Date: 11/19/2017 19:27	Analyst: PXY1	Purge Vol: 5 mL
Prep Date: 11/19/2017 19:27		
Data File: 111917V1\111712.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		55.7	ug/L	0.300	1.00
75-15-0	Carbon disulfide		256	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		60.0	ug/L	0.300	1.00
108-90-7	Chlorobenzene		49.6	ug/L	0.300	1.00
75-00-3	Chloroethane		47.3	ug/L	0.300	1.00
67-66-3	Chloroform		55.5	ug/L	0.300	1.00
74-87-3	Chloromethane		51.7	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		56.6	ug/L	0.300	1.00
74-95-3	Dibromomethane		57.6	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		58.6	ug/L	0.300	1.00
60-29-7	Ethyl ether		50.2	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		51.5	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		52.0	ug/L	0.300	1.00
74-88-4	Iodomethane		257	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		48.8	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		52.7	ug/L	1.00	10.0
91-20-3	Naphthalene		50.4	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		52.6	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		50.5	ug/L	0.300	1.00
108-88-3	Toluene		49.1	ug/L	0.300	1.00
79-01-6	Trichloroethylene		57.1	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		55.3	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		251	ug/L	1.50	5.00
75-01-4	Vinyl chloride		53.7	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		55.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		55.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		101	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5450	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		50.9	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		47.7	ug/L	0.300	1.00
95-47-6	o-Xylene		52.8	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		49.7	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-787	Date Collected:	11/07/2017 11:33	Matrix:	W
Lab Sample ID:	1203923771	Date Received:	11/09/2017 09:00		
Client Sample:	QC for batch 1720463	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-148075PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1720463	Inst:	VOA1.I	Dilution:	1
Run Date:	11/19/2017 19:27	Analyst:	PXY1	Purge Vol:	5 mL
Prep Date:	11/19/2017 19:27				
Data File:	111917V1\111712.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		54.3	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		50.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		56.5	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		56.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	46.3	50.0	ug/L	93	(71%-134%)
Bromofluorobenzene	52.5	50.0	ug/L	105	(70%-131%)
Toluene-d8	45.6	50.0	ug/L	91	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-787
Lab Sample ID: 1203923772
Client Sample: QC for batch 1720463
Client ID: CAMO-18-148075PS
Batch ID: 1720463
Run Date: 11/19/2017 20:25
Prep Date: 11/19/2017 20:25
Data File: 111917V1\111714.D

Date Collected: 11/07/2017 11:33
Date Received: 11/09/2017 09:00
Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

Column: DB-624

Matrix: W

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		48.8	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		212	ug/L	1.50	5.00
107-13-1	Acrylonitrile		231	ug/L	1.50	5.00
107-05-1	Allyl chloride		236	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:	2018-787	Date Collected:	11/07/2017 11:33	Matrix:	W
Lab Sample ID:	1203923772	Date Received:	11/09/2017 09:00		
Client Sample:	QC for batch 1720463	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-148075PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1720463	Inst:	VOA1.I	Dilution:	1
Run Date:	11/19/2017 20:25	Analyst:	PXY1	Purge Vol:	5 mL
Prep Date:	11/19/2017 20:25				
Data File:	111917V1\111714.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		215	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		2370	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		232	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		235	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		222	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		245	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:	2018-787	Date Collected:	11/07/2017 11:33	Matrix:	W
Lab Sample ID:	1203923772	Date Received:	11/09/2017 09:00		
Client Sample:	QC for batch 1720463	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-148075PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1720463	Inst:	VOA1.I	Dilution:	1
Run Date:	11/19/2017 20:25	Analyst:	PXY1	Purge Vol:	5 mL
Prep Date:	11/19/2017 20:25				
Data File:	111917V1\111714.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	44.7	50.0	ug/L 89	(71%-134%)
Bromofluorobenzene	53.8	50.0	ug/L 108	(70%-131%)
Toluene-d8	45.2	50.0	ug/L 90	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-787
Lab Sample ID: 1203923773
Client Sample: QC for batch 1720463
Client ID: CAMO-18-148075PSD
Batch ID: 1720463
Run Date: 11/19/2017 19:56
Prep Date: 11/19/2017 19:56
Data File: 111917V1\111713.D

Date Collected: 11/07/2017 11:33
Date Received: 11/09/2017 09:00
Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

Column: DB-624

Matrix: W

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		54.8	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		54.9	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		46.3	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		50.9	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		54.7	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		55.5	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		54.2	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		51.6	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		49.2	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		54.7	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		50.1	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		45.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		52.4	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		48.4	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		57.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		53.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		50.3	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		46.9	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		50.2	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		47.1	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		56.5	ug/L	0.300	1.00
78-93-3	2-Butanone		149	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		49.0	ug/L	0.300	1.00
591-78-6	2-Hexanone		176	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		48.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		52.0	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		226	ug/L	1.50	5.00
67-64-1	Acetone		110	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		51.6	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.5	ug/L	0.300	1.00
74-97-5	Bromochloromethane		53.6	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		56.9	ug/L	0.300	1.00
75-25-2	Bromoform		53.1	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-787	Date Collected:	11/07/2017 11:33	Matrix:	W
Lab Sample ID:	1203923773	Date Received:	11/09/2017 09:00		
Client Sample:	QC for batch 1720463	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-148075PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1720463	Inst:	VOA1.I	Dilution:	1
Run Date:	11/19/2017 19:56	Analyst:	PXY1	Purge Vol:	5 mL
Prep Date:	11/19/2017 19:56				
Data File:	111917V1\111713.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		57.0	ug/L	0.300	1.00
75-15-0	Carbon disulfide		256	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		57.9	ug/L	0.300	1.00
108-90-7	Chlorobenzene		49.4	ug/L	0.300	1.00
75-00-3	Chloroethane		49.3	ug/L	0.300	1.00
67-66-3	Chloroform		54.3	ug/L	0.300	1.00
74-87-3	Chloromethane		54.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		55.6	ug/L	0.300	1.00
74-95-3	Dibromomethane		55.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		60.3	ug/L	0.300	1.00
60-29-7	Ethyl ether		51.2	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		50.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		54.7	ug/L	0.300	1.00
74-88-4	Iodomethane		258	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		49.4	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		53.4	ug/L	1.00	10.0
91-20-3	Naphthalene		51.3	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		50.4	ug/L	0.300	1.00
108-88-3	Toluene		48.5	ug/L	0.300	1.00
79-01-6	Trichloroethylene		56.1	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		55.9	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		241	ug/L	1.50	5.00
75-01-4	Vinyl chloride		55.5	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		55.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		55.0	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		102	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5140	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		51.8	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		48.8	ug/L	0.300	1.00
95-47-6	o-Xylene		51.7	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		50.7	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	2018-787	Date Collected:	11/07/2017 11:33	Matrix:	W
Lab Sample ID:	1203923773	Date Received:	11/09/2017 09:00		
Client Sample:	QC for batch 1720463	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-148075PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1720463	Inst:	VOA1.I	Dilution:	1
Run Date:	11/19/2017 19:56	Analyst:	PXY1	Purge Vol:	5 mL
Prep Date:	11/19/2017 19:56				
Data File:	111917V1\111713.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		54.3	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		53.1	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		56.3	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		55.5	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	44.6	50.0	ug/L	89	(71%-134%)
Bromofluorobenzene	52.7	50.0	ug/L	105	(70%-131%)
Toluene-d8	45.3	50.0	ug/L	91	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-787
Lab Sample ID: 1203923774
Client Sample: QC for batch 1720463
Client ID: CAMO-18-148075PSD
Batch ID: 1720463
Run Date: 11/19/2017 20:54
Prep Date: 11/19/2017 20:54
Data File: 111917V1\111715.D

Date Collected: 11/07/2017 11:33
Date Received: 11/09/2017 09:00
Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

Column: DB-624

Matrix: W

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		49.3	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		215	ug/L	1.50	5.00
107-13-1	Acrylonitrile		231	ug/L	1.50	5.00
107-05-1	Allyl chloride		243	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: 2018-787	Date Collected: 11/07/2017 11:33	Matrix: W
Lab Sample ID: 1203923774	Date Received: 11/09/2017 09:00	
Client Sample: QC for batch 1720463	Client: ARSL004	Project: QC
Client ID: CAMO-18-148075PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1720463	Inst: VOA1.I	Dilution: 1
Run Date: 11/19/2017 20:54	Analyst: PXY1	Purge Vol: 5 mL
Prep Date: 11/19/2017 20:54		
Data File: 111917V1\111715.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		215	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		233	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		225	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

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Sample Summary

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SDG Number:	2018-787	Date Collected:	11/07/2017 11:33	Matrix:	W
Lab Sample ID:	1203923774	Date Received:	11/09/2017 09:00		
Client Sample:	QC for batch 1720463	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-148075PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1720463	Inst:	VOA1.I	Dilution:	1
Run Date:	11/19/2017 20:54	Analyst:	PXY1	Purge Vol:	5 mL
Prep Date:	11/19/2017 20:54				
Data File:	111917V1\111715.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	44.6	50.0	ug/L 89	(71%-134%)
Bromofluorobenzene	54.5	50.0	ug/L 109	(70%-131%)
Toluene-d8	45.6	50.0	ug/L 91	(74%-124%)

Volatile
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Sample Summary

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SDG Number: 2018-787
Lab Sample ID: 1203925355
Client Sample: QC for batch 1720463
Client ID: MB for batch 1720463
Batch ID: 1720463
Run Date: 11/19/2017 17:03
Prep Date: 11/19/2017 17:03
Data File: 111917V1\11707A.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

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

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Sample Summary

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SDG Number: 2018-787
Lab Sample ID: 1203925355
Client Sample: QC for batch 1720463
Client ID: MB for batch 1720463
Batch ID: 1720463
Run Date: 11/19/2017 17:03
Prep Date: 11/19/2017 17:03
Data File: 111917V1\11707A.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

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

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Sample Summary

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SDG Number:	2018-787	Matrix:	WATER
Lab Sample ID:	1203925355		
Client Sample:	QC for batch 1720463	Client:	ARSL004
Client ID:	MB for batch 1720463	Method:	SW-846:8260B
Batch ID:	1720463	Inst:	VOA1.I
Run Date:	11/19/2017 17:03	Analyst:	PXY1
Prep Date:	11/19/2017 17:03		
Data File:	111917V1\11I707A.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	44.8	50.0	ug/L 90	(71%-134%)
Bromofluorobenzene	56.6	50.0	ug/L 113	(70%-131%)
Toluene-d8	46.1	50.0	ug/L 92	(74%-124%)

Tentatively Identified Compound Summary

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

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Sample Summary

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SDG Number: 2018-787

Lab Sample ID: 1203925356

Client Sample: QC for batch 1720463

Client ID: LCS for batch 1720463

Batch ID: 1720463

Run Date: 11/19/2017 15:07

Prep Date: 11/19/2017 15:07

Data File: 111917V1\11703A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

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		54.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		56.6	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		49.3	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		54.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		56.5	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		55.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		53.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		51.1	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		58.7	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		51.3	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		46.8	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		51.7	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		49.1	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		57.4	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		52.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		50.9	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		47.4	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		49.2	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		47.8	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		59.7	ug/L	0.300	1.00
78-93-3	2-Butanone		275	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		49.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		267	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		49.1	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		53.0	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		238	ug/L	1.50	5.00
67-64-1	Acetone		270	ug/L	1.50	10.0
75-05-8	Acetonitrile		1190	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		51.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		49.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		52.2	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		57.4	ug/L	0.300	1.00
75-25-2	Bromoform		54.1	ug/L	0.300	1.00

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Sample Summary**

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SDG Number: 2018-787
Lab Sample ID: 1203925356
Client Sample: QC for batch 1720463
Client ID: LCS for batch 1720463
Batch ID: 1720463
Run Date: 11/19/2017 15:07
Prep Date: 11/19/2017 15:07
Data File: 111917V1\11703A.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA1.I
Analyst: PXY1

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		56.7	ug/L	0.300	1.00
75-15-0	Carbon disulfide		253	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		59.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		48.7	ug/L	0.300	1.00
75-00-3	Chloroethane		51.0	ug/L	0.300	1.00
67-66-3	Chloroform		54.8	ug/L	0.300	1.00
74-87-3	Chloromethane		56.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		54.4	ug/L	0.300	1.00
74-95-3	Dibromomethane		55.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		62.9	ug/L	0.300	1.00
60-29-7	Ethyl ether		52.6	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		51.1	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		57.6	ug/L	0.300	1.00
74-88-4	Iodomethane		255	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		50.8	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		52.7	ug/L	1.00	10.0
91-20-3	Naphthalene		50.7	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		50.5	ug/L	0.300	1.00
108-88-3	Toluene		48.5	ug/L	0.300	1.00
79-01-6	Trichloroethylene		56.2	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		57.3	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		261	ug/L	1.50	5.00
75-01-4	Vinyl chloride		56.7	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		54.3	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		56.8	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		101	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5210	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		53.9	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		49.6	ug/L	0.300	1.00
95-47-6	o-Xylene		51.7	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		51.2	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number:	2018-787	Matrix:	WATER
Lab Sample ID:	1203925356		
Client Sample:	QC for batch 1720463	Client:	ARSL004
Client ID:	LCS for batch 1720463	Method:	SW-846:8260B
Batch ID:	1720463	Inst:	VOA1.I
Run Date:	11/19/2017 15:07	Analyst:	PXY1
Prep Date:	11/19/2017 15:07	Purge Vol:	5 mL
Data File:	111917V1\11I703A.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		52.6	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		55.7	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		55.5	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	46.4	50.0	ug/L	93	(71%-134%)
Bromofluorobenzene	52.9	50.0	ug/L	106	(70%-131%)
Toluene-d8	44.9	50.0	ug/L	90	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-787

Lab Sample ID: 1203925357

Client Sample: QC for batch 1720463

Client ID: LCS for batch 1720463

Batch ID: 1720463

Run Date: 11/19/2017 16:34

Prep Date: 11/19/2017 16:34

Data File: 111917V1\11706A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

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		46.1	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		213	ug/L	1.50	5.00
107-13-1	Acrylonitrile		226	ug/L	1.50	5.00
107-05-1	Allyl chloride		229	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

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SDG Number: 2018-787

Lab Sample ID: 1203925357

Client Sample: QC for batch 1720463

Client ID: LCS for batch 1720463

Batch ID: 1720463

Run Date: 11/19/2017 16:34

Prep Date: 11/19/2017 16:34

Data File: 111917V1\11706A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

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		210	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		2340	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		219	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		226	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:	2018-787	Matrix:	WATER
Lab Sample ID:	1203925357		
Client Sample:	QC for batch 1720463	Client:	ARSL004
Client ID:	LCS for batch 1720463	Method:	SW-846:8260B
Batch ID:	1720463	Inst:	VOA1.I
Run Date:	11/19/2017 16:34	Analyst:	PXY1
Prep Date:	11/19/2017 16:34		
Data File:	111917V1\11I706A.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	44.6	50.0	ug/L 89	(71%-134%)
Bromofluorobenzene	54.4	50.0	ug/L 109	(70%-131%)
Toluene-d8	45.1	50.0	ug/L 90	(74%-124%)

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-787
Work Order #: 437515**

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:	1717963
Prep Batch Number:	1717962

Sample Analysis

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

Sample ID	Client ID
437515002	CAMO-18-148075
437515005	CAMO-18-148076
1203917432	Method Blank (MB)
1203917433	Laboratory Control Sample (LCS)
1203917434	437322008(CASA-18-147999) Matrix Spike (MS)
1203917435	437322008(CASA-18-147999) 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 samples 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 and/or LCSD (See Below) did not meet spike recovery acceptance criteria. The failures are known to be poor responding analytes as stated per the Method. This may account for the low recoveries and the data were reported.

Sample	Analyte	Value
1203917433 (LCS)	2, 4-Dinitrophenol	30* (34%-122%)
	Hexachlorocyclopentadiene	32* (34%-89%)

QC Sample Designation

Sample 437322008 (CASA-18-147999) 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
--------	---------	-------

1203917434MS and 1203917435MSD (CASA-18-147999)	Benzidine	RPD 93* (0%-30%)
	Pyridine	RPD 49* (0%-30%)

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 samples 437515002 (CAMO-18-148075) and 437515005 (CAMO-18-148076) 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: 2018-787 GEL Work Order: 437515

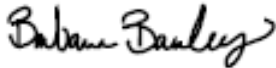
The Qualifiers in this report are defined as follows:

- * 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: Barbara Bailey

Date: 30 NOV 2017

Title: Data Validator

Sample Data Summary

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

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SDG Number: 2018-787
Lab Sample ID: 437515002

Date Collected: 11/07/2017 11:33
Date Received: 11/09/2017 09:00

Matrix: W

Client ID: CAMO-18-148075
Batch ID: 1717963
Run Date: 11/13/2017 21:51
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1324.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 970 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	3.09	ug/L	3.09	10.3
120-82-1	1,2,4-Trichlorobenzene	U	3.09	ug/L	3.09	10.3
95-50-1	1,2-Dichlorobenzene	U	3.09	ug/L	3.09	10.3
122-66-7	Azobenzene	U	3.09	ug/L	3.09	10.3
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.09	ug/L	3.09	10.3
106-46-7	1,4-Dichlorobenzene	U	3.09	ug/L	3.09	10.3
123-91-1	1,4-Dioxane	U	3.09	ug/L	3.09	10.3
90-12-0	1-Methylnaphthalene	U	0.309	ug/L	0.309	1.03
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.09	ug/L	3.09	10.3
95-95-4	2,4,5-Trichlorophenol	U	3.09	ug/L	3.09	10.3
88-06-2	2,4,6-Trichlorophenol	U	3.09	ug/L	3.09	10.3
120-83-2	2,4-Dichlorophenol	U	3.09	ug/L	3.09	10.3
105-67-9	2,4-Dimethylphenol	U	3.09	ug/L	3.09	10.3
51-28-5	2,4-Dinitrophenol	U	5.15	ug/L	5.15	20.6
121-14-2	2,4-Dinitrotoluene	U	3.09	ug/L	3.09	10.3
606-20-2	2,6-Dinitrotoluene	U	3.09	ug/L	3.09	10.3
91-58-7	2-Chloronaphthalene	U	0.423	ug/L	0.423	1.03
95-57-8	2-Chlorophenol	U	3.09	ug/L	3.09	10.3
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.09	ug/L	3.09	10.3
91-57-6	2-Methylnaphthalene	U	0.309	ug/L	0.309	1.03
88-75-5	2-Nitrophenol	U	3.09	ug/L	3.09	10.3
91-94-1	3,3'-Dichlorobenzidine	U	3.09	ug/L	3.09	10.3
101-55-3	4-Bromophenylphenylether	U	3.09	ug/L	3.09	10.3
59-50-7	Parachlorometa cresol	U	3.09	ug/L	3.09	10.3
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.40	ug/L	3.40	10.3
7005-72-3	4-Chlorophenylphenylether	U	3.09	ug/L	3.09	10.3
100-02-7	4-Nitrophenol	U	3.09	ug/L	3.09	10.3
83-32-9	Acenaphthene	U	0.309	ug/L	0.309	1.03
208-96-8	Acenaphthylene	U	0.309	ug/L	0.309	1.03
62-53-3	Aniline	U	4.33	ug/L	4.33	10.3
120-12-7	Anthracene	U	0.309	ug/L	0.309	1.03
1912-24-9	Atrazine	U	3.09	ug/L	3.09	10.3
92-87-5	Benzidine	U	4.02	ug/L	4.02	10.3
56-55-3	Benzo(a)anthracene	U	0.309	ug/L	0.309	1.03
50-32-8	Benzo(a)pyrene	U	0.309	ug/L	0.309	1.03
205-99-2	Benzo(b)fluoranthene	U	0.309	ug/L	0.309	1.03
191-24-2	Benzo(ghi)perylene	U	0.309	ug/L	0.309	1.03

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

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SDG Number: 2018-787
Lab Sample ID: 437515002

Date Collected: 11/07/2017 11:33
Date Received: 11/09/2017 09:00

Matrix: W

Client ID: CAMO-18-148075
Batch ID: 1717963
Run Date: 11/13/2017 21:51
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1324.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 970 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	0.309	ug/L	0.309	1.03
65-85-0	Benzoic acid	U	6.19	ug/L	6.19	20.6
100-51-6	Benzyl alcohol	U	3.09	ug/L	3.09	10.3
85-68-7	Butylbenzylphthalate	U	3.09	ug/L	3.09	10.3
218-01-9	Chrysene	U	0.309	ug/L	0.309	1.03
84-74-2	Di-n-butylphthalate	U	3.09	ug/L	3.09	10.3
117-84-0	Di-n-octylphthalate	U	3.09	ug/L	3.09	10.3
53-70-3	Dibenzo(a,h)anthracene	U	0.309	ug/L	0.309	1.03
132-64-9	Dibenzofuran	U	3.09	ug/L	3.09	10.3
84-66-2	Diethylphthalate	U	3.09	ug/L	3.09	10.3
131-11-3	Dimethylphthalate	U	3.09	ug/L	3.09	10.3
88-85-7	Dinoseb	U	3.09	ug/L	3.09	10.3
122-39-4	Diphenylamine	U	3.09	ug/L	3.09	10.3
206-44-0	Fluoranthene	U	0.309	ug/L	0.309	1.03
86-73-7	Fluorene	U	0.309	ug/L	0.309	1.03
118-74-1	Hexachlorobenzene	U	3.09	ug/L	3.09	10.3
87-68-3	Hexachlorobutadiene	U	3.09	ug/L	3.09	10.3
77-47-4	Hexachlorocyclopentadiene	U	3.09	ug/L	3.09	10.3
67-72-1	Hexachloroethane	U	3.09	ug/L	3.09	10.3
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.309	ug/L	0.309	1.03
78-59-1	Isophorone	U	3.61	ug/L	3.61	10.3
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.09	ug/L	3.09	10.3
924-16-3	N-Nitrosodi-n-butylamine	U	3.09	ug/L	3.09	10.3
55-18-5	N-Nitrosodiethylamine	U	3.09	ug/L	3.09	10.3
621-64-7	N-Nitrosodi-n-propylamine	U	3.09	ug/L	3.09	10.3
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.09	ug/L	3.09	10.3
91-20-3	Naphthalene	U	0.309	ug/L	0.309	1.03
98-95-3	Nitrobenzene	U	3.09	ug/L	3.09	10.3
608-93-5	Pentachlorobenzene	U	3.09	ug/L	3.09	10.3
87-86-5	Pentachlorophenol	U	3.09	ug/L	3.09	10.3
85-01-8	Phenanthrene	U	0.309	ug/L	0.309	1.03
108-95-2	Phenol	U	3.09	ug/L	3.09	10.3
129-00-0	Pyrene	U	0.309	ug/L	0.309	1.03
110-86-1	Pyridine	U	3.09	ug/L	3.09	10.3
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.09	ug/L	3.09	10.3
111-91-1	bis(2-Chloroethoxy)methane	U	3.09	ug/L	3.09	10.3
111-44-4	bis(2-Chloroethyl) ether	U	3.09	ug/L	3.09	10.3
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.09	ug/L	3.09	10.3

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

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SDG Number: 2018-787
Lab Sample ID: 437515002

Date Collected: 11/07/2017 11:33
Date Received: 11/09/2017 09:00

Matrix: W

Client ID: CAMO-18-148075
Batch ID: 1717963
Run Date: 11/13/2017 21:51
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1324.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 970 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	3.81	ug/L	3.81	10.3
99-09-2	3-Nitroaniline	U	3.09	ug/L	3.09	10.3
95-48-7	<i>m</i> -Nitroaniline o-Cresol	U	3.09	ug/L	3.09	10.3
88-74-4	2-Nitroaniline	U	3.09	ug/L	3.09	10.3
100-01-6	<i>o</i> -Nitroaniline 4-Nitroaniline <i>p</i> -Nitroaniline	U	3.09	ug/L	3.09	10.3

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	58.0	103	ug/L	56 (32%-124%)
2-Fluorobiphenyl	35.5	51.5	ug/L	69 (32%-112%)
2-Fluorophenol	47.0	103	ug/L	46 (15%-88%)
Nitrobenzene-d5	35.7	51.5	ug/L	69 (36%-115%)
Phenol-d5	33.2	103	ug/L	32 (15%-91%)
p-Terphenyl-d14	39.1	51.5	ug/L	76 (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**

Page 1 of 3

SDG Number: 2018-787

Lab Sample ID: 437515005

Date Collected: 11/07/2017 12:46

Date Received: 11/09/2017 09:00

Matrix: W

Client ID: CAMO-18-148076

Batch ID: 1717963

Run Date: 11/13/2017 22:21

Prep Date: 11/13/2017 05:43

Data File: s111317.B\s5k1325.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**

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SDG Number: 2018-787

Lab Sample ID: 437515005

Date Collected: 11/07/2017 12:46

Date Received: 11/09/2017 09:00

Matrix: W

Client ID: CAMO-18-148076

Batch ID: 1717963

Run Date: 11/13/2017 22:21

Prep Date: 11/13/2017 05:43

Data File: s111317.B\s5k1325.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: 2018-787

Lab Sample ID: 437515005

Date Collected: 11/07/2017 12:46

Date Received: 11/09/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Client ID: CAMO-18-148076

Batch ID: 1717963

Inst: MSD5.I

Dilution: 1

Run Date: 11/13/2017 22:21

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 11/13/2017 05:43

Aliquot: 980 mL

Final Volume: 1 mL

Data File: s111317.B\s5k1325.D

Column: DB-5ms

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
	<i>m</i> -Nitroaniline					
95-48-7	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
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline	U	3.06	ug/L	3.06	10.2
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	57.6	102	ug/L	56	(32%-124%)
2-Fluorobiphenyl	34.3	51.0	ug/L	67	(32%-112%)
2-Fluorophenol	45.5	102	ug/L	45	(15%-88%)
Nitrobenzene-d5	35.8	51.0	ug/L	70	(36%-115%)
Phenol-d5	32.3	102	ug/L	32	(15%-91%)
p-Terphenyl-d14	42.7	51.0	ug/L	84	(36%-121%)

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

Semi-Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-787

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203917432	MB for batch 1717962	40	28	56	35	50	73
1203917433	LCS for batch 1717962	50	33	71	66	76	88
1203917434	CASA-18-147999MS	63	53	71	69	71	87
1203917435	CASA-18-147999MSD	63	52	69	67	68	81
437515002	CAMO-18-148075	46	32	69	69	56	76
437515005	CAMO-18-148076	45	32	70	67	56	84

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: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1717962

Matrix: WATER

Lab Sample ID 1203917433

Instrument: MSD5.I

Analysis Date: 11/13/2017 15:14

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

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	27.2	54	30-88
110-86-1	LCS Pyridine	50.0	0.0	21.3	43	27-89
62-53-3	LCS Aniline	50.0	0.0	42.5	85	49-112
108-95-2	LCS Phenol	50.0	0.0	17.7	35	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	41.3	83	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	38.4	77	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	29.9	60	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	29.7	59	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	30.7	61	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)ether	50.0	0.0	34.5	69	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	41.1	82	44-102
95-48-7	LCS o-Cresol	50.0	0.0	37.2	74	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	35.7	71	43-102
621-64-7	LCS N-Nitrosodi-n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	33.8	68	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	28.5	57	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	36.1	72	53-115
78-59-1	LCS Isophorone	50.0	0.0	39.0	78	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	39.4	79	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	37.3	75	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	41.8	84	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	40.3	81	53-109
65-85-0	LCS Benzoic acid	100	0.0	35.2	35	21-74

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1717962

Matrix: WATER

Lab Sample ID 1203917433

Instrument: MSD5.I

Analysis Date: 11/13/2017 15:14

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

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	57.0	114	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	24.9	50	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	44.5	89	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	30.6	61	42-103
91-20-3	LCS Naphthalene	50.0	0.0	31.3	63	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	31.5	63	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	15.8	32 *	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	36.8	74	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	40.9	82	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	30.0	60	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	41.8	84	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	64.2	128	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	46.1	92	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	46.5	93	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	47.5	95	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	35.4	71	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	36.1	72	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	15.2	30 *	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	35.6	71	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	39.3	79	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	44.8	90	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	18.3	37	15-137

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1717962

Matrix: WATER

Lab Sample ID 1203917433

Instrument: MSD5.I

Analysis Date: 11/13/2017 15:14

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

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	35.6	71	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	37.7	75	52-121
100-01-6	LCS 4-Nitroaniline	50.0	0.0	54.3	109	44-137
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	26.3	53	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	37.6	75	55-113
122-66-7	LCS Azobenzene	50.0	0.0	35.8	72	53-115
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	37.4	75	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	37.6	75	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	24.0	48	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	40.8	82	55-110
120-12-7	LCS Anthracene	50.0	0.0	41.2	82	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	42.8	86	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	44.0	88	54-118
129-00-0	LCS Pyrene	50.0	0.0	42.1	84	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	44.0	88	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	43.5	87	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	46.8	94	57-112
218-01-9	LCS Chrysene	50.0	0.0	47.1	94	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	43.3	87	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	45.8	92	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	44.8	90	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	46.1	92	40-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-787

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1717962

Matrix: WATER

Lab Sample ID 1203917433

Instrument: MSD5.I

Analysis Date: 11/13/2017 15:14

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

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	45.9	92	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	47.7	95	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	42.9	86	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	28.6	57	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	49.4	99	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	29.1	58	44-102
1912-24-9	LCS Atrazine	50.0	0.0	48.7	97	60-131
92-87-5	LCS Benzidine	100	0.0	40.0	40	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	45.1	90	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	30.1	60	39-99

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-787

Sample Type: Matrix Spike

Client ID: CASA-18-147999MS

Matrix: W

Lab Sample ID 1203917434

Instrument: MSD5.I

Analysis Date: 11/13/2017 18:18

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

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	122	0.00 U	82.6	68	25-106
110-86-1	MS Pyridine	122	0.00 U	45.9	38	24-93
62-53-3	MS Aniline	122	0.00 U	96.8	79	37-113
108-95-2	MS Phenol	122	0.00 U	68.3	56	23-82
111-44-4	MS bis(2-Chloroethyl) ether	122	0.00 U	96.5	79	39-114
95-57-8	MS 2-Chlorophenol	122	0.00 U	91.1	75	37-108
541-73-1	MS 1,3-Dichlorobenzene	122	0.00 U	74.9	61	27-97
106-46-7	MS 1,4-Dichlorobenzene	122	0.00 U	73.1	60	28-97
95-50-1	MS 1,2-Dichlorobenzene	122	0.00 U	75.6	62	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)ether	122	0.00 U	84.6	69	32-127
100-51-6	MS Benzyl alcohol	122	0.00 U	105	86	37-116
95-48-7	MS o-Cresol	122	0.00 U	98.1	80	34-109
65794-96-9	MS m,p-Cresols	122	0.00 U	98.5	81	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	122	0.00 U	79.3	65	42-118
67-72-1	MS Hexachloroethane	122	0.00 U	72.1	59	29-94
98-95-3	MS Nitrobenzene	122	0.00 U	86.3	71	38-123
78-59-1	MS Isophorone	122	0.00 U	94.2	77	43-120
88-75-5	MS 2-Nitrophenol	122	0.00 U	95.9	79	39-115
105-67-9	MS 2,4-Dimethylphenol	122	0.00 U	88.0	72	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	122	0.00 U	99.5	82	42-118
120-83-2	MS 2,4-Dichlorophenol	122	0.00 U	93.0	76	40-111
65-85-0	MS Benzoic acid	244	0.00 U	141	58	17-95

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Matrix Spike

Client ID: CASA-18-147999MS

Matrix: W

Lab Sample ID 1203917434

Instrument: MSD5.I

Analysis Date: 11/13/2017 18:18

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	122	0.00 U	133	109	44-138
87-68-3	MS Hexachlorobutadiene	122	0.00 U	63.4	52	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	122	0.00 U	107	88	41-122
91-57-6	MS 2-Methylnaphthalene	122	0.00 U	76.1	62	29-109
91-20-3	MS Naphthalene	122	0.00 U	78.2	64	31-108
90-12-0	MS 1-Methylnaphthalene	122	0.00 U	79.8	65	33-112
77-47-4	MS Hexachlorocyclopentadiene	122	0.00 U	35.8	29	26-79
88-06-2	MS 2,4,6-Trichlorophenol	122	0.00 U	86.4	71	39-124
95-95-4	MS 2,4,5-Trichlorophenol	122	0.00 U	97.2	80	42-120
91-58-7	MS 2-Chloronaphthalene	122	0.00 U	74.9	61	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	122	0.00 U	96.4	79	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	122	0.00 U	141	116	42-144
131-11-3	MS Dimethylphthalate	122	0.00 U	108	88	45-128
606-20-2	MS 2,6-Dinitrotoluene	122	0.00 U	110	90	46-124
121-14-2	MS 2,4-Dinitrotoluene	122	0.00 U	110	90	45-125
208-96-8	MS Acenaphthylene	122	0.00 U	88.4	72	35-120
83-32-9	MS Acenaphthene	122	0.00 U	92.1	76	35-117
51-28-5	MS 2,4-Dinitrophenol	122	0.00 U	35.4	29	27-122
132-64-9	MS Dibenzofuran	122	0.00 U	90.0	74	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	122	0.00 U	93.2	76	40-128
84-66-2	MS Diethylphthalate	122	0.00 U	102	84	43-127
100-02-7	MS 4-Nitrophenol	122	0.00 U	75.6	62	17-85

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Matrix Spike

Client ID: CASA-18-147999MS

Matrix: W

Lab Sample ID 1203917434

Instrument: MSD5.I

Analysis Date: 11/13/2017 18:18

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS Fluorene	122	0.00 U	89.8	74	39-117
7005-72-3	MS 4-Chlorophenylphenylether	122	0.00 U	94.0	77	39-121
100-01-6	MS 4-Nitroaniline	122	0.00 U	121	99	30-133
534-52-1	MS 2-Methyl-4,6-dinitrophenol	122	0.00 U	65.7	54	32-126
122-39-4	MS Diphenylamine	122	0.00 U	90.0	74	37-118
122-66-7	MS Azobenzene	122	0.00 U	89.7	74	38-120
101-55-3	MS 4-Bromophenylphenylether	122	0.00 U	96.6	79	39-121
118-74-1	MS Hexachlorobenzene	122	0.00 U	92.8	76	40-118
87-86-5	MS Pentachlorophenol	122	0.00 U	66.6	55	35-121
85-01-8	MS Phenanthrene	122	0.00 U	100	82	40-115
120-12-7	MS Anthracene	122	0.00 U	103	84	38-120
84-74-2	MS Di-n-butylphthalate	122	0.00 U	105	86	41-128
206-44-0	MS Fluoranthene	122	0.00 U	109	90	41-119
129-00-0	MS Pyrene	122	0.00 U	96.8	79	35-128
85-68-7	MS Butylbenzylphthalate	122	0.00 U	104	85	40-129
117-81-7	MS bis(2-Ethylhexyl)phthalate	122	0.00 U	104	85	38-131
56-55-3	MS Benzo(a)anthracene	122	0.00 U	110	90	39-120
218-01-9	MS Chrysene	122	0.00 U	110	90	41-124
117-84-0	MS Di-n-octylphthalate	122	0.00 U	106	87	37-134
205-99-2	MS Benzo(b)fluoranthene	122	0.00 U	111	91	31-122
207-08-9	MS Benzo(k)fluoranthene	122	0.00 U	110	90	33-123
50-32-8	MS Benzo(a)pyrene	122	0.00 U	110	90	32-118

Semi-Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-787

Client ID: CASA-18-147999MS

Lab Sample ID 1203917434

Instrument: MSD5.I

Analyst: JMB3

Inj. Vol: 1 uL

Sample Type: Matrix Spike

Matrix: W

Analysis Date: 11/13/2017 18:18

Dilution: 1

Prep Batch ID:1717962

Batch ID: 1717963

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	122	0.00 U	112	92	27-121
53-70-3	MS Dibenzo(a,h)anthracene	122	0.00 U	113	93	30-125
191-24-2	MS Benzo(ghi)perylene	122	0.00 U	105	86	24-126
123-91-1	MS 1,4-Dioxane	122	0.00 U	105	86	24-110
930-55-2	MS N-Nitrosopyrrolidine	122	0.00 U	117	96	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	122	0.00 U	73.8	61	32-101
1912-24-9	MS Atrazine	122	0.00 U	118	97	42-129
92-87-5	MS Benzidine	244	0.00 U	46.8	19	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	122	0.00 U	107	88	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	122	0.00 U	74.8	61	26-102

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Matrix Spike Duplicate

Client ID: CASA-18-147999MSD

Matrix: W

Lab Sample ID 1203917435

Instrument: MSD5.I

Analysis Date: 11/13/2017 18:48

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

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	122	0.00	U	82.4	68	25-106	0	0-30
110-86-1	MSD Pyridine	122	0.00	U	75.6	62	24-93	49 *	0-30
62-53-3	MSD Aniline	122	0.00	U	104	86	37-113	8	0-30
108-95-2	MSD Phenol	122	0.00	U	66.2	54	23-82	3	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	122	0.00	U	94.9	78	39-114	2	0-30
95-57-8	MSD 2-Chlorophenol	122	0.00	U	88.7	73	37-108	3	0-30
541-73-1	MSD 1,3-Dichlorobenzene	122	0.00	U	73.9	61	27-97	1	0-30
106-46-7	MSD 1,4-Dichlorobenzene	122	0.00	U	70.6	58	28-97	3	0-30
95-50-1	MSD 1,2-Dichlorobenzene	122	0.00	U	74.3	61	28-99	2	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)ether	122	0.00	U	81.3	67	32-127	4	0-30
100-51-6	MSD Benzyl alcohol	122	0.00	U	105	86	37-116	1	0-30
95-48-7	MSD o-Cresol	122	0.00	U	95.3	78	34-109	3	0-30
65794-96-9	MSD m,p-Cresols	122	0.00	U	97.8	80	36-120	1	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine N-Nitrosodipropylamine	122	0.00	U	77.6	64	42-118	2	0-30
67-72-1	MSD Hexachloroethane	122	0.00	U	70.9	58	29-94	2	0-30
98-95-3	MSD Nitrobenzene	122	0.00	U	84.0	69	38-123	3	0-30
78-59-1	MSD Isophorone	122	0.00	U	91.5	75	43-120	3	0-30
88-75-5	MSD 2-Nitrophenol	122	0.00	U	91.6	75	39-115	5	0-30
105-67-9	MSD 2,4-Dimethylphenol	122	0.00	U	85.4	70	39-107	3	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	122	0.00	U	96.6	79	42-118	3	0-30
120-83-2	MSD 2,4-Dichlorophenol	122	0.00	U	90.2	74	40-111	3	0-30
65-85-0	MSD Benzoic acid	244	0.00	U	138	57	17-95	2	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Matrix Spike Duplicate

Client ID: CASA-18-147999MSD

Matrix: W

Lab Sample ID 1203917435

Instrument: MSD5.I

Analysis Date: 11/13/2017 18:48

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

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	122	0.00 U	129	106	44-138	3	0-30
87-68-3	MSD Hexachlorobutadiene	122	0.00 U	61.3	50	26-98	3	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	122	0.00 U	102	83	41-122	5	0-30
91-57-6	MSD 2-Methylnaphthalene	122	0.00 U	72.8	60	29-109	4	0-30
91-20-3	MSD Naphthalene	122	0.00 U	74.2	61	31-108	5	0-30
90-12-0	MSD 1-Methylnaphthalene	122	0.00 U	75.1	62	33-112	6	0-30
77-47-4	MSD Hexachlorocyclopentadiene	122	0.00 U	39.0	32	26-79	9	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	122	0.00 U	84.7	69	39-124	2	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	122	0.00 U	93.6	77	42-120	4	0-30
91-58-7	MSD 2-Chloronaphthalene	122	0.00 U	72.0	59	29-113	4	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	122	0.00 U	93.6	77	41-121	3	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	122	0.00 U	140	114	42-144	1	0-30
131-11-3	MSD Dimethylphthalate	122	0.00 U	103	85	45-128	4	0-30
606-20-2	MSD 2,6-Dinitrotoluene	122	0.00 U	106	87	46-124	3	0-30
121-14-2	MSD 2,4-Dinitrotoluene	122	0.00 U	105	86	45-125	4	0-30
208-96-8	MSD Acenaphthylene	122	0.00 U	86.0	71	35-120	3	0-30
83-32-9	MSD Acenaphthene	122	0.00 U	90.0	74	35-117	2	0-30
51-28-5	MSD 2,4-Dinitrophenol	122	0.00 U	40.5	33	27-122	13	0-30
132-64-9	MSD Dibenzofuran	122	0.00 U	87.5	72	38-113	3	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	122	0.00 U	88.8	73	40-128	5	0-30
84-66-2	MSD Diethylphthalate	122	0.00 U	96.2	79	43-127	6	0-30
100-02-7	MSD 4-Nitrophenol	122	0.00 U	76.0	62	17-85	1	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Matrix Spike Duplicate

Client ID: CASA-18-147999MSD

Matrix: W

Lab Sample ID 1203917435

Instrument: MSD5.I

Analysis Date: 11/13/2017 18:48

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

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	122	0.00 U	85.5	70	39-117	5	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	122	0.00 U	91.8	75	39-121	2	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	122	0.00 U	122	100	30-133	0	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	122	0.00 U	67.5	55	32-126	3	0-30
122-39-4	MSD Diphenylamine	122	0.00 U	86.4	71	37-118	4	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	122	0.00 U	85.6	70	38-120	5	0-30
101-55-3	MSD 4-Bromophenylphenylether	122	0.00 U	90.3	74	39-121	7	0-30
118-74-1	MSD Hexachlorobenzene	122	0.00 U	86.8	71	40-118	7	0-30
87-86-5	MSD Pentachlorophenol	122	0.00 U	63.7	52	35-121	4	0-30
85-01-8	MSD Phenanthrene	122	0.00 U	94.6	78	40-115	6	0-30
120-12-7	MSD Anthracene	122	0.00 U	94.1	77	38-120	9	0-30
84-74-2	MSD Di-n-butylphthalate	122	0.00 U	96.0	79	41-128	9	0-30
206-44-0	MSD Fluoranthene	122	0.00 U	101	83	41-119	8	0-30
129-00-0	MSD Pyrene	122	0.00 U	88.6	73	35-128	9	0-30
85-68-7	MSD Butylbenzylphthalate	122	0.00 U	97.2	80	40-129	6	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	122	0.00 U	94.9	78	38-131	9	0-30
56-55-3	MSD Benzo(a)anthracene	122	0.00 U	102	83	39-120	8	0-30
218-01-9	MSD Chrysene	122	0.00 U	102	84	41-124	7	0-30
117-84-0	MSD Di-n-octylphthalate	122	0.00 U	99.0	81	37-134	7	0-30
205-99-2	MSD Benzo(b)fluoranthene	122	0.00 U	102	84	31-122	8	0-30
207-08-9	MSD Benzo(k)fluoranthene	122	0.00 U	100	82	33-123	9	0-30
50-32-8	MSD Benzo(a)pyrene	122	0.00 U	101	83	32-118	8	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-787

Sample Type: Matrix Spike Duplicate

Client ID: CASA-18-147999MSD

Matrix: W

Lab Sample ID 1203917435

Instrument: MSD5.I

Analysis Date: 11/13/2017 18:48

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1717962

Inj. Vol: 1 uL

Batch ID: 1717963

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
193-39-5	MSD Indeno(1,2,3-cd)pyrene	122	0.00	U	91.8	75	27-121	20	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	122	0.00	U	102	83	30-125	11	0-30
191-24-2	MSD Benzo(ghi)perylene	122	0.00	U	90.0	74	24-126	15	0-30
123-91-1	MSD 1,4-Dioxane	122	0.00	U	104	86	24-110	1	0-30
930-55-2	MSD N-Nitrosopyrrolidine	122	0.00	U	116	95	47-119	1	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	122	0.00	U	70.5	58	32-101	5	0-30
1912-24-9	MSD Atrazine	122	0.00	U	109	89	42-129	8	0-30
92-87-5	MSD Benzidine	244	0.00	U	129	53	15-130	93 *	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	122	0.00	U	106	87	34-124	1	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	122	0.00	U	70.9	58	26-102	5	0-30

Method Blank Summary

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SDG Number:	2018-787	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1717962	Instrument ID:	MSD5.I	Data File:	s111317.B\s5k1310.D
Lab Sample ID:	1203917432	Prep Date:	11/13/2017 05:43	Analyzed:	11/13/17 14:44
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 1717962	1203917433	s111317.B\s5k1311.D	11/13/17	1514
02 CASA-18-147999MS	1203917434	s111317.B\s5k1317.D	11/13/17	1818
03 CASA-18-147999MSD	1203917435	s111317.B\s5k1318.D	11/13/17	1848
04 CAMO-18-148075	437515002	s111317.B\s5k1324.D	11/13/17	2151
05 CAMO-18-148076	437515005	s111317.B\s5k1325.D	11/13/17	2221

Quality Control Data

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-787
Lab Sample ID: 1203917432
Client Sample: QC for batch 1717962
Client ID: MB for batch 1717962
Batch ID: 1717963
Run Date: 11/13/2017 14:44
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1310.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
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	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
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	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

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Sample Summary**

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SDG Number: 2018-787
Lab Sample ID: 1203917432
Client Sample: QC for batch 1717962
Client ID: MB for batch 1717962
Batch ID: 1717963
Run Date: 11/13/2017 14:44
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1310.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

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SDG Number: 2018-787
Lab Sample ID: 1203917432
Client Sample: QC for batch 1717962
Client ID: MB for batch 1717962
Batch ID: 1717963
Run Date: 11/13/2017 14:44
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1310.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	49.6	100	ug/L 50	(32%-124%)
2-Fluorobiphenyl	17.3	50.0	ug/L 35	(32%-112%)
2-Fluorophenol	39.7	100	ug/L 40	(15%-88%)
Nitrobenzene-d5	28.0	50.0	ug/L 56	(36%-115%)
Phenol-d5	28.0	100	ug/L 28	(15%-91%)
p-Terphenyl-d14	36.3	50.0	ug/L 73	(36%-121%)

Tentatively Identified Compound Summary

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

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SDG Number: 2018-787
Lab Sample ID: 1203917433
Client Sample: QC for batch 1717962
Client ID: LCS for batch 1717962
Batch ID: 1717963
Run Date: 11/13/2017 15:14
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1311.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		29.1	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		30.1	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		30.7	ug/L	3.00	10.0
122-66-7	Azobenzene		35.8	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		29.9	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		29.7	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		28.6	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		31.5	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		39.3	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		40.9	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		36.8	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		40.3	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		37.3	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol	J	15.2	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		47.5	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		46.5	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		30.0	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		38.4	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		26.3	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		30.6	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		39.4	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		45.1	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		37.4	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		44.5	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		57.0	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		37.7	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		18.3	ug/L	3.00	10.0
83-32-9	Acenaphthene		36.1	ug/L	0.300	1.00
208-96-8	Acenaphthylene		35.4	ug/L	0.300	1.00
62-53-3	Aniline		42.5	ug/L	4.20	10.0
120-12-7	Anthracene		41.2	ug/L	0.300	1.00
1912-24-9	Atrazine		48.7	ug/L	3.00	10.0
92-87-5	Benzidine		40.0	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		46.8	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		46.1	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		45.8	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		42.9	ug/L	0.300	1.00

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-787
Lab Sample ID: 1203917433
Client Sample: QC for batch 1717962
Client ID: LCS for batch 1717962
Batch ID: 1717963
Run Date: 11/13/2017 15:14
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1311.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		44.8	ug/L	0.300	1.00
65-85-0	Benzoic acid		35.2	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		41.1	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		44.0	ug/L	3.00	10.0
218-01-9	Chrysene		47.1	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		42.8	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		43.3	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		47.7	ug/L	0.300	1.00
132-64-9	Dibenzofuran		35.6	ug/L	3.00	10.0
84-66-2	Diethylphthalate		44.8	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		46.1	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		37.6	ug/L	3.00	10.0
206-44-0	Fluoranthene		44.0	ug/L	0.300	1.00
86-73-7	Fluorene		35.6	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		37.6	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		24.9	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		15.8	ug/L	3.00	10.0
67-72-1	Hexachloroethane		28.5	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		45.9	ug/L	0.300	1.00
78-59-1	Isophorone		39.0	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		27.2	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		33.8	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		49.4	ug/L	3.00	10.0
91-20-3	Naphthalene		31.3	ug/L	0.300	1.00
98-95-3	Nitrobenzene		36.1	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		24.0	ug/L	3.00	10.0
85-01-8	Phenanthrene		40.8	ug/L	0.300	1.00
108-95-2	Phenol		17.7	ug/L	3.00	10.0
129-00-0	Pyrene		42.1	ug/L	0.300	1.00
110-86-1	Pyridine		21.3	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		34.5	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		41.8	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		41.3	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		43.5	ug/L	3.00	10.0

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Sample Summary**

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SDG Number: 2018-787	Matrix: WATER
Lab Sample ID: 1203917433	
Client Sample: QC for batch 1717962	Client: ARSL004
Client ID: LCS for batch 1717962	Method: SW846 3510C/8270D
Batch ID: 1717963	Inst: MSD5.I
Run Date: 11/13/2017 15:14	Analyst: JMB3
Prep Date: 11/13/2017 05:43	Aliquot: 1000 mL
Data File: s111317.B\s5k1311.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		35.7	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		64.2	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		37.2	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		41.8	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		54.3	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	75.5	100	ug/L	76	(32%-124%)
2-Fluorobiphenyl	33.0	50.0	ug/L	66	(32%-112%)
2-Fluorophenol	49.7	100	ug/L	50	(15%-88%)
Nitrobenzene-d5	35.5	50.0	ug/L	71	(36%-115%)
Phenol-d5	32.9	100	ug/L	33	(15%-91%)
p-Terphenyl-d14	44.1	50.0	ug/L	88	(36%-121%)

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-787
Lab Sample ID: 1203917434
Client Sample: QC for batch 1717962
Client ID: CASA-18-147999MS
Batch ID: 1717963
Run Date: 11/13/2017 18:18
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1317.D

Date Collected: 11/06/2017 11:17
Date Received: 11/08/2017 09:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 410 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		73.8	ug/L	7.32	24.4
120-82-1	1,2,4-Trichlorobenzene		74.8	ug/L	7.32	24.4
95-50-1	1,2-Dichlorobenzene		75.6	ug/L	7.32	24.4
122-66-7	Azobenzene		89.7	ug/L	7.32	24.4
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		74.9	ug/L	7.32	24.4
106-46-7	1,4-Dichlorobenzene		73.1	ug/L	7.32	24.4
123-91-1	1,4-Dioxane		105	ug/L	7.32	24.4
90-12-0	1-Methylnaphthalene		79.8	ug/L	0.732	2.44
58-90-2	2,3,4,6-Tetrachlorophenol		93.2	ug/L	7.32	24.4
95-95-4	2,4,5-Trichlorophenol		97.2	ug/L	7.32	24.4
88-06-2	2,4,6-Trichlorophenol		86.4	ug/L	7.32	24.4
120-83-2	2,4-Dichlorophenol		93.0	ug/L	7.32	24.4
105-67-9	2,4-Dimethylphenol		88.0	ug/L	7.32	24.4
51-28-5	2,4-Dinitrophenol	J	35.4	ug/L	12.2	48.8
121-14-2	2,4-Dinitrotoluene		110	ug/L	7.32	24.4
606-20-2	2,6-Dinitrotoluene		110	ug/L	7.32	24.4
91-58-7	2-Chloronaphthalene		74.9	ug/L	1.00	2.44
95-57-8	2-Chlorophenol		91.1	ug/L	7.32	24.4
534-52-1	2-Methyl-4,6-dinitrophenol		65.7	ug/L	7.32	24.4
91-57-6	2-Methylnaphthalene		76.1	ug/L	0.732	2.44
88-75-5	2-Nitrophenol		95.9	ug/L	7.32	24.4
91-94-1	3,3'-Dichlorobenzidine		107	ug/L	7.32	24.4
101-55-3	4-Bromophenylphenylether		96.6	ug/L	7.32	24.4
59-50-7	Parachlorometa cresol		107	ug/L	7.32	24.4
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		133	ug/L	8.05	24.4
7005-72-3	4-Chlorophenylphenylether		94.0	ug/L	7.32	24.4
100-02-7	4-Nitrophenol		75.6	ug/L	7.32	24.4
83-32-9	Acenaphthene		92.1	ug/L	0.732	2.44
208-96-8	Acenaphthylene		88.4	ug/L	0.732	2.44
62-53-3	Aniline		96.8	ug/L	10.2	24.4
120-12-7	Anthracene		103	ug/L	0.732	2.44
1912-24-9	Atrazine		118	ug/L	7.32	24.4
92-87-5	Benzidine		46.8	ug/L	9.51	24.4
56-55-3	Benzo(a)anthracene		110	ug/L	0.732	2.44
50-32-8	Benzo(a)pyrene		110	ug/L	0.732	2.44
205-99-2	Benzo(b)fluoranthene		111	ug/L	0.732	2.44
191-24-2	Benzo(ghi)perylene		105	ug/L	0.732	2.44

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-787
Lab Sample ID: 1203917434
Client Sample: QC for batch 1717962
Client ID: CASA-18-147999MS
Batch ID: 1717963
Run Date: 11/13/2017 18:18
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1317.D

Date Collected: 11/06/2017 11:17
Date Received: 11/08/2017 09:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 410 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		110	ug/L	0.732	2.44
65-85-0	Benzoic acid		141	ug/L	14.6	48.8
100-51-6	Benzyl alcohol		105	ug/L	7.32	24.4
85-68-7	Butylbenzylphthalate		104	ug/L	7.32	24.4
218-01-9	Chrysene		110	ug/L	0.732	2.44
84-74-2	Di-n-butylphthalate		105	ug/L	7.32	24.4
117-84-0	Di-n-octylphthalate		106	ug/L	7.32	24.4
53-70-3	Dibenzo(a,h)anthracene		113	ug/L	0.732	2.44
132-64-9	Dibenzofuran		90.0	ug/L	7.32	24.4
84-66-2	Diethylphthalate		102	ug/L	7.32	24.4
131-11-3	Dimethylphthalate		108	ug/L	7.32	24.4
88-85-7	Dinoseb	U	7.32	ug/L	7.32	24.4
122-39-4	Diphenylamine		90.0	ug/L	7.32	24.4
206-44-0	Fluoranthene		109	ug/L	0.732	2.44
86-73-7	Fluorene		89.8	ug/L	0.732	2.44
118-74-1	Hexachlorobenzene		92.8	ug/L	7.32	24.4
87-68-3	Hexachlorobutadiene		63.4	ug/L	7.32	24.4
77-47-4	Hexachlorocyclopentadiene		35.8	ug/L	7.32	24.4
67-72-1	Hexachloroethane		72.1	ug/L	7.32	24.4
193-39-5	Indeno(1,2,3-cd)pyrene		112	ug/L	0.732	2.44
78-59-1	Isophorone		94.2	ug/L	8.54	24.4
62-75-9	N-Methyl-N-nitrosomethylamine		82.6	ug/L	7.32	24.4
924-16-3	N-Nitrosodi-n-butylamine	U	7.32	ug/L	7.32	24.4
55-18-5	N-Nitrosodiethylamine	U	7.32	ug/L	7.32	24.4
621-64-7	N-Nitrosodi-n-propylamine		79.3	ug/L	7.32	24.4
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		117	ug/L	7.32	24.4
91-20-3	Naphthalene		78.2	ug/L	0.732	2.44
98-95-3	Nitrobenzene		86.3	ug/L	7.32	24.4
608-93-5	Pentachlorobenzene	U	7.32	ug/L	7.32	24.4
87-86-5	Pentachlorophenol		66.6	ug/L	7.32	24.4
85-01-8	Phenanthrene		100	ug/L	0.732	2.44
108-95-2	Phenol		68.3	ug/L	7.32	24.4
129-00-0	Pyrene		96.8	ug/L	0.732	2.44
110-86-1	Pyridine		45.9	ug/L	7.32	24.4
108-60-1	bis(2-Chloro-1-methylethyl)ether		84.6	ug/L	7.32	24.4
111-91-1	bis(2-Chloroethoxy)methane		99.5	ug/L	7.32	24.4
111-44-4	bis(2-Chloroethyl) ether		96.5	ug/L	7.32	24.4
117-81-7	bis(2-Ethylhexyl)phthalate		104	ug/L	7.32	24.4

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-787
Lab Sample ID: 1203917434
Client Sample: QC for batch 1717962
Client ID: CASA-18-147999MS
Batch ID: 1717963
Run Date: 11/13/2017 18:18
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1317.D

Date Collected: 11/06/2017 11:17
Date Received: 11/08/2017 09:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 410 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
65794-96-9	m,p-Cresols		98.5	ug/L	9.02	24.4
99-09-2	3-Nitroaniline		141	ug/L	7.32	24.4
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		98.1	ug/L	7.32	24.4
88-74-4	2-Nitroaniline		96.4	ug/L	7.32	24.4
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		121	ug/L	7.32	24.4
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	174	244	ug/L	71	(32%-124%)
2-Fluorobiphenyl	84.1	122	ug/L	69	(32%-112%)
2-Fluorophenol	155	244	ug/L	63	(15%-88%)
Nitrobenzene-d5	86.5	122	ug/L	71	(36%-115%)
Phenol-d5	128	244	ug/L	53	(15%-91%)
p-Terphenyl-d14	106	122	ug/L	87	(36%-121%)

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

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SDG Number: 2018-787
Lab Sample ID: 1203917435
Client Sample: QC for batch 1717962
Client ID: CASA-18-147999MSD
Batch ID: 1717963
Run Date: 11/13/2017 18:48
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1318.D

Date Collected: 11/06/2017 11:17
Date Received: 11/08/2017 09:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 410 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		70.5	ug/L	7.32	24.4
120-82-1	1,2,4-Trichlorobenzene		70.9	ug/L	7.32	24.4
95-50-1	1,2-Dichlorobenzene		74.3	ug/L	7.32	24.4
122-66-7	Azobenzene		85.6	ug/L	7.32	24.4
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		73.9	ug/L	7.32	24.4
106-46-7	1,4-Dichlorobenzene		70.6	ug/L	7.32	24.4
123-91-1	1,4-Dioxane		104	ug/L	7.32	24.4
90-12-0	1-Methylnaphthalene		75.1	ug/L	0.732	2.44
58-90-2	2,3,4,6-Tetrachlorophenol		88.8	ug/L	7.32	24.4
95-95-4	2,4,5-Trichlorophenol		93.6	ug/L	7.32	24.4
88-06-2	2,4,6-Trichlorophenol		84.7	ug/L	7.32	24.4
120-83-2	2,4-Dichlorophenol		90.2	ug/L	7.32	24.4
105-67-9	2,4-Dimethylphenol		85.4	ug/L	7.32	24.4
51-28-5	2,4-Dinitrophenol	J	40.5	ug/L	12.2	48.8
121-14-2	2,4-Dinitrotoluene		105	ug/L	7.32	24.4
606-20-2	2,6-Dinitrotoluene		106	ug/L	7.32	24.4
91-58-7	2-Chloronaphthalene		72.0	ug/L	1.00	2.44
95-57-8	2-Chlorophenol		88.7	ug/L	7.32	24.4
534-52-1	2-Methyl-4,6-dinitrophenol		67.5	ug/L	7.32	24.4
91-57-6	2-Methylnaphthalene		72.8	ug/L	0.732	2.44
88-75-5	2-Nitrophenol		91.6	ug/L	7.32	24.4
91-94-1	3,3'-Dichlorobenzidine		106	ug/L	7.32	24.4
101-55-3	4-Bromophenylphenylether		90.3	ug/L	7.32	24.4
59-50-7	Parachlorometa cresol		102	ug/L	7.32	24.4
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		129	ug/L	8.05	24.4
7005-72-3	4-Chlorophenylphenylether		91.8	ug/L	7.32	24.4
100-02-7	4-Nitrophenol		76.0	ug/L	7.32	24.4
83-32-9	Acenaphthene		90.0	ug/L	0.732	2.44
208-96-8	Acenaphthylene		86.0	ug/L	0.732	2.44
62-53-3	Aniline		104	ug/L	10.2	24.4
120-12-7	Anthracene		94.1	ug/L	0.732	2.44
1912-24-9	Atrazine		109	ug/L	7.32	24.4
92-87-5	Benzidine		129	ug/L	9.51	24.4
56-55-3	Benzo(a)anthracene		102	ug/L	0.732	2.44
50-32-8	Benzo(a)pyrene		101	ug/L	0.732	2.44
205-99-2	Benzo(b)fluoranthene		102	ug/L	0.732	2.44
191-24-2	Benzo(ghi)perylene		90.0	ug/L	0.732	2.44

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

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SDG Number: 2018-787
Lab Sample ID: 1203917435
Client Sample: QC for batch 1717962
Client ID: CASA-18-147999MSD
Batch ID: 1717963
Run Date: 11/13/2017 18:48
Prep Date: 11/13/2017 05:43
Data File: s111317.B\s5k1318.D

Date Collected: 11/06/2017 11:17
Date Received: 11/08/2017 09:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 410 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		100	ug/L	0.732	2.44
65-85-0	Benzoic acid		138	ug/L	14.6	48.8
100-51-6	Benzyl alcohol		105	ug/L	7.32	24.4
85-68-7	Butylbenzylphthalate		97.2	ug/L	7.32	24.4
218-01-9	Chrysene		102	ug/L	0.732	2.44
84-74-2	Di-n-butylphthalate		96.0	ug/L	7.32	24.4
117-84-0	Di-n-octylphthalate		99.0	ug/L	7.32	24.4
53-70-3	Dibenzo(a,h)anthracene		102	ug/L	0.732	2.44
132-64-9	Dibenzofuran		87.5	ug/L	7.32	24.4
84-66-2	Diethylphthalate		96.2	ug/L	7.32	24.4
131-11-3	Dimethylphthalate		103	ug/L	7.32	24.4
88-85-7	Dinoseb	U	7.32	ug/L	7.32	24.4
122-39-4	Diphenylamine		86.4	ug/L	7.32	24.4
206-44-0	Fluoranthene		101	ug/L	0.732	2.44
86-73-7	Fluorene		85.5	ug/L	0.732	2.44
118-74-1	Hexachlorobenzene		86.8	ug/L	7.32	24.4
87-68-3	Hexachlorobutadiene		61.3	ug/L	7.32	24.4
77-47-4	Hexachlorocyclopentadiene		39.0	ug/L	7.32	24.4
67-72-1	Hexachloroethane		70.9	ug/L	7.32	24.4
193-39-5	Indeno(1,2,3-cd)pyrene		91.8	ug/L	0.732	2.44
78-59-1	Isophorone		91.5	ug/L	8.54	24.4
62-75-9	N-Methyl-N-nitrosomethylamine		82.4	ug/L	7.32	24.4
924-16-3	N-Nitrosodi-n-butylamine	U	7.32	ug/L	7.32	24.4
55-18-5	N-Nitrosodiethylamine	U	7.32	ug/L	7.32	24.4
621-64-7	N-Nitrosodi-n-propylamine		77.6	ug/L	7.32	24.4
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		116	ug/L	7.32	24.4
91-20-3	Naphthalene		74.2	ug/L	0.732	2.44
98-95-3	Nitrobenzene		84.0	ug/L	7.32	24.4
608-93-5	Pentachlorobenzene	U	7.32	ug/L	7.32	24.4
87-86-5	Pentachlorophenol		63.7	ug/L	7.32	24.4
85-01-8	Phenanthrene		94.6	ug/L	0.732	2.44
108-95-2	Phenol		66.2	ug/L	7.32	24.4
129-00-0	Pyrene		88.6	ug/L	0.732	2.44
110-86-1	Pyridine		75.6	ug/L	7.32	24.4
108-60-1	bis(2-Chloro-1-methylethyl)ether		81.3	ug/L	7.32	24.4
111-91-1	bis(2-Chloroethoxy)methane		96.6	ug/L	7.32	24.4
111-44-4	bis(2-Chloroethyl) ether		94.9	ug/L	7.32	24.4
117-81-7	bis(2-Ethylhexyl)phthalate		94.9	ug/L	7.32	24.4

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-787	Date Collected: 11/06/2017 11:17	Matrix: W
Lab Sample ID: 1203917435	Date Received: 11/08/2017 09:00	
Client Sample: QC for batch 1717962	Client: ARSL004	Project: QC
Client ID: CASA-18-147999MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1717963	Inst: MSD5.I	Dilution: 1
Run Date: 11/13/2017 18:48	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 11/13/2017 05:43	Aliquot: 410 mL	Final Volume: 1 mL
Data File: s111317.B\s5k1318.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		97.8	ug/L	9.02	24.4
99-09-2	3-Nitroaniline		140	ug/L	7.32	24.4
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		95.3	ug/L	7.32	24.4
88-74-4	2-Nitroaniline		93.6	ug/L	7.32	24.4
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		122	ug/L	7.32	24.4
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	167	244	ug/L	68	(32%-124%)
2-Fluorobiphenyl	82.3	122	ug/L	67	(32%-112%)
2-Fluorophenol	153	244	ug/L	63	(15%-88%)
Nitrobenzene-d5	84.1	122	ug/L	69	(36%-115%)
Phenol-d5	127	244	ug/L	52	(15%-91%)
p-Terphenyl-d14	98.2	122	ug/L	81	(36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-787
Work Order #: 437515**

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: 1718030

Prep Batch Number: 1718029

Sample Analysis

Sample ID	Client ID
437515001	437515001 (CAMO-18-148059)
437515004	437515004 (CAMO-18-148060)
1203917600	Interference Check Sample (ICS)
1203917596	Method Blank (MB)
1203917597	Laboratory Control Sample (LCS)
1203917598	437515001(CAMO-18-148059) Matrix Spike (MS)
1203917599	437515001(CAMO-18-148059) 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

There was a mis-injection of IPB001 due to low volume in the vial.

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 437515001 (CAMO-18-148059) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

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

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: 2018-787 GEL Work Order: 437515

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: Michael Penny

Date: 16 NOV 2017

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1718029Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148059Date Received: 09-NOV-17GEL Job No (SDG): 2018-787GEL Sample ID: 437515001Date Filtered: 10-NOV-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	0.401	ug/L		1	15-NOV-17 12:36	per1115027a
	Perchlorate Isotope Ratio			2.88			1	15-NOV-17 12:36	per1115027a
14797-73-0	Perchlorate-101	.05	.2	0.403	ug/L		1	15-NOV-17 12:36	per1115027a
	Perchlorate-O(18)			0.508	ug/L		1	15-NOV-17 12:36	per1115027a

^ 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: 1718029Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148060Date Received: 09-NOV-17GEL Job No (SDG): 2018-787GEL Sample ID: 437515004Date Filtered: 10-NOV-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	0.381	ug/L		1	15-NOV-17 13:01	per1115030a
	Perchlorate Isotope Ratio			3.13			1	15-NOV-17 13:01	per1115030a
14797-73-0	Perchlorate-101	.05	.2	0.352	ug/L		1	15-NOV-17 13:01	per1115030a
	Perchlorate-O(18)			0.495	ug/L		1	15-NOV-17 13:01	per1115030a

^ 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): 2018-787

Extract Batch Code: 1718029

Date Filtered: 10-NOV-17

Matrix: WATER

Sample ID: 1203917597

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.219	ug/L	110		85 - 115
Perchlorate Isotope Ratio		3.31				-
Perchlorate-101	0.200	.192	ug/L	96		85 - 115
Perchlorate-O(18)		.54	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): 2018-787

Extract Batch Code: 1718029

Date Extracted: 10-NOV-17

GEL MS/PS ID: 1203917598

Client ID: CAMO-18-148059

GEL MSD/PSD ID: 1203917599

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	0.401	ug/L	0.625	112	.6	100	4	30	75 - 125
Perchlorate Isotope Ratio	0	2.88		3.14		2.8		12		-
Perchlorate-101	0.200	0.403	ug/L	0.574	86	.619	108	8	30	75 - 125
Perchlorate-O(18)	0	0.508	ug/L	0.480		.502		5		-

^ 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: 1718029Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 10-NOV-17GEL Job No (SDG): 2018-787GEL Sample ID: 1203917596Date Filtered: 10-NOV-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	15-NOV-17 10:36	per1115013a
	Perchlorate Isotope Ratio						1	15-NOV-17 10:36	per1115013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	15-NOV-17 10:36	per1115013a
	Perchlorate-O(18)			0.512	ug/L		1	15-NOV-17 10:36	per1115013a

^ 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 LLC

Client Sample No.

LCSLab Code: GELDate Received: 10-NOV-17Instrument: LCMSMSGEL Job No (SDG): 2018-787Method: EPA 6850 ModifiedGEL Sample ID: 1203917597Matrix: WATERDate Filtered: 10-NOV-17Extraction Batch ID: 1718029Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL%Solids: Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.219	ug/L		1	15-NOV-17 10:44	per1115014a
	Perchlorate Isotope Ratio			3.31			1	15-NOV-17 10:44	per1115014a
14797-73-0	Perchlorate-101	.05	.2	0.192	ug/L	J	1	15-NOV-17 10:44	per1115014a
	Perchlorate-O(18)			0.540	ug/L		1	15-NOV-17 10:44	per1115014a

^ 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: 1718029Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-787GEL Sample ID: 1203917600Date Filtered: 10-NOV-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	0.226	ug/L		1	15-NOV-17 10:53	per1115015a
	Perchlorate Isotope Ratio			2.95			1	15-NOV-17 10:53	per1115015a
14797-73-0	Perchlorate-101	.05	.2	0.221	ug/L		1	15-NOV-17 10:53	per1115015a
	Perchlorate-O(18)			0.570	ug/L		1	15-NOV-17 10:53	per1115015a

^ 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: 1718029Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148059MSDate Received: 09-NOV-17GEL Job No (SDG): 2018-787GEL Sample ID: 1203917598Date Filtered: 10-NOV-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	0.625	ug/L		1	15-NOV-17 12:44	per1115028a
	Perchlorate Isotope Ratio			3.14			1	15-NOV-17 12:44	per1115028a
14797-73-0	Perchlorate-101	.05	.2	0.574	ug/L		1	15-NOV-17 12:44	per1115028a
	Perchlorate-O(18)			0.480	ug/L		1	15-NOV-17 12:44	per1115028a

^ 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: 1718029Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148059MSDDate Received: 09-NOV-17GEL Job No (SDG): 2018-787GEL Sample ID: 1203917599Date Filtered: 10-NOV-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	0.600	ug/L		1	15-NOV-17 12:53	per1115029a
	Perchlorate Isotope Ratio			2.8			1	15-NOV-17 12:53	per1115029a
14797-73-0	Perchlorate-101	.05	.2	0.619	ug/L		1	15-NOV-17 12:53	per1115029a
	Perchlorate-O(18)			0.502	ug/L		1	15-NOV-17 12:53	per1115029a

^ 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 #: 2018-787
Work Order #: 437515

Sample ID	Client ID
437515001	CAMO-18-148059
437515002	CAMO-18-148075
437515004	CAMO-18-148060
437515005	CAMO-18-148076
1203916660	Method Blank (MB) ICP
1203916661	Laboratory Control Sample (LCS)
1203916664	437515001(CAMO-18-148059L) Serial Dilution (SD)
1203916662	437515001(CAMO-18-148059D) Sample Duplicate (DUP)
1203916663	437515001(CAMO-18-148059S) Matrix Spike (MS)
1203916703	Method Blank (MB) ICP-MS
1203916704	Laboratory Control Sample (LCS)
1203916707	437515001(CAMO-18-148059L) Serial Dilution (SD)
1203916705	437515001(CAMO-18-148059D) Sample Duplicate (DUP)
1203916706	437515001(CAMO-18-148059S) Matrix Spike (MS)
1203927528	Method Blank (MB) CVAA
1203927529	Laboratory Control Sample (LCS)
1203927664	437515001(CAMO-18-148059L) Serial Dilution (SD)
1203927662	437515001(CAMO-18-148059D) Sample Duplicate (DUP)
1203927663	437515001(CAMO-18-148059S) Matrix Spike (MS)

Sample Analysis

Samples 437515001,002,004 and 005 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1717707, 1717723, 1721931 and 1723855
Prep Batch :	1717706, 1717722 and 1721929
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 PE 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-ICP was performed on a PE 7300 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 potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 437515001 (CAMO-18-148059) and 437515004 (CAMO-18-148060)-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: 437515001

(CAMO-18-148059)-ICP, ICP-MS and 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

All applicable analytes in the serial dilution (SDILT) demonstrated acceptable correlation to its associated sample and met the established acceptance percent difference criteria.

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

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Qualifier Definition Report for

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

Client SDG: 2018-787 GEL Work Order: 437515

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, 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: 05 DEC 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-787**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437515001**BASIS:** As Received**DATE COLLECTED** 07-NOV-17**CLIENT ID:** CAMO-18-148059**LEVEL:** Low**DATE RECEIVED** 09-NOV-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	11/29/17 11:18	112917W1-4	1721931

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-787

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 437515001

BASIS: As Received

DATE COLLECTED 07-NOV-17

CLIENT ID: CAMO-18-148059

LEVEL: Low

DATE RECEIVED 09-NOV-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	12/04/17 18:38	120417A-1	1717707
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7440-39-3	Barium	32.6	ug/L		1	5	5	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7440-70-2	Calcium	12200	ug/L		50	200	200	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7440-47-3	Chromium	5.88	ug/L	J	3	10	10	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7439-95-4	Magnesium	3950	ug/L		110	300	300	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7439-98-7	Molybdenum	1.17	ug/L		0.2	0.5	0.5	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7440-02-0	Nickel	1.22	ug/L	J	0.6	2	2	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7440-09-7	Potassium	1570	ug/L		50	150	150	1	P	HSC	12/05/17 10:06	120517A-2	1717707
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7631-86-9	Silica	76500	ug/L		53	213	213	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7440-23-5	Sodium	11700	ug/L		100	300	300	1	P	HSC	12/05/17 10:06	120517A-2	1717707
7440-24-6	Strontium	48.7	ug/L		1	5	5	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7440-61-1	Uranium	0.788	ug/L		0.067	0.2	0.2	1	MS	BAJ	11/29/17 07:27	171128-3	1717723
7440-62-2	Vanadium	5.83	ug/L		1	5	5	1	P	HSC	12/04/17 18:38	120417A-1	1717707
7440-66-6	Zinc	5.74	ug/L	J	3.3	10	10	1	P	HSC	12/04/17 18:38	120417A-1	1717707

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-787**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 437515001**BASIS:** As Received**DATE COLLECTED** 07-NOV-17**CLIENT ID:** CAMO-18-148059**LEVEL:** Low**DATE RECEIVED** 09-NOV-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	46.7	mg/L		0.453	1.24	1.24	1		JJ2	12/05/17 13:07		1723855

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717707	1717706	SW846 3005A	50	mL	50	mL	11/09/17	JXM8
1717723	1717722	SW846 3005A	50	mL	50	mL	11/09/17	JXM8
1721931	1721929	EPA 245.1/245.2 Prep	20	mL	20	mL	11/28/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-787**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437515002**BASIS:** As Received**DATE COLLECTED** 07-NOV-17**CLIENT ID:** CAMO-18-148075**LEVEL:** Low**DATE RECEIVED** 09-NOV-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	11/29/17 11:30	112917W1-4	1721931

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1721931	1721929	EPA 245.1/245.2 Prep	20	mL	20	mL	11/28/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-787**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437515004**BASIS:** As Received**DATE COLLECTED** 07-NOV-17**CLIENT ID:** CAMO-18-148060**LEVEL:** Low**DATE RECEIVED** 09-NOV-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	11/29/17 11:32	112917W1-4	1721931

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-787

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 437515004

BASIS: As Received

DATE COLLECTED 07-NOV-17

CLIENT ID: CAMO-18-148060

LEVEL: Low

DATE RECEIVED 09-NOV-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	12/04/17 18:35	120417A-1	1717707
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7440-39-3	Barium	35.3	ug/L		1	5	5	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7440-70-2	Calcium	11100	ug/L		50	200	200	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7440-47-3	Chromium	6.4	ug/L	J	3	10	10	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7439-95-4	Magnesium	4150	ug/L		110	300	300	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7439-98-7	Molybdenum	1.01	ug/L		0.2	0.5	0.5	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7440-09-7	Potassium	2250	ug/L		50	150	150	1	P	HSC	12/05/17 10:03	120517A-2	1717707
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7631-86-9	Silica	77200	ug/L		53	213	213	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7440-23-5	Sodium	10900	ug/L		100	300	300	1	P	HSC	12/05/17 10:03	120517A-2	1717707
7440-24-6	Strontium	44.5	ug/L		1	5	5	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7440-61-1	Uranium	0.905	ug/L		0.067	0.2	0.2	1	MS	BAJ	11/29/17 07:44	171128-3	1717723
7440-62-2	Vanadium	5.08	ug/L		1	5	5	1	P	HSC	12/04/17 18:35	120417A-1	1717707
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	12/04/17 18:35	120417A-1	1717707

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-787**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 437515004**BASIS:** As Received**DATE COLLECTED** 07-NOV-17**CLIENT ID:** CAMO-18-148060**LEVEL:** Low**DATE RECEIVED** 09-NOV-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	44.9	mg/L		0.453	1.24	1.24	1		JJ2	12/05/17 13:07		1723855

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717707	1717706	SW846 3005A	50	mL	50	mL	11/09/17	JXM8
1717723	1717722	SW846 3005A	50	mL	50	mL	11/09/17	JXM8
1721931	1721929	EPA 245.1/245.2 Prep	20	mL	20	mL	11/28/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-787**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437515005**BASIS:** As Received**DATE COLLECTED** 07-NOV-17**CLIENT ID:** CAMO-18-148076**LEVEL:** Low**DATE RECEIVED** 09-NOV-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	11/29/17 11:33	112917W1-4	1721931

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1721931	1721929	EPA 245.1/245.2 Prep	20	mL	20	mL	11/28/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2018-787
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>
1203916660	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1.24	ug/L	+/-5	J	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203916703	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	3.14	ug/L	+/-10	J	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
1203927528	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. 2018-787

Client ID: CAMO-18-148059S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 437515001

Spike ID: 1203916663

<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	4890		68	U	5000	97.8		P
Barium	ug/L	75-125	526		32.6		500	98.7		P
Beryllium	ug/L	75-125	500		1	U	500	100		P
Boron	ug/L	75-125	527		15	U	500	103		P
Calcium	ug/L	75-125	16400		12200		5000	83.7		P
Cobalt	ug/L	75-125	506		1	U	500	101		P
Copper	ug/L	75-125	510		3	U	500	102		P
Iron	ug/L	75-125	4810		30	U	5000	95.9		P
Magnesium	ug/L	75-125	8830		3950		5000	97.6		P
Manganese	ug/L	75-125	502		2	U	500	100		P
Potassium	ug/L	75-125	6070		1570		5000	89.9		P
Silica	ug/L		82600		76500		10700	57.2	N/A	P
Sodium	ug/L	75-125	15900		11700		5000	83.6		P
Strontium	ug/L	75-125	494		48.7		500	89		P
Tin	ug/L	75-125	511		2.5	U	500	102		P
Vanadium	ug/L	75-125	508		5.83		500	100		P
Zinc	ug/L	75-125	492		5.74	J	500	97.2		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-787 Client ID CAMO-18-148059S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 437515001 Spike ID: 1203916706

<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	50.8		1	U	50	101		MS
Arsenic	ug/L	75-125	50.7		2	U	50	98.7		MS
Cadmium	ug/L	75-125	50.5		0.3	U	50	101		MS
Chromium	ug/L	75-125	56.6		5.88	J	50	102		MS
Lead	ug/L	75-125	49.2		0.5	U	50	98.4		MS
Molybdenum	ug/L	75-125	53.5		1.17		50	105		MS
Nickel	ug/L	75-125	51.9		1.22	J	50	101		MS
Selenium	ug/L	75-125	48.9		2	U	50	97.4		MS
Silver	ug/L	75-125	52.3		0.3	U	50	104		MS
Thallium	ug/L	75-125	47.1		0.6	U	50	94.2		MS
Uranium	ug/L	75-125	50.2		0.788		50	98.8		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-787

Client ID: CAMO-18-148059S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 437515001

Spike ID: 1203927663

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	2.01		0.067	U	2	100		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-787

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-18-148059D

Matrix: WATER

Level: Low

Sample ID: 437515001

Duplicate ID: 1203916662

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-20%	32.6		32		1.82		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	12200		12200		.115		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%	3950		3900		1.24		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1570		1500		4.43		P
Silica	ug/L	+/-20%	76500		75700		1.02		P
Sodium	ug/L	+/-20%	11700		11700		.47		P
Strontium	ug/L	+/-20%	48.7		47.9		1.48		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	5.83		5.49		6.16		P
Zinc	ug/L		5.74 J		3.3 U		200		P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-787

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-18-148059D

Matrix: WATER

Level: Low

Sample ID: 437515001

Duplicate ID: 1203916705

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	+/-10	5.88 J		5.92 J		.661		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.17		1.25		6.46		MS
Nickel	ug/L	+/-2	1.22 J		1.19 J		2.48		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	0.788		0.819		3.86		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
–6–
Duplicate Sample Summary

SDG No.: 2018–787**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAMO–18–148059D**Matrix:** WATER**Level:** Low**Sample ID:** 437515001**Duplicate ID:** 1203927662**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

-7-

Laboratory Control Sample Summary

SDG NO. 2018-787

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>
1203916661								
	Aluminum	ug/L	5000	4950		99	80-120	P
	Barium	ug/L	500	494		98.8	80-120	P
	Beryllium	ug/L	500	490		97.9	80-120	P
	Boron	ug/L	500	502		100	80-120	P
	Calcium	ug/L	5000	5010		100	80-120	P
	Cobalt	ug/L	500	505		101	80-120	P
	Copper	ug/L	500	491		98.2	80-120	P
	Iron	ug/L	5000	4810		96.1	80-120	P
	Magnesium	ug/L	5000	5140		103	80-120	P
	Manganese	ug/L	500	498		99.5	80-120	P
	Potassium	ug/L	5000	4800		96	80-120	P
	Silica	ug/L	10700	10000		93.4	80-120	P
	Sodium	ug/L	5000	4660		93.2	80-120	P
	Strontium	ug/L	500	454		90.7	80-120	P
	Tin	ug/L	500	497		99.5	80-120	P
	Vanadium	ug/L	500	491		98.2	80-120	P
	Zinc	ug/L	500	482		96.4	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-787

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>
1203916704								
	Antimony	ug/L	50	49.4		98.7	80-120	MS
	Arsenic	ug/L	50	50.6		101	80-120	MS
	Cadmium	ug/L	50	51.8		104	80-120	MS
	Chromium	ug/L	50	50.9		102	80-120	MS
	Lead	ug/L	50	49.2		98.3	80-120	MS
	Molybdenum	ug/L	50	50.3		101	80-120	MS
	Nickel	ug/L	50	50		99.9	80-120	MS
	Selenium	ug/L	50	50.2		100	80-120	MS
	Silver	ug/L	50	51.2		102	80-120	MS
	Thallium	ug/L	50	47		94.1	80-120	MS
	Uranium	ug/L	50	48.1		96.1	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2018-787

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>
1203927529	Mercury	ug/L	2	2.04		102	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-787

Client ID: CAMO-18-148059L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 437515001

Serial Dilution ID: 1203916664

<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	32.6		31.9		2.104			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	12200		12100		.554		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3950		3740		5.311			P
Manganese	2	U	10	U				P
Potassium	1570		2210		40.837			P
Silica	76500		75600		1.167		10	P
Sodium	11700		11900		1.612		10	P
Strontium	48.7		53.8		10.496			P
Tin	2.5	U	12.5	U				P
Vanadium	5.83		6.01	J	3.084			P
Zinc	5.74	J	30.2	J	426.803			P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-787

Client ID: CAMO-18-148059L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 437515001

Serial Dilution ID: 1203916707

<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	5.88	J	15	U	2.126			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.17		1.4	J	19.333			MS
Nickel	1.22	J	3	U	4.742			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.788		.855	J	8.503			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-787 **Client ID:** CAMO-18-148059L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 437515001 **Serial Dilution ID:** 1203927664

<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 #: 2018-787
Work Order #: 437515**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1717030

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
437515002	CAMO-18-148075
437515005	CAMO-18-148076
1203916271	Method Blank (MB)
1203916272	Laboratory Control Sample (LCS)
1203916414	437514002(CrIN6-18-148628) Sample Duplicate (DUP)
1203916415	437514002(CrIN6-18-148628) 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

Sample 437514002 (CrIN6-18-148628) 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:	Cyanide and Total		
Analytical Batch:	1717583	Method:	WSP-CN(T)
Prep Batch :	1717580	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
437515002	CAMO-18-148075
437515005	CAMO-18-148076
1203916357	Method Blank (MB)
1203916358	Laboratory Control Sample (LCS)
1203916359	437478001(WST05-17-147341) Sample Duplicate (DUP)
1203916361	437478001(WST05-17-147341) Matrix Spike (MS)
1203916363	437478001(WST05-17-147341) Matrix Spike Duplicate (MSD)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 21.

Preparation/Analytical Method Verification

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

Calibration Information

The 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.

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 437478001 (WST05-17-147341) 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.

MS/MSD Relative Percent Difference (RPD) Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1718519

Method: WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
437515001	CAMO-18-148059
437515004	CAMO-18-148060
1203918853	Method Blank (MB)
1203918854	Laboratory Control Sample (LCS)
1203918855	437515004(CAMO-18-148060) Sample Duplicate (DUP)
1203918856	437515004(CAMO-18-148060) 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 437515004 (CAMO-18-148060) 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 1203918855 (CAMO-18-148060DUP), 1203918856 (CAMO-18-148060PS), 437515001 (CAMO-18-148059) and 437515004 (CAMO-18-148060) 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:

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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:	1717818	Method:	NH3
Prep Batch :	1717815	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
437515001	CAMO-18-148059
437515004	CAMO-18-148060
1203916974	Method Blank (MB)
1203916975	Laboratory Control Sample (LCS)
1203916976	437478005(WST05-17-147350) Sample Duplicate (DUP)
1203916977	437478005(WST05-17-147350) 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# 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.

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 437478005 (WST05-17-147350) 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

Sample1203916975 (LCS) 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:

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Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1717811	Method:	TKN
Prep Batch :	1717809	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
437515002	CAMO-18-148075
437515005	CAMO-18-148076
1203916954	Method Blank (MB)
1203916955	Laboratory Control Sample (LCS)
1203916956	437300004(CrIN6-18-148629) Sample Duplicate (DUP)
1203916957	437300004(CrIN6-18-148629) 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# 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 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 437300004 (CrIN6-18-148629) was 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

Samples 1203916954 (MB), 1203916955 (LCS), 1203916956 (CrIN6-18-148629DUP) and 1203916957 (CrIN6-18-148629MS) were 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:

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Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1717805

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
437515001	CAMO-18-148059
437515004	CAMO-18-148060
1203916935	Method Blank (MB)
1203916936	Laboratory Control Sample (LCS)
1203916938	437478001(WST05-17-147341) Sample Duplicate (DUP)
1203916943	437478001(WST05-17-147341) 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# 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+ 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 437478001 (WST05-17-147341) was 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 following samples 1203916938 (WST05-17-147341DUP) and 1203916943 (WST05-17-147341PS) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

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 Phosphorus		
Analytical Batch:	1717814	Method:	PO4
Prep Batch :	1717812	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
437515001	CAMO-18-148059
437515004	CAMO-18-148060
1203916964	Method Blank (MB)
1203916965	Laboratory Control Sample (LCS)
1203916966	437300004(CrIN6-18-148629) Sample Duplicate (DUP)
1203916967	437300004(CrIN6-18-148629) 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# 11.

Preparation/Analytical Method Verification

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

Calibration Information

The 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 437300004 (CrIN6-18-148629) 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: Solids and Total Dissolved

Analytical Batch: 1718225

Method: TDS

Sample Analysis

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

Sample ID	Client ID
437515001	CAMO-18-148059
437515004	CAMO-18-148060
1203918111	Method Blank (MB)
1203918112	Laboratory Control Sample (LCS)
1203918114	437515001(CAMO-18-148059) 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 437515001 (CAMO-18-148059) 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	1203918114 (CAMO-18-148059DUP)	27.5* (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: 1719019

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
437515001	CAMO-18-148059
437515004	CAMO-18-148060
1203920147	Laboratory Control Sample (LCS)
1203920149	437508001(CAMO-18-148114) 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

Sample 437508001 (CAMO-18-148114) was 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: 1717607 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
437515001	CAMO-18-148059
437515004	CAMO-18-148060
1203916416	Laboratory Control Sample (LCS)
1203916417	437515004(CAMO-18-148060) 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

Sample 437515004 (CAMO-18-148060) was 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
1203916417 (CAMO-18-148060DUP)	pH	Received 09-NOV-17, out of holding 07-NOV-17
437515001 (CAMO-18-148059)	pH	Received 09-NOV-17, out of holding 07-NOV-17
437515004 (CAMO-18-148060)	pH	Received 09-NOV-17, out of holding 07-NOV-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: 1717604 **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
437515001	CAMO-18-148059
437515004	CAMO-18-148060
1203916407	Laboratory Control Sample (LCS)
1203916409	437515004(CAMO-18-148060) Sample Duplicate (DUP)
1203916411	437515004(CAMO-18-148060) 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 437515004 (CAMO-18-148060) 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.

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: 2018-787 GEL Work Order: 437515


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: 24 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

Report Date: November 24, 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: 2018-787

Client Sample ID: CAMO-18-148059
Sample ID: 437515001
Matrix: W
Collect Date: 07-NOV-17 11:33
Receive Date: 09-NOV-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	MXL2	11/13/17	2256	1718519	1
Chloride		2.20	0.067	0.200	mg/L		1					
Fluoride		0.163	0.033	0.100	mg/L		1					
Sulfate		3.37	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0211	0.017	0.050	mg/L	1.00	1	KLP1	11/10/17	0927	1717818	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.465	0.017	0.050	mg/L		1	KLP1	11/10/17	1439	1717805	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0452	0.020	0.050	mg/L	1.00	1	KLP1	11/13/17	1418	1717814	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		160	3.40	14.3	mg/L			KLP1	11/14/17	1538	1718225	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		66.9	1.45	4.00	mg/L			RXB5	11/11/17	1418	1717604	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		149	1.00	1.00	umhos/cm		1	VH1	11/21/17	1312	1719019	7
PH "As Received"												
pH at Temp 19.0C	H	7.85	0.010	0.100	SU		1	RXB5	11/11/17	1417	1717607	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	11/10/17	0621	1717815
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	11/13/17	1030	1717812

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 24, 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: 2018-787

Client Sample ID: CAMO-18-148059
Sample ID: 437515001

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 24, 2017

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-787

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148075

Project: ESHL00114

Sample ID: 437515002

Client ID: ARSL004

Matrix: W

Collect Date: 07-NOV-17 11:33

Receive Date: 09-NOV-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	11/14/17	1509	1717030	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	11/10/17	0657	1717583	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/14/17	1358	1717811	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/10/17	0612	1717580
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	11/13/17	1030	1717809

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

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 24, 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: 2018-787

Client Sample ID: CAMO-18-148060
Sample ID: 437515004
Matrix: W
Collect Date: 07-NOV-17 12:46
Receive Date: 09-NOV-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	MXL2	11/13/17	2327	1718519	1
Chloride		1.96	0.067	0.200	mg/L		1					
Fluoride		0.144	0.033	0.100	mg/L		1					
Sulfate		2.27	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	11/10/17	0928	1717818	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.304	0.017	0.050	mg/L		1	KLP1	11/10/17	1440	1717805	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0447	0.020	0.050	mg/L	1.00	1	KLP1	11/13/17	1419	1717814	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		131	3.40	14.3	mg/L			KLP1	11/14/17	1538	1718225	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		67.5	1.45	4.00	mg/L			RXB5	11/11/17	1421	1717604	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		145	1.00	1.00	umhos/cm		1	VH1	11/21/17	1312	1719019	7
PH "As Received"												
pH at Temp 19.4C	H	7.91	0.010	0.100	SU		1	RXB5	11/11/17	1421	1717607	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	11/10/17	0621	1717815
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	11/13/17	1030	1717812

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Certificate of Analysis

Report Date: November 24, 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: 2018-787

Client Sample ID: CAMO-18-148060
Sample ID: 437515004

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 24, 2017

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-787

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148076

Project: ESHL00114

Sample ID: 437515005

Client ID: ARSL004

Matrix: W

Collect Date: 07-NOV-17 12:46

Receive Date: 09-NOV-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	11/14/17	1556	1717030	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	11/10/17	0658	1717583	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/14/17	1359	1717811	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/10/17	0612	1717580
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	11/13/17	1030	1717809

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

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

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 24, 2017

Page 1 of 6

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

Contact: Ms. Nita Patel

Workorder: 437515

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1717030										
QC1203916414	437514002	DUP									
Total Organic Carbon Average		J	0.444	J	0.474	mg/L	6.54	^	(+/-1.00)	TSM	11/14/17 13:35
QC1203916272	LCS										
Total Organic Carbon Average	10.0				10.5	mg/L			105	(80%-120%)	11/14/17 03:14
QC1203916271	MB										
Total Organic Carbon Average			U	ND	mg/L						11/14/17 03:02
QC1203916415	437514002	PS									
Total Organic Carbon Average	10.0	J	0.444		11.3	mg/L			109	(75%-125%)	11/14/17 14:22
Flow Injection Analysis											
Batch	1717583										
QC1203916359	437478001	DUP									
Cyanide, Total		J	3.35	J	3.22	ug/L	3.96	^	(+/-5.00)	AXH3	11/10/17 06:40
QC1203916358	LCS										
Cyanide, Total	50.0				50.2	ug/L			100	(90%-110%)	11/10/17 06:26
QC1203916357	MB										
Cyanide, Total			U	ND	ug/L						11/10/17 06:25
QC1203916361	437478001	MS									
Cyanide, Total	100	J	3.35		105	ug/L			102	(90%-110%)	11/10/17 06:41
QC1203916363	437478001	MSD									
Cyanide, Total	100	J	3.35		104	ug/L	0.957		101	(0%-20%)	11/10/17 06:42

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QC Summary

Workorder: 437515

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1718519										
QC1203918855	437515004	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	11/13/17	23:58
Chloride			1.96		1.96	mg/L	0.0971	(0%-20%)			
Fluoride			0.144		0.143	mg/L	0.556 ^	(+/-0.100)			
Sulfate			2.27		2.21	mg/L	2.97	(0%-20%)			
QC1203918854	LCS										
Bromide	1.25				1.19	mg/L	95	(80%-120%)		11/13/17	17:16
Chloride	5.00				4.64	mg/L	92.8	(80%-120%)			
Fluoride	2.50				2.52	mg/L	101	(80%-120%)			
Sulfate	10.0				9.58	mg/L	95.8	(80%-120%)			
QC1203918853	MB										
Bromide			U		ND	mg/L				11/13/17	16:45
Chloride			U		ND	mg/L					
Fluoride			U		ND	mg/L					
Sulfate			U		ND	mg/L					
QC1203918856	437515004	PS									
Bromide	1.25	U	ND		1.26	mg/L	96.2	(75%-125%)		11/14/17	00:29
Chloride	5.00		1.96		6.68	mg/L	94.5	(75%-125%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1718519										
Fluoride	2.50	0.144		2.62	mg/L		98.9	(75%-125%)	MXL2	11/14/17	00:29
Sulfate	10.0	2.27		11.7	mg/L		94.4	(75%-125%)			
Nutrient Analysis											
Batch	1717805										
QC1203916938	437478001	DUP									
Nitrogen, Nitrate/Nitrite		1.65		1.66	mg/L	0.908		(0%-20%)	KLP1	11/10/17	14:13
QC1203916936	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.901	mg/L		90.1	(90%-110%)		11/10/17	13:55
QC1203916935	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					11/10/17	13:54
QC1203916943	437478001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.329		1.35	mg/L		102	(90%-110%)		11/10/17	14:14
Batch	1717811										
QC1203916956	437300004	DUP									
Nitrogen, Total Kjeldahl		U	ND	J	0.0953	mg/L	200		KLP1	11/14/17	13:33
QC1203916955	LCS										
Nitrogen, Total Kjeldahl	1.00			1.03	mg/L		103	(90%-110%)		11/14/17	13:30
QC1203916954	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					11/14/17	13:29
QC1203916957	437300004	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.05	mg/L		105	(90%-110%)		11/14/17	13:34
Batch	1717814										
QC1203916966	437300004	DUP									
Phosphorus, Total as P		J	0.0238	U	ND	mg/L	200	^	KLP1	11/13/17	13:54

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QC Summary

Workorder: 437515

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1717814										
QC1203916965	LCS										
Phosphorus, Total as P	1.00			1.01	mg/L		101	(80%-124%)	KLP1	11/13/17	13:52
QC1203916964	MB										
Phosphorus, Total as P			J	0.0291	mg/L					11/13/17	13:51
QC1203916967	437300004	MS									
Phosphorus, Total as P	1.00	J	0.0238	0.991	mg/L		96.7	(63%-139%)		11/13/17	13:55
Batch	1717818										
QC1203916976	437478005	DUP									
Nitrogen, Ammonia			0.076	0.0622	mg/L	20 ^		(+/-0.050)	KLP1	11/10/17	09:15
QC1203916975	LCS										
Nitrogen, Ammonia	1.00			1.10	mg/L		110	(90%-110%)		11/10/17	09:53
QC1203916974	MB										
Nitrogen, Ammonia			U	ND	mg/L					11/10/17	09:12
QC1203916977	437478005	MS									
Nitrogen, Ammonia	1.00		0.076	1.06	mg/L		98.4	(90%-110%)		11/10/17	09:16
Solids Analysis											
Batch	1718225										
QC1203918114	437515001	DUP									
Total Dissolved Solids			160	126	mg/L	27.5*		(0%-5%)	KLP1	11/14/17	15:38
QC1203918112	LCS										
Total Dissolved Solids	300			287	mg/L		95.7	(95%-105%)		11/14/17	15:38
QC1203918111	MB										
Total Dissolved Solids			U	ND	mg/L					11/14/17	15:38

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1717604										
QC1203916409	437515004	DUP									
Alkalinity, Total as CaCO3		67.5		67.3	mg/L	0.299		(0%-20%)	RXB5	11/11/17	14:22
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203916407	LCS										
Alkalinity, Total as CaCO3	100			108	mg/L		108	(90%-110%)		11/11/17	13:02
QC1203916411	437515004	MS									
Alkalinity, Total as CaCO3	100	67.5		173	mg/L		105	(80%-120%)		11/11/17	14:23
Batch	1717607										
QC1203916417	437515004	DUP									
pH	H	7.91	H	7.93	SU	0.253		(0%-5%)	RXB5	11/11/17	14:21
QC1203916416	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		11/11/17	13:23
Batch	1719019										
QC1203920149	437508001	DUP									
Conductivity		131		130	umhos/cm	0.0767		(0%-10%)	VH1	11/21/17	13:12
QC1203920147	LCS										
Conductivity	1410			1400	umhos/cm		99.2	(95%-105%)		11/21/17	13:04

Notes:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J Value is estimated
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
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 #: 2018-787
Work Order #: 437515**

Method/Analysis Information

Product: Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1718541

Sample ID	Client ID
437515002	CAMO-18-148075
437515005	CAMO-18-148076
1203918915	Method Blank (MB)
1203918917	Laboratory Control Sample (LCS)
1203918916	437632010(CAMO-18-148111) 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 November 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 1203918915 (MB) and 1203918917 (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: 437632010 (CAMO-18-148111). The QC was from ARSL work order 437632.

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

Samples results 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 1203918917 (LCS) was recounted due to a peak shift. 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: ISOPU
Analytical Method: HASL-300:ISOPU
Analytical Batch Number: 1718543

Sample ID	Client ID
437515002	CAMO-18-148075
1203918921	Method Blank (MB)
1203918923	Laboratory Control Sample (LCS)
1203918922	437632010(CAMO-18-148111) 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 November 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 1203918921 (MB) and 1203918923 (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: 437632010 (CAMO-18-148111). The QC was from ARSL work order 437632.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

Samples (See Below) did not meet the detection limits due to the high standard deviation. When a blank population is performed the MDC is greater than the RDL due to the high standard deviation. The samples were counted the maximum count time of in order to achieve the lowest possible MDAs.

Sample	Analyte	Value
1203918921 (MB)	Plutonium-239/240	Result 0.00818 < MDA 0.0575 > RDL 0.05 pCi/L
1203918922 (CAMO-18-148111DUP)	Plutonium-238	Result -0.00868 < MDA 0.064 > RDL 0.05 pCi/L
	Plutonium-239/240	Result -0.00434 < MDA 0.0914 > RDL 0.05 pCi/L
437515002 (CAMO-18-148075)	Plutonium-239/240	Result 0.00732 < MDA 0.0772 > RDL 0.05 pCi/L

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Samples results 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 1203918922 (CAMO-18-148111DUP) was recounted due to a peak shift. 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: IsoU
Analytical Method: HASL-300:ISOU
Analytical Batch Number: 1718546

Sample ID	Client ID
437515002	CAMO-18-148075
437515005	CAMO-18-148076
1203918932	Method Blank (MB)
1203918934	Laboratory Control Sample (LCS)
1203918933	437632010(CAMO-18-148111) 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 November 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 1203918932 (MB) and 1203918934 (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
1203918932 (MB)	Uranium-233/234, Uranium-235/236 and Uranium-238	Blank result > 1.65 CSU

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

Sample (See Below) did not meet the client's yield requirement. However, there are 400 tracer counts, GEL's standard tracer yield requirements are met, and the client's detection limits are met.

Sample	Analyte	Value
1203918934 (LCS)	Uranium-232 Tracer	43.6* (50%-105%)

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 437632010 (CAMO-18-148111). The QC was from ARSL work order 437632.

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

Samples results 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: ISOPU
Analytical Method: HASL-300:ISOPU
Analytical Batch Number: 1722422

Sample ID	Client ID
437515005	CAMO-18-148076
1203928684	Method Blank (MB)
1203928686	Laboratory Control Sample (LCS)
1203928762	Laboratory Control Sample Duplicate (LCSD)

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 November 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 1203928684 (MB), 1203928686 (LCS) and 1203928762 (LCSD) 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.

Duplication Criteria between LCS and LCSD

The Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) met the duplication acceptance criteria.

Designated QC

A laboratory control sample and a laboratory control sample duplicate, 1203928686 (LCS) and 1203928762 (LCSD), were run with the batch instead of a sample duplicate due to limited sample volume.

RDL Met

Sample (See Below) did not meet the detection limit due to limited sample volume. Sample was counted the maximum count time in order to achieve the lowest MDAs possible.

Sample	Analyte	Value
437515005 (CAMO-18-148076)	Plutonium-239/240	Result 0.00524 < MDA 0.0553 > RDL 0.05 pCi/L

Technical Information:

Holding Time

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

Negative > 3 sigma TPU

Samples results 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.

Recounts

Samples 1203928684 (MB) and 437515005 (CAMO-18-148076) were recounted due to a peak shift. The recounts are 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: **GammaSpec**

Analytical Method: EPA:901.1

Analytical Batch Number: 1717887

Sample ID	Client ID
437515002	CAMO-18-148075
437515005	CAMO-18-148076
1203917194	Method Blank (MB)
1203917196	Laboratory Control Sample (LCS)
1203917195	437515002(CAMO-18-148075) 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 August 2017, January 2017, 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: 437515002 (CAMO-18-148075). The QC was from ARSL work order 437515.

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: 1720044

Sample ID	Client ID
437515002	CAMO-18-148075
437515005	CAMO-18-148076
1203922619	Method Blank (MB)
1203922622	Laboratory Control Sample (LCS)
1203922620	437632002(CAMO-18-148073) Sample Duplicate (DUP)
1203922621	437632002(CAMO-18-148073) 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 1203922619 (MB) and 1203922622 (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: 437632002 (CAMO-18-148073). The QC was from ARSL work order 437632.

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

Samples results 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 437515002 (CAMO-18-148075) 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, 1203922621 (CAMO-18-148073MS), 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:	1720050

Sample ID	Client ID
437515002	CAMO-18-148075
437515005	CAMO-18-148076
1203922639	Method Blank (MB)
1203922643	Laboratory Control Sample (LCS)
1203922640	437508002(CAMO-18-148117) Sample Duplicate (DUP)
1203922641	437508002(CAMO-18-148117) Matrix Spike (MS)
1203922642	437508002(CAMO-18-148117) 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 1203922639 (MB) and 1203922643 (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: 437508002 (CAMO-18-148117). The QC was from ARSL work order 437508.

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

Samples results 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.

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame

until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating, especially to a dull red heat. For this sample set, the prepared planchet was counted for beta activity before being flamed. After flaming, the planchet was counted for alpha activity.

Recounts

Sample 1203922641 (CAMO-18-148117MS) was recounted due to high recovery. The recount is reported.
Sample 437515002 (CAMO-18-148075) was recounted to verify sample results. 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, 1203922641 (CAMO-18-148117MS) and 1203922642 (CAMO-18-148117MSD), 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: 2018-787 GEL Work Order: 437515

The Qualifiers in this report are defined as follows:

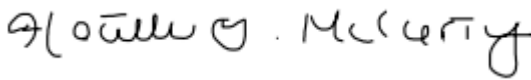
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

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: Heather McCarty

Date: 05 DEC 2017

Title: Analyst II

Sample Data Summary

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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

Report Date: December 5, 2017

Client Sample ID: CAMO-18-148075
Sample ID: 437515002
Matrix: W
Collect Date: 07-NOV-17
Receive Date: 09-NOV-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	0.00694	+/-0.00425	0.0309	0.0131	+/-0.00426	0.050	pCi/L			BXA4	11/25/17	1129	1718541	1
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ISOPU "As Received"

Plutonium-238	U	0.0147	+/-0.0116	0.054	0.022	+/-0.0116	0.050	pCi/L			BXA4	11/25/17	1131	1718543	2
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Plutonium-239/240	U	0.00732	+/-0.0104	0.0772	0.0336	+/-0.0104	0.050	pCi/L							
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IsoU "As Received"

Uranium-234		0.522	+/-0.0396	0.138	0.0653	+/-0.0475	1.00	pCi/L			BXA4	11/26/17	1118	1718546	3
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Uranium-235/236	U	0.0412	+/-0.0146	0.0597	0.0252	+/-0.0147	1.00	pCi/L							
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Uranium-238		0.391	+/-0.0346	0.0809	0.0367	+/-0.0397	0.500	pCi/L							
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Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	-0.436	+/-1.90	6.35	2.81	+/-1.91	8.00	pCi/L			BSW1	11/10/17	1551	1717887	4
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Cobalt-60	U	0.632	+/-1.57	6.46	2.68	+/-1.58	8.00	pCi/L							
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Neptunium-237	U	1.17	+/-2.65	9.97	4.56	+/-2.67		pCi/L							
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Potassium-40	U	47.1	+/-21.5	55.9	22.4	+/-21.6		pCi/L							
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Sodium-22	U	2.53	+/-1.64	7.34	3.14	+/-1.74		pCi/L							
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Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	-0.0466	+/-0.0887	0.359	0.153	+/-0.0887	0.500	pCi/L			LXB3	11/30/17	1307	1720044	5
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WSP-GrossA/B "As Received"

Beta		20.4	+/-1.62	2.19	0.927	+/-2.36	3.00	pCi/L			AXH4	11/28/17	1130	1720050	6
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Alpha	U	0.981	+/-0.709	2.41	0.976	+/-0.714	3.00	pCi/L			AXH4	11/29/17	1140	1720050	7
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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"	1718541	101	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1718543	59.6	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1718546	64.7	(50%-105%)

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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-18-148075

Sample ID: 437515002

Report Date: December 5, 2017

Project: ESHL00114

Client ID: ARSL004

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"							1720044	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

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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-18-148076

Sample ID: 437515005

Matrix: W

Collect Date: 07-NOV-17

Receive Date: 09-NOV-17

Collector: Client

Report Date: December 5, 2017

Project: ESHL00114

Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	0.00198	+/-0.00656	0.0352	0.0149	+/-0.00657	0.050	pCi/L			BXA4	11/25/17	1129	1718541	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	-0.00262	+/-0.00587	0.0387	0.0158	+/-0.00587	0.050	pCi/L			BXA4	12/04/17	1637	1722422	2
Plutonium-239/240	U	0.00524	+/-0.00829	0.0553	0.0241	+/-0.00829	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.634	+/-0.0429	0.125	0.059	+/-0.0529	1.00	pCi/L			BXA4	11/26/17	1118	1718546	3
Uranium-235/236		0.0806	+/-0.0191	0.054	0.0228	+/-0.0195	1.00	pCi/L							
Uranium-238		0.379	+/-0.0332	0.073	0.0331	+/-0.038	0.500	pCi/L							
Rad Gamma Spec Analysis															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	-0.254	+/-1.22	3.93	1.67	+/-1.23	8.00	pCi/L			BSW1	11/11/17	0821	1717887	4
Cobalt-60	U	0.435	+/-1.59	6.20	2.65	+/-1.59	8.00	pCi/L							
Neptunium-237	U	-1.48	+/-3.10	10.9	5.05	+/-3.12		pCi/L							
Potassium-40	U	50.6	+/-20.8	54.4	22.7	+/-21.0		pCi/L							
Sodium-22	U	0.658	+/-1.61	6.34	2.74	+/-1.62		pCi/L							
Rad Gas Flow Proportional Counting															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.0798	+/-0.113	0.449	0.196	+/-0.113	0.500	pCi/L			LXB3	11/29/17	0741	1720044	5
<i>WSP-GrossA/B "As Received"</i>															
Beta		3.39	+/-0.890	2.47	1.07	+/-0.933	3.00	pCi/L			AXH4	11/28/17	1130	1720050	6
Alpha	U	-0.0395	+/-0.677	2.83	1.12	+/-0.677	3.00	pCi/L			AXH4	11/29/17	1140	1720050	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"	1718541	83.7	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1722422	88	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1718546	75.3	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1720044	82.8	(50%-105%)

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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-18-148076

Sample ID: 437515005

Report Date: December 5, 2017

Project: ESHL00114

Client ID: ARSL004

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	

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

GEL LABORATORIES LLC

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QC Summary

Report Date: December 5, 2017

Page 1 of 7

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

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 437515

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1718541										
QC1203918916	437632010	DUP									
Americium-241	U	0.00457	U	0.0127	pCi/L	0.34		(0-1)	BXA4	11/25/17	11:32
	Uncert:	+/-0.00457		+/-0.00732							
	TPU:	+/-0.00457		+/-0.00734							
**Americium-243 Tracer	2.62	2.62		2.69	pCi/L		102	(50%-105%)			
	Uncert:	+/-0.077		+/-0.0744							
	TPU:	+/-0.140		+/-0.137							
QC1203918917	LCS										
Americium-241	1.97			1.85	pCi/L		93.9	(80%-120%)	BXA4	11/28/17	18:14
	Uncert:			+/-0.0513							
	TPU:			+/-0.0937							
**Americium-243 Tracer	2.10			2.17	pCi/L		103	(50%-105%)			
	Uncert:			+/-0.0543							
	TPU:			+/-0.104							
QC1203918915	MB										
Americium-241			U	0.00	pCi/L				BXA4	11/25/17	11:32
	Uncert:			+/-0.00481							
	TPU:			+/-0.00481							
**Americium-243 Tracer	2.10			1.90	pCi/L		90.8	(50%-105%)			
	Uncert:			+/-0.0641							
	TPU:			+/-0.115							
Batch	1718543										
QC1203918922	437632010	DUP									
Plutonium-238	U	0.00552	U	-0.00868	pCi/L	0.385		(0-1)	BXA4	11/28/17	14:21
	Uncert:	+/-0.00781		+/-0.0106							
	TPU:	+/-0.00781		+/-0.0106							
Plutonium-239/240	U	0.00828	U	-0.00434	pCi/L	0.24		(0-1)			
	Uncert:	+/-0.0107		+/-0.0156							
	TPU:	+/-0.0107		+/-0.0156							
**Plutonium-242 Tracer	2.47	1.96		1.29	pCi/L		52.5	(50%-105%)			
	Uncert:	+/-0.0831		+/-0.105							
	TPU:	+/-0.137		+/-0.164							
QC1203918923	LCS										
Plutonium-238			U	0.0151	pCi/L			(80%-120%)	BXA4	11/25/17	11:32
	Uncert:			+/-0.0094							
	TPU:			+/-0.00942							
Plutonium-239/240	1.98			2.07	pCi/L		105	(80%-120%)			
	Uncert:			+/-0.0723							
	TPU:			+/-0.119							
**Plutonium-242 Tracer	1.97			1.35	pCi/L		68.2	(50%-105%)			
	Uncert:			+/-0.0707							
	TPU:			+/-0.114							

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QC Summary

Workorder: 437515

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1718543										
QC1203918921	MB										
Plutonium-238			U	0.00545	pCi/L				BXA4	11/25/17	11:31
				Uncert:							
				TPU:							
Plutonium-239/240			U	0.00818	pCi/L						
				Uncert:							
				TPU:							
**Plutonium-242 Tracer	1.97			1.30	pCi/L		65.7	(50%-105%)			
				Uncert:							
				TPU:							
Batch	1718546										
QC1203918933	437632010	DUP									
Uranium-234		0.275		0.364	pCi/L	0.687		(0-1)	BXA4	11/26/17	11:19
		Uncert:		+/-0.0272							
		TPU:		+/-0.0303							
Uranium-235/236		U	0.0271	0.0725	pCi/L	0.891		(0-1)			
		Uncert:		+/-0.00997							
		TPU:		+/-0.0101							
Uranium-238		0.114		0.183	pCi/L	0.823		(0-1)			
		Uncert:		+/-0.0177							
		TPU:		+/-0.0186							
**Uranium-232 Tracer	2.62	2.16		2.12	pCi/L		80.8	(50%-105%)			
		Uncert:		+/-0.0807							
		TPU:		+/-0.150							
QC1203918934	LCS										
Uranium-234				2.65	pCi/L				BXA4	11/26/17	11:19
		Uncert:		+/-0.0957							
		TPU:		+/-0.175							
Uranium-235/236				0.218	pCi/L						
		Uncert:		+/-0.0314							
		TPU:		+/-0.0336							
Uranium-238	2.70			3.00	pCi/L		111	(80%-120%)			
		Uncert:		+/-0.101							
		TPU:		+/-0.195							
**Uranium-232 Tracer	2.09			0.912	pCi/L		43.6 *	(50%-105%)			
		Uncert:		+/-0.0858							
		TPU:		+/-0.144							
QC1203918932	MB										
Uranium-234			U	0.0463	pCi/L				BXA4	11/26/17	11:19
		Uncert:		+/-0.0131							
		TPU:		+/-0.0133							
Uranium-235/236			U	0.0143	pCi/L						
		Uncert:		+/-0.00757							
		TPU:		+/-0.0076							
Uranium-238			U	0.0185	pCi/L						
		Uncert:		+/-0.00982							
		TPU:		+/-0.00986							

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QC Summary

Workorder: 437515

Page 3 of 7

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1718546										
<hr/>											
**Uranium-232 Tracer	2.09			1.21	pCi/L		57.7	(50%-105%)			
	Uncert:			+/-0.0709							
	TPU:			+/-0.127							
Batch	1722422										
QC1203928686	LCS										
Plutonium-238			U	0.00156	pCi/L			(80%-120%)	BXA4	12/02/17	17:53
	Uncert:			+/-0.00563							
	TPU:			+/-0.00563							
Plutonium-239/240	1.98			1.90	pCi/L		96.3	(80%-120%)			
	Uncert:			+/-0.0547							
	TPU:			+/-0.0934							
**Plutonium-242 Tracer	1.97			1.67	pCi/L		84.6	(50%-105%)			
	Uncert:			+/-0.0557							
	TPU:			+/-0.0962							
QC1203928762	LCS										
Plutonium-238			U	0.0146	pCi/L	0.406		(0-1)	BXA4	12/02/17	17:53
	Uncert:			+/-0.0105							
	TPU:			+/-0.0105							
Plutonium-239/240	1.98			1.93	pCi/L	0.0598	97.5	(0-1)			
	Uncert:			+/-0.0636							
	TPU:			+/-0.105							
**Plutonium-242 Tracer	1.97			1.41	pCi/L		71.5	(50%-105%)			
	Uncert:			+/-0.0646							
	TPU:			+/-0.107							
QC1203928684	MB										
Plutonium-238			U	0.00319	pCi/L				BXA4	12/04/17	16:37
	Uncert:			+/-0.00552							
	TPU:			+/-0.00553							
Plutonium-239/240			U	-0.00319	pCi/L						
	Uncert:			+/-0.00677							
	TPU:			+/-0.00677							
**Plutonium-242 Tracer	1.97			1.62	pCi/L		82	(50%-105%)			
	Uncert:			+/-0.0566							
	TPU:			+/-0.0973							
<hr/>											
Rad Gamma Spec											
Batch	1717887										
QC1203917195	437515002 DUP										
Cesium-137		U	-0.436	U	0.808	pCi/L	0.2	(0-1)	BSW1	11/11/17	08:22
	Uncert:		+/-1.90		+/-1.19						
	TPU:		+/-1.91		+/-1.21						
Cobalt-60		U	0.632	U	-0.358	pCi/L	0.186	(0-1)			
	Uncert:		+/-1.57		+/-1.08						
	TPU:		+/-1.58		+/-1.08						
Neptunium-237		U	1.17	U	-1.54	pCi/L	0.261	(0-1)			
	Uncert:		+/-2.65		+/-2.49						
	TPU:		+/-2.67		+/-2.51						

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
Batch	1717887										
Potassium-40	U	47.1	U	6.05	pCi/L	0.431		(0-1)			
	Uncert:	+/-21.5		+/-26.1							
	TPU:	+/-21.6		+/-26.1							
Sodium-22	U	2.53	U	-0.633	pCi/L	0.521		(0-1)			
	Uncert:	+/-1.64		+/-1.28							
	TPU:	+/-1.74		+/-1.29							
QC1203917196 LCS											
Americium-241	34300			35000	pCi/L		102	(80%-120%)	BSW1	11/11/17	09:07
	Uncert:			+/-225							
	TPU:			+/-2010							
Cesium-137	13000			13200	pCi/L		102	(80%-120%)			
	Uncert:			+/-62.9							
	TPU:			+/-569							
Cobalt-60	11300			11700	pCi/L		104	(80%-120%)			
	Uncert:			+/-66.8							
	TPU:			+/-542							
Neptunium-237			U	16.9	pCi/L						
	Uncert:			+/-22.2							
	TPU:			+/-22.5							
Potassium-40			U	-3.92	pCi/L						
	Uncert:			+/-39.3							
	TPU:			+/-39.4							
Sodium-22			U	-4.03	pCi/L						
	Uncert:			+/-7.70							
	TPU:			+/-7.76							
QC1203917194 MB											
Cesium-137			U	0.852	pCi/L				BSW1	11/11/17	08:22
	Uncert:			+/-2.03							
	TPU:			+/-2.03							
Cobalt-60			U	1.39	pCi/L						
	Uncert:			+/-1.22							
	TPU:			+/-1.26							
Neptunium-237			U	0.897	pCi/L						
	Uncert:			+/-2.03							
	TPU:			+/-2.04							
Potassium-40			U	-25.4	pCi/L						
	Uncert:			+/-12.3							
	TPU:			+/-13.7							
Sodium-22			U	-0.0408	pCi/L						
	Uncert:			+/-0.646							
	TPU:			+/-0.646							
Rad Gas Flow											
Batch	1720044										
QC1203922620 437632002 DUP											
Strontium-90	U	-0.0581	U	0.0685	pCi/L	0.252		(0-1)	LXB3	11/29/17	08:46
	Uncert:	+/-0.123		+/-0.128							

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Parmname		NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow												
Batch	1720044											
		TPU:	+/-0.123		+/-0.128							
**Strontium Carrier		7.85	7.30		5.70	mg		72.6	(50%-105%)			
QC1203922622	LCS											
Strontium-90		23.7			27.2	pCi/L		115	(80%-120%)	LXB3	11/29/17	08:46
		Uncert:			+/-0.765							
		TPU:			+/-2.39							
**Strontium Carrier		7.85			5.50	mg		70.1	(50%-105%)			
QC1203922619	MB											
Strontium-90				U	-0.172	pCi/L				LXB3	11/29/17	08:45
		Uncert:			+/-0.0647							
		TPU:			+/-0.0647							
**Strontium Carrier		7.85			6.90	mg		87.9	(50%-105%)			
QC1203922621	437632002 MS											
Strontium-90		474	U	-0.0581	451	pCi/L		95.1	(75%-125%)	LXB3	11/29/17	08:45
		Uncert:		+/-0.123	+/-12.4							
		TPU:		+/-0.123	+/-39.3							
**Strontium Carrier		7.85			6.90	mg		87.9	(50%-105%)			
Batch	1720050											
QC1203922640	437508002 DUP											
Alpha			U	0.372	U	0.551	pCi/L	0.0795	(0-1)	AXH4	11/29/17	11:44
		Uncert:		+/-0.611		+/-0.511						
		TPU:		+/-0.612		+/-0.514						
Beta				1.86	U	2.24	pCi/L	0.124	(0-1)		11/28/17	13:44
		Uncert:		+/-0.620		+/-0.846						
		TPU:		+/-0.640		+/-0.868						
QC1203922643	LCS											
Alpha		12.1			13.7	pCi/L		113	(80%-120%)	AXH4	11/29/17	11:37
		Uncert:			+/-0.705							
		TPU:			+/-1.35							
Beta		47.4			46.9	pCi/L		99	(80%-120%)		11/28/17	13:57
		Uncert:			+/-0.856							
		TPU:			+/-4.03							
QC1203922639	MB											
Alpha				U	-0.192	pCi/L				AXH4	11/29/17	11:42
		Uncert:			+/-0.0655							
		TPU:			+/-0.0655							
Beta				U	-0.198	pCi/L					11/28/17	13:44
		Uncert:			+/-0.0776							
		TPU:			+/-0.0776							
QC1203922641	437508002 MS											
Alpha		483	U	0.372	529	pCi/L		109	(75%-125%)	AXH4	11/29/17	16:48
		Uncert:		+/-0.611	+/-26.7							
		TPU:		+/-0.612	+/-60.1							
Beta		1890		1.86	1860	pCi/L		98.3	(75%-125%)		11/28/17	13:44
		Uncert:		+/-0.620	+/-35.1							
		TPU:		+/-0.640	+/-164							

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow										
Batch	1720050									
QC1203922642	437508002 MSD									
Alpha	483	U	0.372	545	pCi/L	0.0692	113	(0-1) AXH4	11/29/17	11:37
	Uncert:		+/-0.611	+/-26.9						
	TPU:		+/-0.612	+/-53.9						
Beta	1890		1.86	1930	pCi/L	0.095	102	(0-1)	11/28/17	13:56
	Uncert:		+/-0.620	+/-34.3						
	TPU:		+/-0.640	+/-164						

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 REMF Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, 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

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