

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-18-148067**WORK ORDER:**

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/17/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1242		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-61 S1		FIELD PREP:	F	
LOCATION TYPE:	NA		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+PerChlorate	1 LITER POLY	1	ICE	↓	↓
↓	WSP-NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4	↓	↓

**SAMPLE COMMENTS:** None**LOCATION COMMENTS:** None**FIELD PARAMETERS:**

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

KT 11/17/17

**COLLECTED BY (PRINT):** M. Shendo + T. Vander Vis

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 11/17/17 1320	RECEIVED BY (Printed Name) (Signature)	S. Sherwood <i>[Signature]</i>	Date/Time 11/17/17 1320
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-18-148083

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/17/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1242		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-61 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		


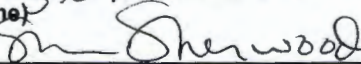
SAMPLE COMMENTS: Sampled 40 ft from running diesel generator

LOCATION COMMENTS: weather was rainy while sampling

## FIELD PARAMETERS:

Sample Time	1242	HH:MM	Discharge Rate	2.08	Dissolved Oxygen	6.34
Groundwater Elevation	5831.92		Oxidation-Reduction Potential	289.7	Period Purge Volume	NA
pH	7.44		Purge Volume	520.0	Specific Conductance	148.4
Temperature	20.2		Total Volume Pumped	578.24	Turbidity	0.74

COLLECTED BY (PRINT): M. Shendo &amp; T. Vander Vis

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow 	Date/Time 11/17/17 1320	RECEIVED BY (Printed Name) (Signature)	S. Sherwood 	Date/Time 11/17/17 1320
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-18-148084

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/17/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1059		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-62		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
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: Breezy white sampling

LOCATION COMMENTS: NA

**FIELD PARAMETERS:**

Sample Time	1059	HH:MM	Discharge Rate	4.35	Dissolved Oxygen	6.61
Groundwater Elevation	5831.91		Oxidation-Reduction Potential	168.0	Period Purge Volume	NA
pH	8.54		Purge Volume	152.25	Specific Conductance	236.4
Temperature	18.0		Total Volume Pumped	256.65	Turbidity	0.50



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148084

WORK ORDER:

COLLECTED BY (PRINT): T. Berham

RELINQUISHED BY (Printed Name) <i>T. Berham</i> (Signature) <i>[Signature]</i>	Date/Time <i>11/17/2017</i> <i>1150</i>	RECEIVED BY <i>Sherwood</i> (Printed Name) (Signature) <i>[Signature]</i>	Date/Time <i>11/17/17</i> <i>1150</i>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/30/2017

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148106

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/17/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1059		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-62		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FTB	
TOP DEPTH:	↓		SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	1 TV 11-16-17 2	HCL	Y	MA

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	_____

11/17/2017

COLLECTED BY (PRINT): T. Barham

RELINQUISHED BY (Printed Name) T. Barham (Signature) [Signature]	Date/Time 11/17/2017 1150	RECEIVED BY (Printed Name) S. Sherwood (Signature) [Signature]	Date/Time 11/17/17 1150
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-18-148068

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/17/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1059		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-62		FIELD PREP:	F	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
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	_____

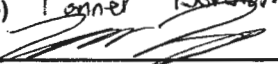
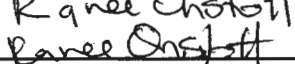
11/17/2017



**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY****EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)  
MY2018 Q1**SAMPLE ID:** CAMO-18-148068**WORK ORDER:**  

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**COLLECTED BY (PRINT):** T. Benham

<b>RELINQUISHED BY</b> (Printed Name) T. Benham (Signature) 	<b>Date/Time</b> 11/17/2017 1150	<b>RECEIVED BY</b> (Printed Name) Raneel Onstott (Signature) 	<b>Date/Time</b> 11/17/17 1150
<b>RELINQUISHED BY</b> (Printed Name) (Signature)	<b>Date/Time</b>	<b>RECEIVED BY</b> (Printed Name) (Signature)	<b>Date/Time</b>

Sampling Plan ID/Name: 11552 (R-62)COC: 2018-1001

TEST - Explosives		YES	NO
Samples collected from a WFO area? (TAs -08, 09, 11, 14, 15, 16, 22, 36, 37, 39, 40, and 49)			<input checked="" type="checkbox"/>
Field Test for Explosives Results		YES	NO
HE SPOT test result positive. If YES - Do not transport.			<input checked="" type="checkbox"/>

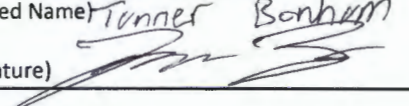
TEST - Chemical Preservation		YES	NO
Samples are chemically preserved?		<input checked="" type="checkbox"/>	
Field Team Member Statement		YES	NO
Chemical preservation exceeds limits given 40 CFR 136, Table II - Required Containers, Preservation Techniques and Holding Times (footnote 3). If YES - Do not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

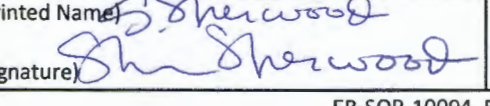
TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				<input checked="" type="checkbox"/>
Sample Activity (dpm/100cm <sup>2</sup> )	Shipment Activity (dpm*g/100cm <sup>2</sup> )	Sampled Location	YES	NO
Alpha detectable	AND Alpha ≥ 160,000	AT 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	AND Alpha ≥ 1,250,000	AT other locations		
Beta ≥ 1,500	AND Beta ≥ 15,000,000	AT any location		
The sample Alpha ≥ 16,000,000 dpm*g/100cm <sup>2</sup> or Beta ≥ 160,000,000 dpm*g/100cm <sup>2</sup> . If YES - Do not ship.				
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm <sup>2</sup> , beta activity ≥ 240 dpm/cm <sup>2</sup> , 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.				<input checked="" type="checkbox"/>

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
• Am-241 ≥ 27 pCi/g	AND	Am-241 ≥ 270,000 pCi Total		<input checked="" type="checkbox"/>
• Cs-137 ≥ 270 pCi/g	AND	Cs-137 ≥ 270,000 pCi Total		
• Pu-238 ≥ 27 pCi/g	AND	Pu-238 ≥ 270,000 pCi Total		
• Pu-239/240 ≥ 27 pCi/g	AND	Pu-239/240 ≥ 270,000 pCi Total		
• Th-228 ≥ 27 pCi/g	AND	Th-228 ≥ 270,000 pCi Total		
• U-234 ≥ 270 pCi/g	AND	U-234 ≥ 1,600,000,000 pCi Total		
• U-238 ≥ 270 pCi/g	AND	U-238 ≥ unlimited		
• H-3 ≥ 27,000,000 pCi/g	AND	H-3 ≥ 27,000,000,000 pCi Total		
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.				
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
The shippers documented knowledge of the sample positively identifies appropriate labeling.			<input checked="" type="checkbox"/>
Documented Field Team Member Statement		YES	NO
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"/>

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) <u>Tanner Bonham</u>	<u>11/17/2017</u>
(Signature) 	<u>11:50</u>

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) <u>S. Sherwood</u>	<u>11/17/17</u>
(Signature) 	<u>11:50</u>

ER-SOP-10094, R1, Attachmen



Sampling Plan ID/Name: 11552COC: 2018-1001

TEST - Explosives		YES	NO
Samples collected from a WFO area? (TAs -08, 09, 11, 14, 15, 16, 22, 36, 37, 39, 40, and 49)			X
Field Test for Explosives Results		YES	NO
HE SPOT test result positive. If YES - Do not transport.			X

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

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

TEST - Location		YES	NO
Prior analytical measurements of radioactive isotopes are available?		X	
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO
• Am-241 ≥ 27 pCi/g	AND Am-241 ≥ 270,000 pCi Total		
• Cs-137 ≥ 270 pCi/g	AND Cs-137 ≥ 270,000 pCi Total		
• Pu-238 ≥ 27 pCi/g	AND Pu-238 ≥ 270,000 pCi Total		X
• Pu-239/240 ≥ 27 pCi/g	AND Pu-239/240 ≥ 270,000 pCi Total		
• Th-228 ≥ 27 pCi/g	AND Th-228 ≥ 270,000 pCi Total		
• U-234 ≥ 270 pCi/g	AND U-234 ≥ 1,600,000,000 pCi Total		
• U-238 ≥ 270 pCi/g	AND U-238 ≥ unlimited		
• H-3 ≥ 27,000,000 pCi/g	AND H-3 ≥ 27,000,000,000 pCi Total		
Am-241, Pu-238, Pu-239/240, or Th-228 ≥ 27,000,000 pCi; or Cs-137 ≥ 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. If YES - Do not ship.			X
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on prior analytical measurements of radioactive isotopes.			X

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

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)	Katrina Tow	11/17/17
(Signature)		1335

Hazard Assessment Reviewed By:		Date/Time
(Printed Name)	B. Sherwood	11/17/17
(Signature)		1335

## DATA VALIDATION REPORT

Chain Of Custody No. 2018-1001

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
438413	EPA:120.1	2				
438413	EPA:150.1	2				
438413	EPA:160.1	2				
438413	EPA:170.0	4		1		
438413	EPA:245.2	4				
438413	EPA:300.0	2				
438413	EPA:310.1	2				
438413	EPA:335.4	2				
438413	EPA:350.1	2				
438413	EPA:351.2	2				
438413	EPA:353.2	2				
438413	EPA:365.4	2				
438413	EPA:900	1				
438413	EPA:901.1	1				
438413	EPA:905.0	1				
438413	HASL-300:AM-241	1				
438413	HASL-300:ISOPU	1				
438413	HASL-300:ISOU	1				
438413	SM:A2340B	2				
438413	SW-846:6010C	2				
438413	SW-846:6020	2				
438413	SW-846:6850	2				
438413	SW-846:8260B	1		1		
438413	SW-846:8270D	1				
438413	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
438413	EPA:120.1	1721096	1721096	2										1				1			
438413	EPA:150.1	1721541	1721541	2										1				2			
438413	EPA:160.1	1720543	1720543	2					1					1				1			
438413	EPA:170.0	NA	NA	4		1															
438413	EPA:245.2	1724370	1724365	4					1	1				1				1			
438413	EPA:300.0	1721837	1721837	2					1					1				1			
438413	EPA:310.1	1721540	1721540	2						1				1				1			
438413	EPA:335.4	1720228	1720227	2					1	1				1				1			
438413	EPA:350.1	1721221	1721220	2					1	1				1				1			
438413	EPA:351.2	1721225	1721224	2					1	1				1				1			
438413	EPA:353.2	1721226	1721226	2					1					1				1			
438413	EPA:365.4	1721223	1721222	2					1	1				1				1			
438413	EPA:900	1722977	1722977	1					1	1	1			1				1			
438413	EPA:901.1	1721213	1721213	1					1					1				1			
438413	EPA:905.0	1723383	1723383	1					1	1				1				1			
438413	HASL-300:AM-241	1722107	1722107	1					1					1				1			
438413	HASL-300:ISOPU	1722108	1722108	1					1					1				1			
438413	HASL-300:ISOU	1722109	1722109	1					1					1				1			
438413	SM:A2340B	1726878	1726878	2																	
438413	SW-846:6010C	1721113	1721112	2					1	1				1				1			
438413	SW-846:6020	1721102	1721101	2					1	1				1				1			
438413	SW-846:6850	1723621	1723619	2					1	1	1			1							
438413	SW-846:8260B	1722112	1722112	1		1			2					4							
438413	SW-846:8270D	1721440	1721439	1					1	1	1			1							
438413	SW-846:9060	1720555	1720555	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
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-148067	438413001	REG	1	0	0	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-148068	438413003	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203925380	LCS	0	0	1	0
EPA:120.1	GENERAL CHEMISTRY	WST05-18-148667	1203925382	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-147990	1203926490	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-148064	1203926491	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-148067	438413001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-148068	438413003	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203926489	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-148065	1203923973	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-148067	438413001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-148068	438413003	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203923972	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203923971	MB	1	0	0	0
EPA:170.0	VOC	CAMO-18-148067	438413001	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148068	438413003	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148083	438413002	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148084	438413005	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148106	438413006	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148067	1203933644	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148067	1203933645	MS	0	0	1	0
EPA:245.2	INORGANIC	CAMO-18-148067	438413001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148068	438413003	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148083	438413002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148084	438413005	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203933643	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203933642	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-148067	1203927311	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-148067	438413001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-148068	438413003	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203927310	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203927309	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-147990	1203926485	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-147990	1203926488	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148067	438413001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148068	438413003	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203926482	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAMO-18-148083	438413002	REG	1	0	0	0
EPA:335.4	INORGANIC	CAMO-18-148084	438413005	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203923113	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203923112	MB	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:335.4	INORGANIC	WST05-18-148667	1203923114	DUP	1	0	0	0
EPA:335.4	INORGANIC	WST05-18-148667	1203923116	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-147990	1203925722	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-147990	1203925725	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-148067	438413001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-148068	438413003	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203925720	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203925719	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-148083	1203925739	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-148083	1203925741	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-148083	438413002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-148084	438413005	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203925738	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203925737	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-148067	1203925745	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-148067	438413001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-148068	438413003	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203925744	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203925743	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-148067	1203925729	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-148067	1203925731	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-148067	438413001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-148068	438413003	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203925728	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203925727	MB	1	0	0	0
EPA:900	RAD	CAMO-18-148078	1203930062	DUP	2	0	0	0
EPA:900	RAD	CAMO-18-148078	1203930063	MS	0	0	2	0
EPA:900	RAD	CAMO-18-148078	1203930064	MSD	0	0	2	0
EPA:900	RAD	CAMO-18-148084	438413005	REG	2	0	0	0
EPA:900	RAD	LCS	1203930065	LCS	0	0	2	0
EPA:900	RAD	MB	1203930061	MB	2	0	0	0
EPA:901.1	RAD	CAMO-18-148084	1203925711	DUP	5	0	0	0
EPA:901.1	RAD	CAMO-18-148084	438413005	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203925712	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203925710	MB	5	0	0	0
EPA:905.0	RAD	CAMO-18-148080	1203931118	DUP	1	0	0	0
EPA:905.0	RAD	CAMO-18-148080	1203931119	MS	0	0	1	0
EPA:905.0	RAD	CAMO-18-148084	438413005	REG	1	0	0	0
EPA:905.0	RAD	LCS	1203931120	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203931117	MB	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
HASL-300:AM-241	RAD	CAMO-18-148077	1203927925	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-148084	438413005	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203927926	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203927924	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-148077	1203927928	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-148084	438413005	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203927929	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203927927	MB	2	0	0	0
HASL-300:ISOU	RAD	CAMO-18-148077	1203927931	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAMO-18-148084	438413005	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203927932	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203927930	MB	3	0	0	0
SM:A2340B	INORGANIC	CAMO-18-148067	438413001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-18-148068	438413003	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-148067	1203925416	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-148067	1203925417	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAMO-18-148067	438413001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-148068	438413003	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203925415	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203925414	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-18-148067	1203925390	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-148067	1203925391	MS	0	0	11	0
SW-846:6020	INORGANIC	CAMO-18-148067	438413001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-148068	438413003	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203925389	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203925388	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148067	1203931740	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148067	1203931741	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148067	438413001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148068	438413003	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203931739	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203931738	MB	1	0	0	0
SW-846:8260B	VOC	CAMO-18-148084	438413004	REG	80	3	0	0
SW-846:8260B	VOC	CAMO-18-148106	438413006	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203927944	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203927945	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203927946	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203927947	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203927942	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203927943	MB	80	3	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-846:8270D	SVOC	CAMO-18-148084	1203926330	MS	0	6	76	0
SW-846:8270D	SVOC	CAMO-18-148084	1203926331	MSD	0	6	76	0
SW-846:8270D	SVOC	CAMO-18-148084	438413004	REG	80	6	0	0
SW-846:8270D	SVOC	LCS	1203926329	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203926328	MB	80	6	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-148083	438413002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-148084	438413005	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-18-147963	1203927021	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203927019	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203927018	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203925414	METHOD BLANK	SW-846:6010C	W	Potassium	50.7	J	ug/L	150
MB	1203925719	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0348	J	mg/L	0.050
CAMO-18-148106	438413006	TRIP BLANK	EPA:170.0	W	Temperature	2		Deg C	



## DATA VALIDATION REPORT

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-18-148068	1203925719	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0348	mg/L	0.0206	J	0.050	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
CAMO-18-147990	1203925725		EPA:350.1	Ammonia as Nitrogen	1721220	11-27-2017	W	113		110	90	10		
CAMO-18-148067	1203931740	1203931741	SW-846:6850	Perchlorate	1723619	12-07-2017	W	0	0	125	75	10	4	30
CAMO-18-148084	1203926330	1203926331	SW-846:8270D	Benzidine	1721439	11-28-2017	W	48	26	130	15		60	30
CAMO-18-148084	1203926330	1203926331	SW-846:8270D	Pyridine	1721439	11-28-2017	W	44	32	93	24		31	30

8. Any LCS/LCSD or BS/BSR 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

## DATA VALIDATION REPORT

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
1203926329		SW-846:8270D	Benzoic Acid	1721439	11-28-2017	W	16		74	21				

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

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-61 S1	2018-1001	CAMO-18-148067	REG	INIT	LCMS/MS PERCHLORAT	SW-846:6850	Perchlorate	U	U	PE12d	Y	11.9	ug/L	11.9	ug/L		W	11/17/2017		1723621	VAL	Y	
R-62	2018-1001	CAMO-18-148068	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	U	U	I4	N	0.0206	mg/L	0.0206	mg/L		W	11/17/2017		1721221	VAL	Y	
R-62	2018-1001	CAMO-18-148084	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	-0.00206	pCi/L	-0.00206	pCi/L	0.0367	0.00744	W	11/17/2017		1722107	VAL	Y
R-62	2018-1001	CAMO-18-148084	REG	INIT	SVOC	SW-846:8270D	Benzoic Acid	U	UJ	SV12a	N	6.00	ug/L	6.00	ug/L		W	11/17/2017		1721440	VAL	Y	
R-62	2018-1001	CAMO-18-148084	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-0.411	pCi/L	-0.411	pCi/L	4.77	1.33	W	11/17/2017		1721213	VAL	Y
R-62	2018-1001	CAMO-18-148084	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.709	pCi/L	0.709	pCi/L	5.89	1.42	W	11/17/2017		1721213	VAL	Y
R-62	2018-1001	CAMO-18-148084	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	2.53	pCi/L	2.53	pCi/L	2.66	1.01	W	11/17/2017		1722977	VAL	Y

## DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-62	2018-1001	CAMO-18-148084	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-0.128	pCi/L	-0.128	pCi/L	10.1	2.79	W	11/17/2017		1721213	VAL	Y
R-62	2018-1001	CAMO-18-148084	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.00903	pCi/L	0.00903	pCi/L	0.0333	0.00639	W	11/17/2017		1722108	VAL	Y
R-62	2018-1001	CAMO-18-148084	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.00677	pCi/L	-0.00677	pCi/L	0.0476	0.00677	W	11/17/2017		1722108	VAL	Y
R-62	2018-1001	CAMO-18-148084	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-29.9	pCi/L	-29.9	pCi/L	64.9	21.2	W	11/17/2017		1721213	VAL	Y
R-62	2018-1001	CAMO-18-148084	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.0118	pCi/L	-0.0118	pCi/L	5.19	1.28	W	11/17/2017		1721213	VAL	Y
R-62	2018-1001	CAMO-18-148084	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.237	pCi/L	-0.237	pCi/L	0.487	0.116	W	11/17/2017		1723383	VAL	Y

### Reason Code

### Description

I4	the sample result is =<5x the concentration of related analyte in the method blank.
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.
PE12d	The MS/MSD percent recovery was <10%
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-18-148067	R-61 S1	REG	EPA:120.1	0	1
CAMO-18-148067	R-61 S1	REG	EPA:150.1	0	1
CAMO-18-148067	R-61 S1	REG	EPA:160.1	0	1
CAMO-18-148067	R-61 S1	REG	EPA:170.0	0	1
CAMO-18-148067	R-61 S1	REG	EPA:245.2	0	1
CAMO-18-148067	R-61 S1	REG	EPA:300.0	0	4
CAMO-18-148067	R-61 S1	REG	EPA:310.1	0	2
CAMO-18-148067	R-61 S1	REG	EPA:350.1	0	1
CAMO-18-148067	R-61 S1	REG	EPA:353.2	0	1
CAMO-18-148067	R-61 S1	REG	EPA:365.4	0	1



## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-148067	R-61 S1	REG	SM:A2340B	0	1
CAMO-18-148067	R-61 S1	REG	SW-846:6010C	0	17
CAMO-18-148067	R-61 S1	REG	SW-846:6020	0	11
CAMO-18-148067	R-61 S1	REG	SW-846:6850	0	1
CAMO-18-148068	R-62	REG	EPA:120.1	0	1
CAMO-18-148068	R-62	REG	EPA:150.1	0	1
CAMO-18-148068	R-62	REG	EPA:160.1	0	1
CAMO-18-148068	R-62	REG	EPA:170.0	0	1
CAMO-18-148068	R-62	REG	EPA:245.2	0	1
CAMO-18-148068	R-62	REG	EPA:300.0	0	4
CAMO-18-148068	R-62	REG	EPA:310.1	0	2
CAMO-18-148068	R-62	REG	EPA:350.1	0	1
CAMO-18-148068	R-62	REG	EPA:353.2	0	1
CAMO-18-148068	R-62	REG	EPA:365.4	0	1
CAMO-18-148068	R-62	REG	SM:A2340B	0	1
CAMO-18-148068	R-62	REG	SW-846:6010C	0	17
CAMO-18-148068	R-62	REG	SW-846:6020	0	11
CAMO-18-148068	R-62	REG	SW-846:6850	0	1
CAMO-18-148083	R-61 S1	REG	EPA:170.0	0	1
CAMO-18-148083	R-61 S1	REG	EPA:245.2	0	1
CAMO-18-148083	R-61 S1	REG	EPA:335.4	0	1
CAMO-18-148083	R-61 S1	REG	EPA:351.2	0	1
CAMO-18-148083	R-61 S1	REG	SW-846:9060	0	1
CAMO-18-148084	R-62	REG	EPA:170.0	0	1
CAMO-18-148084	R-62	REG	EPA:245.2	0	1
CAMO-18-148084	R-62	REG	EPA:335.4	0	1
CAMO-18-148084	R-62	REG	EPA:351.2	0	1
CAMO-18-148084	R-62	REG	EPA:900	0	2
CAMO-18-148084	R-62	REG	EPA:901.1	0	5
CAMO-18-148084	R-62	REG	EPA:905.0	0	1
CAMO-18-148084	R-62	REG	HASL-300:AM-241	0	1
CAMO-18-148084	R-62	REG	HASL-300:ISOPU	0	2
CAMO-18-148084	R-62	REG	HASL-300:ISOU	0	3
CAMO-18-148084	R-62	REG	SW-846:8260B	0	80
CAMO-18-148084	R-62	REG	SW-846:8270D	0	80
CAMO-18-148084	R-62	REG	SW-846:9060	0	1
CAMO-18-148106	R-62	FTB	EPA:170.0	0	1

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-148106	R-62	FTB	SW-846:8260B	0	80



December 15, 2017

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

Re: LANL- WQH Water Samples  
Work Order: 438413  
SDG: 2018-1001

Dear Ms. Patel:

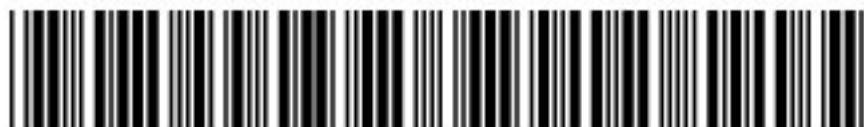
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on November 21, 2017, and analyzed for GC/MS Semivolatile, GC/MS Volatile, General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry. This original data report 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: 2018-1001  
Enclosures



**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 438413**  
**SDG: 2018-1001**



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# Case Narrative

**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 438413  
SDG # : 2018-1001**

**December 15, 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 21, 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:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
438413001	CAMO-18-148067
438413002	CAMO-18-148083
438413003	CAMO-18-148068
438413004	CAMO-18-148084
438413005	CAMO-18-148084
438413006	CAMO-18-148106

**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 15 December 2017**

<b>State</b>	<b>Certification</b>
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**





## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <b>ESHL</b>		SDG/AR/COC/Work Order: <b>438413</b>	
Received By: <b>ZKW</b>		Date Received: <b>11/21/17</b>	
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  <b>59081783 2360</b> <b>59081783 2350</b>	
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): <b>0</b> <input checked="" type="checkbox"/> 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: Wet Ice <input checked="" type="checkbox"/> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius <b>TEMP: 22</b>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <b>IR3-16</b> Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No <input checked="" type="checkbox"/> N/A ___ (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No ___ N/A ___ Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC? <b>11/21/17</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: <b>See Below</b>
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 a container for CAMO-18-148068 for WSP-CR52/53 not on the COC**

PM (or PMA) review: Initials **HAH**Date **11/21/17**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  
SHIP DATE: 20NOV17  
ACTWT: 30.0 LB MAN  
CAD: 0014176/CAFE2916

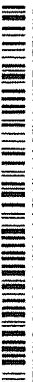
LOS ALAMOS, NM 87545  
UNITED STATES US  
BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

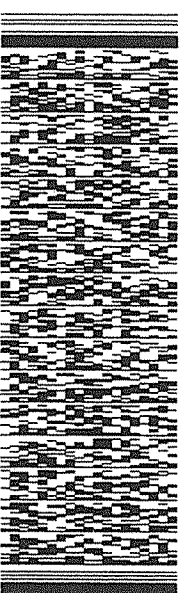
CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWE0



FedEx Express



TUE - 21 NOV 10:30  
PRIORITY OVERNIGHT

2 of 2

TRK# 5908 1783 2360

0263

Mstr# 5908 1783 2350

X7 RBWA

29407  
SC-US CH

ORIGIN ID:SAFA (505) 665-9966  
KEITH GREENE  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03  
SHIP DATE: 20NOV17  
ACTWT: 57.0 LB MAN  
CAD: 0014176/CAFE2916

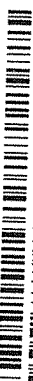
LOS ALAMOS, NM 87545  
UNITED STATES US  
BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

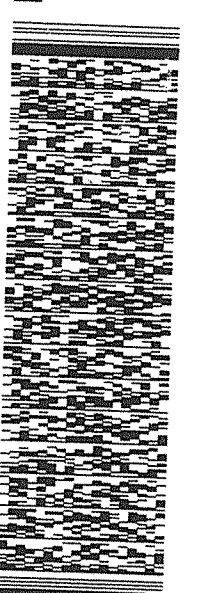
CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWE0



FedEx Express



TUE - 21 NOV 10:30  
PRIORITY OVERNIGHT

1 of 2

TRK# 5908 1783 2350

0201

## MASTER ##

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 #: 2018-1001  
Work Order #: 438413**

**Method/Analysis Information**

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

Analytical Method: SW-846:8260B

Analytical Batch  
Number: 1722112

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413004	CAMO-18-148084
438413006	CAMO-18-148106
1203927942	Method Blank (MB)
1203927943	Method Blank (MB)
1203927944	Laboratory Control Sample (LCS)
1203927945	Laboratory Control Sample (LCS)
1203927946	Laboratory Control Sample (LCS)
1203927947	Laboratory Control Sample (LCS)
1203927948	438505002(CAMO-18-148077) Post Spike (PS)
1203927949	438505002(CAMO-18-148077) Post Spike (PS)
1203927950	438505002(CAMO-18-148077) Post Spike Duplicate (PSD)
1203927951	438505002(CAMO-18-148077) Post Spike Duplicate (PSD)

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

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

**SOP Reference**

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

**Calibration Information**

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

industry shortage.

#### **Initial Calibration**

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

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

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

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

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

Target analytes were detected in the blank 1203927942 (MB) below the reporting limit.

##### **Surrogate Recoveries**

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

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

The LCS spike recoveries met the acceptance limits.

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

Sample 438505002 (CAMO-18-148077) 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:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>	<b>P &amp; T Trap</b>
VOA6.I	Agilent 6890N/5975 GC/MS w/ OI 4560/Archon Autosampler	HP6890N/HP5975	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

#### **Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2018-1001 GEL Work Order: 438413

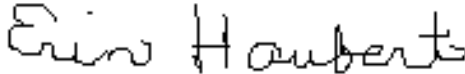
#### The Qualifiers in this report are defined as follows:

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

#### Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 13 DEC 2017

Title: Data Validator

# **Sample Data Summary**

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

Page 1 of 3

SDG Number: 2018-1001

Lab Sample ID: 438413004

Date Collected: 11/17/2017 10:59

Date Received: 11/21/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1722112

Inst: VOA6.I

Dilution: 1

Run Date: 11/29/2017 04:56

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 11/29/2017 04:56

Data File: 112817V6\6J240.D

Column: DB-624

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

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

**SDG Number:** 2018-1001  
**Lab Sample ID:** 438413004  
  
**Client ID:** CAMO-18-148084  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 04:56  
**Prep Date:** 11/29/2017 04:56  
**Data File:** 112817V6\6J240.D

**Date Collected:** 11/17/2017 10:59  
**Date Received:** 11/21/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

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

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-1001  
**Lab Sample ID:** 438413004  
  
**Client ID:** CAMO-18-148084  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 04:56  
**Prep Date:** 11/29/2017 04:56  
**Data File:** 112817V6\6J240.D

**Date Collected:** 11/17/2017 10:59  
**Date Received:** 11/21/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.8	50.0	ug/L 106	(71%-134%)
Bromofluorobenzene	52.7	50.0	ug/L 105	(70%-131%)
Toluene-d8	49.6	50.0	ug/L 99	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.592	5.96	ug/L	0	J
	unknown siloxane	13.75	14.5	ug/L	0	J



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

Page 1 of 3

SDG Number: 2018-1001

Lab Sample ID: 438413006

Date Collected: 11/17/2017 10:59

Date Received: 11/21/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1722112

Inst: VOA6.I

Dilution: 1

Run Date: 11/29/2017 05:23

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 11/29/2017 05:23

Data File: 112817V6\6J241.D

Column: DB-624

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

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

**SDG Number:** 2018-1001  
**Lab Sample ID:** 438413006  
  
**Client ID:** CAMO-18-148106  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 05:23  
**Prep Date:** 11/29/2017 05:23  
**Data File:** 112817V6\6J241.D

**Date Collected:** 11/17/2017 10:59  
**Date Received:** 11/21/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

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

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-1001  
**Lab Sample ID:** 438413006  
  
**Client ID:** CAMO-18-148106  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 05:23  
**Prep Date:** 11/29/2017 05:23  
**Data File:** 112817V6\6J241.D

**Date Collected:** 11/17/2017 10:59  
**Date Received:** 11/21/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.7	50.0	ug/L 103	(71%-134%)
Bromofluorobenzene	51.8	50.0	ug/L 104	(70%-131%)
Toluene-d8	49.3	50.0	ug/L 99	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.584	6.23	ug/L	0	J
	unknown	13.75	7.24	ug/L	0	J

# **Quality Control Summary**

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

Page 1 of 1

**SDG Number: 2018-1001****Matrix Type: LIQUID**

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Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203927944	LCS for batch 1722112	102	100	101
1203927945	LCS for batch 1722112	103	99	103
1203927942	MB for batch 1722112	102	98	101
438413004	CAMO-18-148084	106	99	105
438413006	CAMO-18-148106	103	99	104
1203927946	LCS for batch 1722112	104	100	102
1203927947	LCS for batch 1722112	104	99	105
1203927943	MB for batch 1722112	103	100	103
1203927948	CAMO-18-148077PS	102	100	99
1203927950	CAMO-18-148077PSD	103	100	100
1203927949	CAMO-18-148077PS	103	98	102
1203927951	CAMO-18-148077PSD	102	99	103

**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: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722112

Matrix: WATER

Lab Sample ID 1203927944

Instrument: VOA6.I

Analysis Date: 11/29/2017 00:14

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	95.5	96	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1310	105	61-125
67-64-1	LCS Acetone	250	0.0	222	89	48-157
74-88-4	LCS Iodomethane	250	0.0	249	99	72-128
75-15-0	LCS Carbon disulfide	250	0.0	252	101	69-138
108-05-4	LCS Vinyl acetate	250	0.0	240	96	67-125
78-93-3	LCS 2-Butanone	250	0.0	231	93	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	232	93	66-124
591-78-6	LCS 2-Hexanone	250	0.0	188	75	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	50.8	102	40-160
74-87-3	LCS Chloromethane	50.0	0.0	48.5	97	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	46.2	92	65-137
74-83-9	LCS Bromomethane	50.0	0.0	49.0	98	63-137
75-00-3	LCS Chloroethane	50.0	0.0	48.0	96	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	46.8	94	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	47.9	96	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	52.3	105	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	50.3	101	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	51.3	103	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	53.8	108	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	53.8	108	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	53.1	106	75-123



Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722112

Matrix: WATER

Lab Sample ID 1203927944

Instrument: VOA6.I

Analysis Date: 11/29/2017 00:14

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	47.1	94	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	52.4	105	76-125
67-66-3	LCS Chloroform	50.0	0.0	52.0	104	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	49.6	99	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	48.3	97	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	50.1	100	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	54.7	109	74-122
71-43-2	LCS Benzene	50.0	0.0	50.5	101	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	51.6	103	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	53.0	106	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	51.7	103	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	52.9	106	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	50.7	101	78-131
108-88-3	LCS Toluene	50.0	0.0	49.0	98	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	50.6	101	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	50.9	102	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	50.9	102	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	46.9	94	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	52.5	105	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	51.6	103	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	48.9	98	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	48.4	97	73-125

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722112

Matrix: WATER

Lab Sample ID 1203927944

Instrument: VOA6.I

Analysis Date: 11/29/2017 00:14

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	48.5	97	74-126
100-42-5	LCS Styrene	50.0	0.0	49.0	98	72-130
75-25-2	LCS Bromoform	50.0	0.0	49.2	98	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	47.2	94	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	48.2	96	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	49.3	99	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	48.1	96	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	46.4	93	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	48.3	97	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	47.5	95	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	47.9	96	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	47.5	95	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	47.6	95	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	46.8	94	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	47.0	94	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	45.5	91	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	45.4	91	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	46.2	92	72-136
91-20-3	LCS Naphthalene	50.0	0.0	50.2	100	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	47.4	95	70-130

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722112

Matrix: WATER

Lab Sample ID 1203927944

Instrument: VOA6.I

Analysis Date: 11/29/2017 00:14

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	45.5	91	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	51.7	103	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	48.0	96	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5080	102	63-138

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722112

Matrix: WATER

Lab Sample ID 1203927945

Instrument: VOA6.I

Analysis Date: 11/29/2017 01:10

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	197	79	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	243	97	61-148
107-05-1	LCS	Allyl chloride	250	0.0	246	98	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	262	105	65-122
107-12-0	LCS	Propionitrile	250	0.0	257	103	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	260	104	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	250	100	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	237	95	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2560	102	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	44.8	90	66-147

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722112

Matrix: WATER

Lab Sample ID 1203927946

Instrument: VOA6.I

Analysis Date: 11/29/2017 10:42

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	97.3	97	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1250	100	61-125
67-64-1	LCS Acetone	250	0.0	292	117	48-157
74-88-4	LCS Iodomethane	250	0.0	240	96	72-128
75-15-0	LCS Carbon disulfide	250	0.0	255	102	69-138
108-05-4	LCS Vinyl acetate	250	0.0	252	101	67-125
78-93-3	LCS 2-Butanone	250	0.0	289	116	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	239	95	66-124
591-78-6	LCS 2-Hexanone	250	0.0	262	105	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	52.7	105	40-160
74-87-3	LCS Chloromethane	50.0	0.0	52.5	105	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	49.8	100	65-137
74-83-9	LCS Bromomethane	50.0	0.0	47.3	95	63-137
75-00-3	LCS Chloroethane	50.0	0.0	49.7	99	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	50.8	102	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	46.7	93	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	53.1	106	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	46.3	93	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	48.1	96	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	53.8	108	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	52.0	104	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	52.1	104	75-123

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722112

Matrix: WATER

Lab Sample ID 1203927946

Instrument: VOA6.I

Analysis Date: 11/29/2017 10:42

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	50.8	102	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	48.8	98	76-125
67-66-3	LCS Chloroform	50.0	0.0	50.4	101	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	50.4	101	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	49.7	99	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	51.7	103	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	51.4	103	74-122
71-43-2	LCS Benzene	50.0	0.0	49.0	98	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	51.0	102	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	50.3	101	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	48.7	97	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	49.7	99	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	49.0	98	78-131
108-88-3	LCS Toluene	50.0	0.0	48.8	98	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	49.2	98	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	48.2	96	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	48.1	96	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	48.8	98	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	49.3	99	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	49.0	98	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	48.1	96	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	49.4	99	73-125



Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722112

Matrix: WATER

Lab Sample ID 1203927946

Instrument: VOA6.I

Analysis Date: 11/29/2017 10:42

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	48.3	97	74-126
100-42-5	LCS Styrene	50.0	0.0	48.2	96	72-130
75-25-2	LCS Bromoform	50.0	0.0	46.0	92	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	48.0	96	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	46.6	93	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	46.8	94	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	46.3	93	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	48.0	96	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	49.1	98	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	47.2	94	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	47.8	96	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	48.1	96	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	48.8	98	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	49.2	98	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	48.4	97	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	46.6	93	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	46.6	93	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	48.8	98	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	43.1	86	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	47.7	95	72-136
91-20-3	LCS Naphthalene	50.0	0.0	47.3	95	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	46.8	94	70-130

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722112

Matrix: WATER

Lab Sample ID 1203927946

Instrument: VOA6.I

Analysis Date: 11/29/2017 10:42

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	47.0	94	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	49.6	99	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	46.8	94	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4900	98	63-138

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722112

Matrix: WATER

Lab Sample ID 1203927947

Instrument: VOA6.I

Analysis Date: 11/29/2017 12:07

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	219	88	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	261	104	61-148
107-05-1	LCS Allyl chloride	250	0.0	264	105	59-125
107-13-1	LCS Acrylonitrile	250	0.0	271	108	65-122
107-12-0	LCS Propionitrile	250	0.0	262	105	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	268	107	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	254	101	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	242	97	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2620	105	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	48.0	96	66-147

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Post Spike

Client ID: CAMO-18-148077PS

Matrix: W

Lab Sample ID 1203927948

Instrument: VOA6.I

Analysis Date: 11/29/2017 18:42

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	96.6	97	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1270	102	56-131
67-64-1	PS Acetone	250	0.00 U	145	58	25-155
74-88-4	PS Iodomethane	250	0.00 U	248	99	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	257	103	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	229	92	48-133
78-93-3	PS 2-Butanone	250	0.00 U	175	70	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	227	91	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	168	67	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	50.1	100	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	49.2	98	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	46.8	94	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	51.9	104	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	47.9	96	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	47.7	95	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	46.0	92	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	53.0	106	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	48.9	98	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	49.4	99	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	54.6	109	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	53.6	107	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	53.2	106	69-127

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Post Spike

Client ID: CAMO-18-148077PS

Matrix: W

Lab Sample ID 1203927948

Instrument: VOA6.I

Analysis Date: 11/29/2017 18:42

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	PS 2,2-Dichloropropane	50.0	0.00	U	49.0	98	66-137
74-97-5	PS Bromochloromethane	50.0	0.00	U	50.4	101	71-130
67-66-3	PS Chloroform	50.0	0.00	U	52.0	104	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00	U	49.9	100	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00	U	49.0	98	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00	U	51.0	102	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00	U	53.5	107	69-130
71-43-2	PS Benzene	50.0	0.00	U	50.4	101	66-125
79-01-6	PS Trichloroethylene	50.0	0.00	U	51.1	102	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00	U	52.0	104	67-127
74-95-3	PS Dibromomethane	50.0	0.00	U	50.3	101	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00	U	51.8	104	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00	U	49.2	98	70-134
108-88-3	PS Toluene	50.0	0.00	U	49.4	99	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00	U	49.9	100	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00	U	49.7	99	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00	U	50.3	101	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00	U	48.1	96	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00	U	52.0	104	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00	U	50.7	101	71-127
108-90-7	PS Chlorobenzene	50.0	0.00	U	48.8	98	64-124
100-41-4	PS Ethylbenzene	50.0	0.00	U	49.1	98	61-130

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Post Spike

Client ID: CAMO-18-148077PS

Matrix: W

Lab Sample ID 1203927948

Instrument: VOA6.I

Analysis Date: 11/29/2017 18:42

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	48.8	98	62-131
100-42-5	PS Styrene	50.0	0.00 U	48.1	96	59-135
75-25-2	PS Bromoform	50.0	0.00 U	47.4	95	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	47.8	96	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	48.1	96	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	49.0	98	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	47.2	94	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	46.6	93	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	48.6	97	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	47.0	94	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	47.2	94	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	48.3	97	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	48.2	96	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	48.1	96	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	48.1	96	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	46.3	93	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	46.1	92	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	45.9	92	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	42.5	85	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	45.4	91	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	47.3	95	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	45.8	92	52-135

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-1001

Sample Type: Post Spike

Client ID: CAMO-18-148077PS

Matrix: W

Lab Sample ID 1203927948

Instrument: VOA6.I

Analysis Date: 11/29/2017 18:42

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	44.6	89	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	51.6	103	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	47.2	94	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	4720	94	60-140



Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148077PSD

Matrix: W

Lab Sample ID 1203927950

Instrument: VOA6.I

Analysis Date: 11/29/2017 19:09

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	96.8	97	59-132	0	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1360	109	56-131	7	0-20
67-64-1	PSD Acetone	250	0.00 U	158	63	25-155	9	0-20
74-88-4	PSD Iodomethane	250	0.00 U	249	99	66-133	0	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	257	103	61-141	0	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	234	94	48-133	2	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	190	76	25-143	8	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	243	97	61-127	7	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	182	73	33-138	8	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	49.2	98	33-164	2	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	47.4	95	53-139	4	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	45.4	91	58-140	3	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	50.6	101	59-146	3	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	47.5	95	65-129	1	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	47.3	95	65-141	1	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	47.0	94	69-127	2	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	52.8	106	59-130	1	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	48.5	97	62-123	1	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	51.2	102	69-132	3	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	54.3	109	65-127	0	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	53.3	107	67-127	0	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	53.3	107	69-127	0	0-20

**Volatile**  
**Quality Control Summary**  
**Spike Recovery Report**

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SDG Number: 2018-1001

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148077PSD

Matrix: W

Lab Sample ID 1203927950

Instrument: VOA6.I

Analysis Date: 11/29/2017 19:09

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
594-20-7	PSD 2,2-Dichloropropane	50.0	0.00	U 48.9	98	66-137	0	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 51.4	103	71-130	2	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 52.2	104	71-129	0	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 50.5	101	69-139	1	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 49.5	99	67-130	1	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 50.9	102	66-143	0	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 54.3	109	69-130	1	0-20
71-43-2	PSD Benzene	50.0	0.00	U 50.3	101	66-125	0	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 51.1	102	65-131	0	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 52.1	104	67-127	0	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 51.5	103	72-129	2	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 52.0	104	70-138	0	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 49.9	100	70-134	2	0-20
108-88-3	PSD Toluene	50.0	0.00	U 49.7	99	60-126	1	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 51.2	102	69-135	3	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 51.0	102	66-125	2	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 51.5	103	67-124	2	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 48.4	97	60-130	1	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 52.7	105	68-143	1	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 52.2	104	71-127	3	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 49.3	99	64-124	1	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 49.4	99	61-130	1	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148077PSD

Matrix: W

Lab Sample ID 1203927950

Instrument: VOA6.I

Analysis Date: 11/29/2017 19:09

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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 48.9	98	62-131	0	0-20
100-42-5	PSD Styrene	50.0	0.00	U 47.8	96	59-135	1	0-20
75-25-2	PSD Bromoform	50.0	0.00	U 50.2	100	64-138	6	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00	U 47.8	96	55-133	0	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00	U 50.3	101	62-129	4	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00	U 50.7	101	70-124	3	0-20
108-86-1	PSD Bromobenzene	50.0	0.00	U 47.5	95	62-124	1	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00	U 47.0	94	50-133	1	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00	U 48.5	97	53-135	0	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00	U 47.4	95	56-128	1	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00	U 47.2	94	53-130	0	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00	U 48.2	96	55-135	0	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00	U 48.0	96	53-132	0	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00	U 48.2	96	50-138	0	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00	U 48.2	96	49-138	0	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00	U 46.8	94	56-126	1	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00	U 46.5	93	55-125	1	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00	U 46.2	92	43-142	1	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00	U 48.4	97	62-141	13	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00	U 45.1	90	40-147	1	0-20
91-20-3	PSD Naphthalene	50.0	0.00	U 50.8	102	62-134	7	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00	U 47.2	94	52-135	3	0-20

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-1001

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148077PSD

Matrix: W

Lab Sample ID 1203927950

Instrument: VOA6.I

Analysis Date: 11/29/2017 19:09

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	45.0	90	50-133	1	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	52.0	104	71-133	1	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	47.3	95	60-125	0	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	5260	105	60-140	11	0-20

## Volatile

Page 1 of 2

Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-1001

Sample Type: Post Spike

Client ID: CAMO-18-148077PS

Matrix: W

Lab Sample ID 1203927949

Instrument: VOA6.I

Analysis Date: 11/29/2017 20:33

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	PS	Acrolein	250	0.00	U	223	89	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00	U	238	95	57-149
107-05-1	PS	Allyl chloride	250	0.00	U	244	97	54-128
107-13-1	PS	Acrylonitrile	250	0.00	U	274	110	59-129
107-12-0	PS	Propionitrile	250	0.00	U	270	108	58-131
126-98-7	PS	Methacrylonitrile	250	0.00	U	268	107	59-134
80-62-6	PS	Methyl methacrylate	250	0.00	U	256	102	62-135
97-63-2	PS	Ethyl methacrylate	250	0.00	U	242	97	60-136
78-83-1	PS	Isobutyl alcohol	2500	0.00	U	2750	110	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00	U	43.1	86	63-146

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-1001

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148077PSD

Matrix: W

Lab Sample ID 1203927951

Instrument: VOA6.I

Analysis Date: 11/29/2017 21:01

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1722112

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	216	86	49-141	3	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00	U	242	97	57-149	2	0-20
107-05-1	PSD Allyl chloride	250	0.00	U	248	99	54-128	2	0-20
107-13-1	PSD Acrylonitrile	250	0.00	U	266	106	59-129	3	0-20
107-12-0	PSD Propionitrile	250	0.00	U	257	103	58-131	5	0-20
126-98-7	PSD Methacrylonitrile	250	0.00	U	259	104	59-134	4	0-20
80-62-6	PSD Methyl methacrylate	250	0.00	U	247	99	62-135	4	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00	U	238	95	60-136	2	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00	U	2570	103	60-143	7	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00	U	44.6	89	63-146	3	0-20

## Method Blank Summary

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SDG Number:	2018-1001	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1722112	Instrument ID:	VOA6.I	Data File:	112817V6\6J233BA12.D
Lab Sample ID:	1203927942	Prep Date:	11/29/2017 01:39	Analyzed:	11/29/17 01:39
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 1722112	1203927944	112817V6\6J230LA12.D	11/29/17	0014
02 LCS for batch 1722112	1203927945	112817V6\6J232LA12.D	11/29/17	0110
03 CAMO-18-148084	438413004	112817V6\6J240.D	11/29/17	0456
04 CAMO-18-148106	438413006	112817V6\6J241.D	11/29/17	0523

## Method Blank Summary

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SDG Number:	2018-1001	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1722112	Instrument ID:	VOA6.I	Data File:	112917V6\6J309BA.D
Lab Sample ID:	1203927943	Prep Date:	11/29/2017 13:31	Analyzed:	11/29/17 13:31
Column:	DB-624				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
06 LCS for batch 1722112	1203927946	112917V6\6J303LA.D	11/29/17	1042
07 LCS for batch 1722112	1203927947	112917V6\6J306LA.D	11/29/17	1207
08 CAMO-18-148077PS	1203927948	112917V6\6J320.D	11/29/17	1842
09 CAMO-18-148077PSD	1203927950	112917V6\6J321.D	11/29/17	1909
10 CAMO-18-148077PS	1203927949	112917V6\6J324.D	11/29/17	2033
11 CAMO-18-148077PSD	1203927951	112917V6\6J325.D	11/29/17	2101



# Quality Control Data

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

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927942  
**Client Sample:** QC for batch 1722112  
**Client ID:** MB for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 01:39  
**Prep Date:** 11/29/2017 01:39  
**Data File:** 112817V6\6J233BA12.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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	J	0.410	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	J	0.330	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:** 2018-1001  
**Lab Sample ID:** 1203927942  
**Client Sample:** QC for batch 1722112  
**Client ID:** MB for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 01:39  
**Prep Date:** 11/29/2017 01:39  
**Data File:** 112817V6\6J233BA12.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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	J	0.490	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  
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Sample Summary

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SDG Number:	2018-1001	Matrix:	WATER
Lab Sample ID:	1203927942		
Client Sample:	QC for batch 1722112	Client:	ARSL004
Client ID:	MB for batch 1722112	Method:	SW-846:8260B
Batch ID:	1722112	Inst:	VOA6.I
Run Date:	11/29/2017 01:39	Analyst:	JP1
Prep Date:	11/29/2017 01:39		
Data File:	112817V6\6J233BA12.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	51.0	50.0	ug/L 102	(71%-134%)
Bromofluorobenzene	50.7	50.0	ug/L 101	(70%-131%)
Toluene-d8	48.9	50.0	ug/L 98	(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**

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927943  
**Client Sample:** QC for batch 1722112  
**Client ID:** MB for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 13:31  
**Prep Date:** 11/29/2017 13:31  
**Data File:** 112917V6\6J309BA.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

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

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

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927943  
**Client Sample:** QC for batch 1722112  
**Client ID:** MB for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 13:31  
**Prep Date:** 11/29/2017 13:31  
**Data File:** 112917V6\6J309BA.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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  
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SDG Number:	2018-1001	Matrix:	WATER
Lab Sample ID:	1203927943		
Client Sample:	QC for batch 1722112	Client:	ARSL004
Client ID:	MB for batch 1722112	Method:	SW-846:8260B
Batch ID:	1722112	Inst:	VOA6.I
Run Date:	11/29/2017 13:31	Analyst:	JP1
Prep Date:	11/29/2017 13:31		
Data File:	112917V6\6J309BA.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	51.7	50.0	ug/L 103	(71%-134%)
Bromofluorobenzene	51.7	50.0	ug/L 103	(70%-131%)
Toluene-d8	49.9	50.0	ug/L 100	(74%-124%)

## Tentatively Identified Compound Summary

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

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

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927944  
**Client Sample:** QC for batch 1722112  
**Client ID:** LCS for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 00:14  
**Prep Date:** 11/29/2017 00:14  
**Data File:** 112817V6\6J230LA12.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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		51.7	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		49.6	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		48.2	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		53.8	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		52.3	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		48.3	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	47.4	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		49.3	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	B	45.5	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		45.4	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		51.6	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		48.0	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		54.7	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		53.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		48.3	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		46.8	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		50.9	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		47.0	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		47.1	ug/L	0.300	1.00
78-93-3	2-Butanone		231	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		188	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		47.5	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		47.6	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		232	ug/L	1.50	5.00
67-64-1	Acetone		222	ug/L	1.50	10.0
75-05-8	Acetonitrile		1310	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		50.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		52.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		52.9	ug/L	0.300	1.00
75-25-2	Bromoform		49.2	ug/L	0.300	1.00



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

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927944  
**Client Sample:** QC for batch 1722112  
**Client ID:** LCS for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 00:14  
**Prep Date:** 11/29/2017 00:14  
**Data File:** 112817V6\6J230LA12.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		49.0	ug/L	0.300	1.00
75-15-0	Carbon disulfide		252	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		50.1	ug/L	0.300	1.00
108-90-7	Chlorobenzene		48.9	ug/L	0.300	1.00
75-00-3	Chloroethane		48.0	ug/L	0.300	1.00
67-66-3	Chloroform		52.0	ug/L	0.300	1.00
74-87-3	Chloromethane		48.5	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		52.5	ug/L	0.300	1.00
74-95-3	Dibromomethane		51.7	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		50.8	ug/L	0.300	1.00
60-29-7	Ethyl ether		47.9	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		48.4	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	46.2	ug/L	0.300	1.00
74-88-4	Iodomethane		249	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		47.2	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		50.3	ug/L	1.00	10.0
91-20-3	Naphthalene		50.2	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		49.0	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.9	ug/L	0.300	1.00
108-88-3	Toluene		49.0	ug/L	0.300	1.00
79-01-6	Trichloroethylene		51.6	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		46.8	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		240	ug/L	1.50	5.00
75-01-4	Vinyl chloride		46.2	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		53.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		50.7	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		95.5	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5080	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		45.5	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		46.4	ug/L	0.300	1.00
95-47-6	o-Xylene		48.5	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		47.5	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

SDG Number:	2018-1001	Matrix:	WATER
Lab Sample ID:	1203927944		
Client Sample:	QC for batch 1722112	Client:	ARSL004
Client ID:	LCS for batch 1722112	Method:	SW-846:8260B
Batch ID:	1722112	Inst:	VOA6.I
Run Date:	11/29/2017 00:14	Analyst:	JP1
Prep Date:	11/29/2017 00:14		
Data File:	112817V6\6J230LA12.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		51.3	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		47.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		53.8	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		50.6	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.2	50.0	ug/L	102	(71%-134%)
Bromofluorobenzene	50.6	50.0	ug/L	101	(70%-131%)
Toluene-d8	50.1	50.0	ug/L	100	(74%-124%)

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

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927945  
**Client Sample:** QC for batch 1722112  
**Client ID:** LCS for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 01:10  
**Prep Date:** 11/29/2017 01:10  
**Data File:** 112817V6\6J232LA12.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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		44.8	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		197	ug/L	1.50	5.00
107-13-1	Acrylonitrile		262	ug/L	1.50	5.00
107-05-1	Allyl chloride		246	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: 2018-1001  
 Lab Sample ID: 1203927945  
 Client Sample: QC for batch 1722112  
 Client ID: LCS for batch 1722112  
 Batch ID: 1722112  
 Run Date: 11/29/2017 01:10  
 Prep Date: 11/29/2017 01:10  
 Data File: 112817V6\6J232LA12.D

Client: ARSL004  
 Method: SW-846:8260B  
 Inst: VOA6.I  
 Analyst: JP1  
 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		237	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		2560	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		260	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		250	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		257	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		243	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**

<b>SDG Number:</b>	<b>2018-1001</b>	<b>Matrix:</b>	<b>WATER</b>
<b>Lab Sample ID:</b>	<b>1203927945</b>		
<b>Client Sample:</b>	<b>QC for batch 1722112</b>	<b>Client:</b>	<b>ARSL004</b>
<b>Client ID:</b>	<b>LCS for batch 1722112</b>	<b>Method:</b>	<b>SW-846:8260B</b>
<b>Batch ID:</b>	<b>1722112</b>	<b>Inst:</b>	<b>VOA6.I</b>
<b>Run Date:</b>	<b>11/29/2017 01:10</b>	<b>Analyst:</b>	<b>JP1</b>
<b>Prep Date:</b>	<b>11/29/2017 01:10</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Data File:</b>	<b>112817V6\6J232LA12.D</b>	<b>Column:</b>	<b>DB-624</b>

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	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	51.3	50.0	ug/L 103	(71%-134%)
Bromofluorobenzene	51.5	50.0	ug/L 103	(70%-131%)
Toluene-d8	49.3	50.0	ug/L 99	(74%-124%)

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

Page 1 of 3

**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927946  
**Client Sample:** QC for batch 1722112  
**Client ID:** LCS for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 10:42  
**Prep Date:** 11/29/2017 10:42  
**Data File:** 112917V6\6J303LA.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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		49.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		50.4	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		46.6	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		48.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		52.0	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		53.1	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		49.7	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		46.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		46.8	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		47.0	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		48.8	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		43.1	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		49.0	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		46.8	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		51.4	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		50.3	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		49.1	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		46.6	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		48.1	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.6	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		50.8	ug/L	0.300	1.00
78-93-3	2-Butanone		289	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		47.2	ug/L	0.300	1.00
591-78-6	2-Hexanone		262	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		47.8	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		48.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		239	ug/L	1.50	5.00
67-64-1	Acetone		292	ug/L	1.50	10.0
75-05-8	Acetonitrile		1250	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		49.0	ug/L	0.300	1.00
108-86-1	Bromobenzene		46.3	ug/L	0.300	1.00
74-97-5	Bromochloromethane		48.8	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		49.7	ug/L	0.300	1.00
75-25-2	Bromoform		46.0	ug/L	0.300	1.00

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

**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927946  
**Client Sample:** QC for batch 1722112  
**Client ID:** LCS for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 10:42  
**Prep Date:** 11/29/2017 10:42  
**Data File:** 112917V6\6J303LA.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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		47.3	ug/L	0.300	1.00
75-15-0	Carbon disulfide		255	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		51.7	ug/L	0.300	1.00
108-90-7	Chlorobenzene		48.1	ug/L	0.300	1.00
75-00-3	Chloroethane		49.7	ug/L	0.300	1.00
67-66-3	Chloroform		50.4	ug/L	0.300	1.00
74-87-3	Chloromethane		52.5	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		49.3	ug/L	0.300	1.00
74-95-3	Dibromomethane		48.7	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		52.7	ug/L	0.300	1.00
60-29-7	Ethyl ether		46.7	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		49.4	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		47.7	ug/L	0.300	1.00
74-88-4	Iodomethane		240	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		48.0	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		46.3	ug/L	1.00	10.0
91-20-3	Naphthalene		47.3	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		48.2	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		48.8	ug/L	0.300	1.00
108-88-3	Toluene		48.8	ug/L	0.300	1.00
79-01-6	Trichloroethylene		51.0	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		50.8	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		252	ug/L	1.50	5.00
75-01-4	Vinyl chloride		49.8	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		52.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		49.0	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		97.3	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4900	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		48.8	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		48.0	ug/L	0.300	1.00
95-47-6	o-Xylene		48.3	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		49.2	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b>	<b>2018-1001</b>	<b>Matrix:</b>	<b>WATER</b>
<b>Lab Sample ID:</b>	<b>1203927946</b>		
<b>Client Sample:</b>	<b>QC for batch 1722112</b>	<b>Client:</b>	<b>ARSL004</b>
<b>Client ID:</b>	<b>LCS for batch 1722112</b>	<b>Method:</b>	<b>SW-846:8260B</b>
<b>Batch ID:</b>	<b>1722112</b>	<b>Inst:</b>	<b>VOA6.I</b>
<b>Run Date:</b>	<b>11/29/2017 10:42</b>	<b>Analyst:</b>	<b>JP1</b>
<b>Prep Date:</b>	<b>11/29/2017 10:42</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Data File:</b>	<b>112917V6\6J303LA.D</b>	<b>Column:</b>	<b>DB-624</b>

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		48.1	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		48.1	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		53.8	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		49.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.0	50.0	ug/L	104	(71%-134%)
Bromofluorobenzene	50.8	50.0	ug/L	102	(70%-131%)
Toluene-d8	50.2	50.0	ug/L	100	(74%-124%)



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

Page 1 of 3

**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927947  
**Client Sample:** QC for batch 1722112  
**Client ID:** LCS for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 12:07  
**Prep Date:** 11/29/2017 12:07  
**Data File:** 112917V6\6J306LA.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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		48.0	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		219	ug/L	1.50	5.00
107-13-1	Acrylonitrile		271	ug/L	1.50	5.00
107-05-1	Allyl chloride		264	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:** 2018-1001  
**Lab Sample ID:** 1203927947  
**Client Sample:** QC for batch 1722112  
**Client ID:** LCS for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 12:07  
**Prep Date:** 11/29/2017 12:07  
**Data File:** 112917V6\6J306LA.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		242	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2620	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		268	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		254	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		262	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		261	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:** 2018-1001  
**Lab Sample ID:** 1203927947  
**Client Sample:** QC for batch 1722112  
**Client ID:** LCS for batch 1722112  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 12:07  
**Prep Date:** 11/29/2017 12:07  
**Data File:** 112917V6\6J306LA.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.1	50.0	ug/L 104	(71%-134%)
Bromofluorobenzene	52.3	50.0	ug/L 105	(70%-131%)
Toluene-d8	49.4	50.0	ug/L 99	(74%-124%)

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

Page 1 of 3

**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927948  
**Client Sample:** QC for batch 1722112  
**Client ID:** CAMO-18-148077PS  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 18:42  
**Prep Date:** 11/29/2017 18:42  
**Data File:** 112917V6\6J320.D

**Date Collected:** 11/20/2017 10:50  
**Date Received:** 11/22/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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		51.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		49.9	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		48.1	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		49.7	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		53.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		53.0	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		49.0	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		45.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		49.0	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		44.6	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		48.2	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		42.5	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		50.7	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		47.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		53.5	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		48.6	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		46.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		50.3	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.1	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		49.0	ug/L	0.300	1.00
78-93-3	2-Butanone		175	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		47.0	ug/L	0.300	1.00
591-78-6	2-Hexanone		168	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		47.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		48.1	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		227	ug/L	1.50	5.00
67-64-1	Acetone		145	ug/L	1.50	10.0
75-05-8	Acetonitrile		1270	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		50.4	ug/L	0.300	1.00
108-86-1	Bromobenzene		47.2	ug/L	0.300	1.00
74-97-5	Bromochloromethane		50.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		51.8	ug/L	0.300	1.00
75-25-2	Bromoform		47.4	ug/L	0.300	1.00

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

<b>SDG Number:</b> 2018-1001	<b>Date Collected:</b> 11/20/2017 10:50	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203927948	<b>Date Received:</b> 11/22/2017 08:55	
<b>Client Sample:</b> QC for batch 1722112	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAMO-18-148077PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1722112	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 11/29/2017 18:42	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 11/29/2017 18:42		
<b>Data File:</b> 112917V6\6J320.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		51.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		257	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		51.0	ug/L	0.300	1.00
108-90-7	Chlorobenzene		48.8	ug/L	0.300	1.00
75-00-3	Chloroethane		47.9	ug/L	0.300	1.00
67-66-3	Chloroform		52.0	ug/L	0.300	1.00
74-87-3	Chloromethane		49.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		52.0	ug/L	0.300	1.00
74-95-3	Dibromomethane		50.3	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		50.1	ug/L	0.300	1.00
60-29-7	Ethyl ether		46.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		49.1	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		45.4	ug/L	0.300	1.00
74-88-4	Iodomethane		248	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		47.8	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		48.9	ug/L	1.00	10.0
91-20-3	Naphthalene		47.3	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		48.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		48.1	ug/L	0.300	1.00
108-88-3	Toluene		49.4	ug/L	0.300	1.00
79-01-6	Trichloroethylene		51.1	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		47.7	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		229	ug/L	1.50	5.00
75-01-4	Vinyl chloride		46.8	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		53.2	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		49.2	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		96.6	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4720	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		45.9	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		46.6	ug/L	0.300	1.00
95-47-6	o-Xylene		48.8	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		48.1	ug/L	0.300	1.00

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

<b>SDG Number:</b>	<b>2018-1001</b>	<b>Date Collected:</b>	<b>11/20/2017 10:50</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203927948</b>	<b>Date Received:</b>	<b>11/22/2017 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1722112</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAMO-18-148077PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1722112</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>11/29/2017 18:42</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>11/29/2017 18:42</b>				
<b>Data File:</b>	<b>112917V6\6J320.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		49.4	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		48.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		54.6	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		49.9	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.0	50.0	ug/L	102	(71%-134%)
Bromofluorobenzene	49.7	50.0	ug/L	99	(70%-131%)
Toluene-d8	49.9	50.0	ug/L	100	(74%-124%)

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

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927949  
**Client Sample:** QC for batch 1722112  
**Client ID:** CAMO-18-148077PS  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 20:33  
**Prep Date:** 11/29/2017 20:33  
**Data File:** 112917V6\6J324.D

**Date Collected:** 11/20/2017 10:50  
**Date Received:** 11/22/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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		43.1	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		223	ug/L	1.50	5.00
107-13-1	Acrylonitrile		274	ug/L	1.50	5.00
107-05-1	Allyl chloride		244	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:** 2018-1001  
**Lab Sample ID:** 1203927949  
**Client Sample:** QC for batch 1722112  
**Client ID:** CAMO-18-148077PS  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 20:33  
**Prep Date:** 11/29/2017 20:33  
**Data File:** 112917V6\6J324.D

**Date Collected:** 11/20/2017 10:50  
**Date Received:** 11/22/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		242	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2750	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		268	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		256	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		270	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		238	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**

<b>SDG Number:</b>	<b>2018-1001</b>	<b>Date Collected:</b>	<b>11/20/2017 10:50</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203927949</b>	<b>Date Received:</b>	<b>11/22/2017 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1722112</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAMO-18-148077PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1722112</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>11/29/2017 20:33</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>11/29/2017 20:33</b>				
<b>Data File:</b>	<b>112917V6\6J324.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	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	51.5	50.0	ug/L 103	(71%-134%)
Bromofluorobenzene	51.2	50.0	ug/L 102	(70%-131%)
Toluene-d8	49.0	50.0	ug/L 98	(74%-124%)

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

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927950  
**Client Sample:** QC for batch 1722112  
**Client ID:** CAMO-18-148077PSD  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 19:09  
**Prep Date:** 11/29/2017 19:09  
**Data File:** 112917V6\6J321.D

**Date Collected:** 11/20/2017 10:50  
**Date Received:** 11/22/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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		52.0	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		50.3	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		51.0	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		53.3	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		52.8	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		49.5	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		47.2	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		50.7	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		45.0	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		48.0	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		48.4	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		52.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		47.3	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		54.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		52.1	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		48.5	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		46.8	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		46.5	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		48.9	ug/L	0.300	1.00
78-93-3	2-Butanone		190	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		47.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		182	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		47.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		48.2	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		243	ug/L	1.50	5.00
67-64-1	Acetone		158	ug/L	1.50	10.0
75-05-8	Acetonitrile		1360	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		50.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		47.5	ug/L	0.300	1.00
74-97-5	Bromochloromethane		51.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		52.0	ug/L	0.300	1.00
75-25-2	Bromoform		50.2	ug/L	0.300	1.00

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

<b>SDG Number:</b> 2018-1001	<b>Date Collected:</b> 11/20/2017 10:50	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203927950	<b>Date Received:</b> 11/22/2017 08:55	
<b>Client Sample:</b> QC for batch 1722112	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAMO-18-148077PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1722112	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 11/29/2017 19:09	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 11/29/2017 19:09		
<b>Data File:</b> 112917V6\6J321.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		50.6	ug/L	0.300	1.00
75-15-0	Carbon disulfide		257	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		50.9	ug/L	0.300	1.00
108-90-7	Chlorobenzene		49.3	ug/L	0.300	1.00
75-00-3	Chloroethane		47.5	ug/L	0.300	1.00
67-66-3	Chloroform		52.2	ug/L	0.300	1.00
74-87-3	Chloromethane		47.4	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		52.7	ug/L	0.300	1.00
74-95-3	Dibromomethane		51.5	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		49.2	ug/L	0.300	1.00
60-29-7	Ethyl ether		47.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		49.4	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		45.1	ug/L	0.300	1.00
74-88-4	Iodomethane		249	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		47.8	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		48.5	ug/L	1.00	10.0
91-20-3	Naphthalene		50.8	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		47.8	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		48.4	ug/L	0.300	1.00
108-88-3	Toluene		49.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		51.1	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		47.3	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		234	ug/L	1.50	5.00
75-01-4	Vinyl chloride		45.4	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		53.3	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		49.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		96.8	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5260	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		46.2	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		47.0	ug/L	0.300	1.00
95-47-6	o-Xylene		48.9	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		48.2	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b>	<b>2018-1001</b>	<b>Date Collected:</b>	<b>11/20/2017 10:50</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203927950</b>	<b>Date Received:</b>	<b>11/22/2017 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1722112</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAMO-18-148077PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1722112</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>11/29/2017 19:09</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>11/29/2017 19:09</b>				
<b>Data File:</b>	<b>112917V6\6J321.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		51.2	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		48.2	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		54.3	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		51.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.4	50.0	ug/L	103	(71%-134%)
Bromofluorobenzene	50.2	50.0	ug/L	100	(70%-131%)
Toluene-d8	50.0	50.0	ug/L	100	(74%-124%)

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

**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203927951  
**Client Sample:** QC for batch 1722112  
**Client ID:** CAMO-18-148077PSD  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 21:01  
**Prep Date:** 11/29/2017 21:01  
**Data File:** 112917V6\6J325.D

**Date Collected:** 11/20/2017 10:50  
**Date Received:** 11/22/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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		44.6	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		216	ug/L	1.50	5.00
107-13-1	Acrylonitrile		266	ug/L	1.50	5.00
107-05-1	Allyl chloride		248	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:** 2018-1001  
**Lab Sample ID:** 1203927951  
**Client Sample:** QC for batch 1722112  
**Client ID:** CAMO-18-148077PSD  
**Batch ID:** 1722112  
**Run Date:** 11/29/2017 21:01  
**Prep Date:** 11/29/2017 21:01  
**Data File:** 112917V6\6J325.D

**Date Collected:** 11/20/2017 10:50  
**Date Received:** 11/22/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**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
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		238	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		2570	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		259	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		247	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		257	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		242	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**

<b>SDG Number:</b>	<b>2018-1001</b>	<b>Date Collected:</b>	<b>11/20/2017 10:50</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203927951</b>	<b>Date Received:</b>	<b>11/22/2017 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1722112</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAMO-18-148077PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1722112</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>11/29/2017 21:01</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>11/29/2017 21:01</b>				
<b>Data File:</b>	<b>112917V6\6J325.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	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	51.0	50.0	ug/L	102	(71%-134%)
Bromofluorobenzene	51.5	50.0	ug/L	103	(70%-131%)
Toluene-d8	49.3	50.0	ug/L	99	(74%-124%)

# **Semi-Volatile Analysis**



# Case Narrative

**GC/MS Semivolatile  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1001  
Work Order #: 438413**

**Method/Analysis Information**

<b>Procedure:</b>	<b>Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry</b>
Analytical Method:	SW846 3510C/8270D
Prep Method:	SW846 3510C
Analytical Batch Number:	1721440
Prep Batch Number:	1721439

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413004	CAMO-18-148084
1203926328	Method Blank (MB)
1203926329	Laboratory Control Sample (LCS)
1203926330	438413004(CAMO-18-148084) Matrix Spike (MS)
1203926331	438413004(CAMO-18-148084) 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 associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

#### **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
1203926329 (LCS)	Benzoic acid	16* (21%-74%)

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

Sample 438413004 (CAMO-18-148084) 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
1203926330MS and 1203926331MSD (CAMO-18-148084)	Benzidine	RPD 60* (0%-30%)
	Pyridine	RPD 31* (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**

Sample (See Below) required manual integration in order to properly identify one or more peaks and/or to correctly position the baseline as set in the calibration standard injections.

Sample	Analyte	Value
1203926329 (LCS)	4-Nitrophenol	Result 10.4ug/L

**TIC Comment**

Tentatively identified compounds (TIC) were requested for sample 438413004 (CAMO-18-148084) 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:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>
MSDA.I	Agilent 7890B/5977A GC/MSD with 7693A Autoinjector	Agilent7890B/5977	DB-5MS	25m x 0.2mm x 0.33um (5% Polysilarylene-95% Polydimethylsiloxane)

### **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: 2018-1001 GEL Work Order: 438413

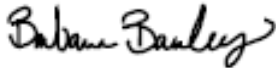
#### The Qualifiers in this report are defined as follows:

- \* 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**

Page 1 of 3

SDG Number: 2018-1001

Lab Sample ID: 438413004

Date Collected: 11/17/2017 10:59

Date Received: 11/21/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1721440

Inst: MSDA.I

Dilution: 1

Run Date: 11/28/2017 13:42

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 11/24/2017 02:40

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: 112817.s\Ak2809.D

Column: DB-5ms

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



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

Page 2 of 3

SDG Number: 2018-1001

Lab Sample ID: 438413004

Date Collected: 11/17/2017 10:59

Date Received: 11/21/2017 08:55

Matrix: W

Client: ARSL004

Method: SW846 3510C/8270D

Project: ESHL00114

SOP Ref: GL-OA-E-009

Client ID: CAMO-18-148084

Batch ID: 1721440

Inst: MSDA.I

Dilution: 1

Run Date: 11/28/2017 13:42

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 11/24/2017 02:40

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: 112817.s\Ak2809.D

Column: DB-5ms

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

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

Page 3 of 3

SDG Number: 2018-1001

Lab Sample ID: 438413004

Date Collected: 11/17/2017 10:59

Date Received: 11/21/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1721440

Inst: MSDA.I

Dilution: 1

Run Date: 11/28/2017 13:42

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 11/24/2017 02:40

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: 112817.s\Ak2809.D

Column: DB-5ms

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
	<i>m</i> -Nitroaniline					
95-48-7	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
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline	U	3.00	ug/L	3.00	10.0
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	68.6	100	ug/L 69	(32%-124%)
2-Fluorobiphenyl	29.3	50.0	ug/L 59	(32%-112%)
2-Fluorophenol	35.0	100	ug/L 35	(15%-88%)
Nitrobenzene-d5	34.4	50.0	ug/L 69	(36%-115%)
Phenol-d5	24.1	100	ug/L 24	(15%-91%)
p-Terphenyl-d14	27.6	50.0	ug/L 55	(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**

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**Semi-Volatile**  
**Surrogate Recovery Report**

Page 1 of 1

**SDG Number: 2018-1001****Matrix Type: LIQUID**

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203926328	MB for batch 1721439	35	22	81	65	77	88
1203926329	LCS for batch 1721439	34	21	77	67	77	85
438413004	CAMO-18-148084	35	24	69	59	69	55
1203926330	CAMO-18-148084MS	50	42	68	54	77	85
1203926331	CAMO-18-148084MSD	50	41	69	57	76	81

**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: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721439

Matrix: WATER

Lab Sample ID 1203926329

Instrument: MSDA.I

Analysis Date: 11/28/2017 13:15

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

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	18.8	38	30-88
110-86-1	LCS Pyridine	50.0	0.0	18.3	37	27-89
62-53-3	LCS Aniline	50.0	0.0	31.6	63	49-112
108-95-2	LCS Phenol	50.0	0.0	10.8	22	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	40.0	80	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	31.9	64	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	28.9	58	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	29.3	59	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	30.6	61	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)ether	50.0	0.0	38.8	78	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	28.9	58	44-102
95-48-7	LCS o-Cresol	50.0	0.0	25.6	51	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	26.8	54	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	41.0	82	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	27.1	54	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	37.8	76	53-115
78-59-1	LCS Isophorone	50.0	0.0	37.4	75	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	38.8	78	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	27.8	56	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	39.2	78	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	35.8	72	53-109
65-85-0	LCS Benzoic acid	100	0.0	16.4	16 *	21-74

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721439

Matrix: WATER

Lab Sample ID 1203926329

Instrument: MSDA.I

Analysis Date: 11/28/2017 13:15

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

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	46.0	92	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	26.8	54	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	33.6	67	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	31.0	62	42-103
91-20-3	LCS Naphthalene	50.0	0.0	32.7	65	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	32.4	65	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	19.3	39	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	37.4	75	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	36.4	73	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	32.2	64	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	39.0	78	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	41.9	84	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	39.4	79	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	37.1	74	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	37.8	76	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	34.4	69	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	35.6	71	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	34.6	69	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	33.5	67	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	36.6	73	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	39.4	79	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	10.4	21	15-137

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721439

Matrix: WATER

Lab Sample ID 1203926329

Instrument: MSDA.I

Analysis Date: 11/28/2017 13:15

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

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	33.2	66	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	33.7	67	52-121
100-01-6	LCS 4-Nitroaniline	50.0	0.0	36.5	73	44-137
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	40.8	82	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	39.5	79	55-113
122-66-7	LCS Azobenzene	50.0	0.0	37.8	76	53-115
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	34.9	70	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	36.4	73	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	48.1	96	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	35.9	72	55-110
120-12-7	LCS Anthracene	50.0	0.0	36.8	74	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	40.7	81	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	36.6	73	54-118
129-00-0	LCS Pyrene	50.0	0.0	38.3	77	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	42.7	85	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	39.7	79	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	38.0	76	57-112
218-01-9	LCS Chrysene	50.0	0.0	39.7	79	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	35.2	70	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	36.0	72	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	37.1	74	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	36.4	73	40-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721439

Matrix: WATER

Lab Sample ID 1203926329

Instrument: MSDA.I

Analysis Date: 11/28/2017 13:15

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

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	41.6	83	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	42.8	86	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	40.6	81	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	20.0	40	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	34.1	68	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	29.2	58	44-102
1912-24-9	LCS Atrazine	50.0	0.0	43.1	86	60-131
92-87-5	LCS Benzidine	100	0.0	64.5	65	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	36.8	74	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	29.7	59	39-99



Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Client ID: CAMO-18-148084MS

Lab Sample ID 1203926330

Instrument: MSDA.I

Analyst: JMB3

Inj. Vol: 1 uL

Sample Type: Matrix Spike

Matrix: W

Analysis Date: 11/28/2017 14:09

Dilution: 1

Prep Batch ID: 1721439

Batch ID: 1721440

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	119	0.00 U	64.0	54	25-106
110-86-1	MS Pyridine	119	0.00 U	52.3	44	24-93
62-53-3	MS Aniline	119	0.00 U	81.5	68	37-113
108-95-2	MS Phenol	119	0.00 U	51.5	43	23-82
111-44-4	MS bis(2-Chloroethyl) ether	119	0.00 U	91.5	77	39-114
95-57-8	MS 2-Chlorophenol	119	0.00 U	83.8	70	37-108
541-73-1	MS 1,3-Dichlorobenzene	119	0.00 U	65.4	55	27-97
106-46-7	MS 1,4-Dichlorobenzene	119	0.00 U	66.4	56	28-97
95-50-1	MS 1,2-Dichlorobenzene	119	0.00 U	68.8	58	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)ether	119	0.00 U	90.3	76	32-127
100-51-6	MS Benzyl alcohol	119	0.00 U	85.2	72	37-116
95-48-7	MS o-Cresol	119	0.00 U	77.7	65	34-109
65794-96-9	MS m,p-Cresols	119	0.00 U	88.9	75	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	119	0.00 U	95.5	80	42-118
67-72-1	MS Hexachloroethane	119	0.00 U	61.5	52	29-94
98-95-3	MS Nitrobenzene	119	0.00 U	86.9	73	38-123
78-59-1	MS Isophorone	119	0.00 U	86.1	72	43-120
88-75-5	MS 2-Nitrophenol	119	0.00 U	92.7	78	39-115
105-67-9	MS 2,4-Dimethylphenol	119	0.00 U	71.1	60	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	119	0.00 U	90.2	76	42-118
120-83-2	MS 2,4-Dichlorophenol	119	0.00 U	87.2	73	40-111
65-85-0	MS Benzoic acid	238	0.00 U	119	50	17-95

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Matrix Spike

Client ID: CAMO-18-148084MS

Matrix: W

Lab Sample ID 1203926330

Instrument: MSDA.I

Analysis Date: 11/28/2017 14:09

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	119	0.00 U	108	91	44-138
87-68-3	MS Hexachlorobutadiene	119	0.00 U	62.7	53	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	119	0.00 U	88.9	75	41-122
91-57-6	MS 2-Methylnaphthalene	119	0.00 U	71.5	60	29-109
91-20-3	MS Naphthalene	119	0.00 U	74.4	63	31-108
90-12-0	MS 1-Methylnaphthalene	119	0.00 U	74.0	62	33-112
77-47-4	MS Hexachlorocyclopentadiene	119	0.00 U	42.4	36	26-79
88-06-2	MS 2,4,6-Trichlorophenol	119	0.00 U	86.9	73	39-124
95-95-4	MS 2,4,5-Trichlorophenol	119	0.00 U	86.6	73	42-120
91-58-7	MS 2-Chloronaphthalene	119	0.00 U	71.9	60	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	119	0.00 U	92.9	78	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	119	0.00 U	108	90	42-144
131-11-3	MS Dimethylphthalate	119	0.00 U	92.2	77	45-128
606-20-2	MS 2,6-Dinitrotoluene	119	0.00 U	87.3	73	46-124
121-14-2	MS 2,4-Dinitrotoluene	119	0.00 U	93.6	79	45-125
208-96-8	MS Acenaphthylene	119	0.00 U	78.3	66	35-120
83-32-9	MS Acenaphthene	119	0.00 U	81.5	68	35-117
51-28-5	MS 2,4-Dinitrophenol	119	0.00 U	93.3	78	27-122
132-64-9	MS Dibenzofuran	119	0.00 U	79.2	67	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	119	0.00 U	90.1	76	40-128
84-66-2	MS Diethylphthalate	119	0.00 U	94.0	79	43-127
100-02-7	MS 4-Nitrophenol	119	0.00 U	44.7	38	17-85

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Matrix Spike

Client ID: CAMO-18-148084MS

Matrix: W

Lab Sample ID 1203926330

Instrument: MSDA.I

Analysis Date: 11/28/2017 14:09

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS Fluorene	119	0.00 U	80.5	68	39-117
7005-72-3	MS 4-Chlorophenylphenylether	119	0.00 U	82.2	69	39-121
100-01-6	MS 4-Nitroaniline	119	0.00 U	99.9	84	30-133
534-52-1	MS 2-Methyl-4,6-dinitrophenol	119	0.00 U	102	85	32-126
122-39-4	MS Diphenylamine	119	0.00 U	83.3	70	37-118
122-66-7	MS Azobenzene	119	0.00 U	84.1	71	38-120
101-55-3	MS 4-Bromophenylphenylether	119	0.00 U	83.6	70	39-121
118-74-1	MS Hexachlorobenzene	119	0.00 U	84.7	71	40-118
87-86-5	MS Pentachlorophenol	119	0.00 U	115	97	35-121
85-01-8	MS Phenanthrene	119	0.00 U	85.2	72	40-115
120-12-7	MS Anthracene	119	0.00 U	86.2	72	38-120
84-74-2	MS Di-n-butylphthalate	119	0.00 U	95.9	81	41-128
206-44-0	MS Fluoranthene	119	0.00 U	89.1	75	41-119
129-00-0	MS Pyrene	119	0.00 U	88.7	74	35-128
85-68-7	MS Butylbenzylphthalate	119	0.00 U	96.8	81	40-129
117-81-7	MS bis(2-Ethylhexyl)phthalate	119	0.00 U	96.7	81	38-131
56-55-3	MS Benzo(a)anthracene	119	0.00 U	88.8	75	39-120
218-01-9	MS Chrysene	119	0.00 U	93.0	78	41-124
117-84-0	MS Di-n-octylphthalate	119	0.00 U	86.8	73	37-134
205-99-2	MS Benzo(b)fluoranthene	119	0.00 U	87.0	73	31-122
207-08-9	MS Benzo(k)fluoranthene	119	0.00 U	90.5	76	33-123
50-32-8	MS Benzo(a)pyrene	119	0.00 U	85.3	72	32-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Matrix Spike

Client ID: CAMO-18-148084MS

Matrix: W

Lab Sample ID 1203926330

Instrument: MSDA.I

Analysis Date: 11/28/2017 14:09

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

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	119	0.00 U	87.7	74	27-121
53-70-3	MS Dibenzo(a,h)anthracene	119	0.00 U	88.6	74	30-125
191-24-2	MS Benzo(ghi)perylene	119	0.00 U	85.0	71	24-126
123-91-1	MS 1,4-Dioxane	119	0.00 U	67.0	56	24-110
930-55-2	MS N-Nitrosopyrrolidine	119	0.00 U	92.1	77	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	119	0.00 U	66.3	56	32-101
1912-24-9	MS Atrazine	119	0.00 U	97.1	82	42-129
92-87-5	MS Benzidine	238	0.00 U	114	48	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	119	0.00 U	80.0	67	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	119	0.00 U	68.2	57	26-102

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-148084MSD

Matrix: W

Lab Sample ID 1203926331

Instrument: MSDA.I

Analysis Date: 11/28/2017 14:36

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

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	119	0.00	U	66.4	56	25-106	4	0-30
110-86-1	MSD Pyridine	119	0.00	U	38.2	32	24-93	31 *	0-30
62-53-3	MSD Aniline	119	0.00	U	74.2	62	37-113	9	0-30
108-95-2	MSD Phenol	119	0.00	U	51.5	43	23-82	0	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	119	0.00	U	91.3	77	39-114	0	0-30
95-57-8	MSD 2-Chlorophenol	119	0.00	U	83.1	70	37-108	1	0-30
541-73-1	MSD 1,3-Dichlorobenzene	119	0.00	U	64.1	54	27-97	2	0-30
106-46-7	MSD 1,4-Dichlorobenzene	119	0.00	U	65.1	55	28-97	2	0-30
95-50-1	MSD 1,2-Dichlorobenzene	119	0.00	U	67.7	57	28-99	2	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)ether	119	0.00	U	89.4	75	32-127	1	0-30
100-51-6	MSD Benzyl alcohol	119	0.00	U	85.5	72	37-116	0	0-30
95-48-7	MSD o-Cresol	119	0.00	U	77.2	65	34-109	1	0-30
65794-96-9	MSD m,p-Cresols	119	0.00	U	87.5	74	36-120	2	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine N-Nitrosodipropylamine	119	0.00	U	93.3	78	42-118	2	0-30
67-72-1	MSD Hexachloroethane	119	0.00	U	61.3	51	29-94	0	0-30
98-95-3	MSD Nitrobenzene	119	0.00	U	87.7	74	38-123	1	0-30
78-59-1	MSD Isophorone	119	0.00	U	85.4	72	43-120	1	0-30
88-75-5	MSD 2-Nitrophenol	119	0.00	U	93.4	78	39-115	1	0-30
105-67-9	MSD 2,4-Dimethylphenol	119	0.00	U	71.3	60	39-107	0	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	119	0.00	U	89.5	75	42-118	1	0-30
120-83-2	MSD 2,4-Dichlorophenol	119	0.00	U	88.0	74	40-111	1	0-30
65-85-0	MSD Benzoic acid	238	0.00	U	120	50	17-95	1	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-148084MSD

Matrix: W

Lab Sample ID 1203926331

Instrument: MSDA.I

Analysis Date: 11/28/2017 14:36

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

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	119	0.00	U 106	89	44-138	2	0-30
87-68-3	MSD Hexachlorobutadiene	119	0.00	U 61.5	52	26-98	2	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	119	0.00	U 88.4	74	41-122	1	0-30
91-57-6	MSD 2-Methylnaphthalene	119	0.00	U 71.8	60	29-109	0	0-30
91-20-3	MSD Naphthalene	119	0.00	U 74.0	62	31-108	1	0-30
90-12-0	MSD 1-Methylnaphthalene	119	0.00	U 74.8	63	33-112	1	0-30
77-47-4	MSD Hexachlorocyclopentadiene	119	0.00	U 42.2	35	26-79	0	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	119	0.00	U 86.6	73	39-124	0	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	119	0.00	U 86.4	73	42-120	0	0-30
91-58-7	MSD 2-Chloronaphthalene	119	0.00	U 73.1	61	29-113	2	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	119	0.00	U 92.0	77	41-121	1	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	119	0.00	U 108	91	42-144	0	0-30
131-11-3	MSD Dimethylphthalate	119	0.00	U 91.3	77	45-128	1	0-30
606-20-2	MSD 2,6-Dinitrotoluene	119	0.00	U 87.9	74	46-124	1	0-30
121-14-2	MSD 2,4-Dinitrotoluene	119	0.00	U 92.9	78	45-125	1	0-30
208-96-8	MSD Acenaphthylene	119	0.00	U 79.1	66	35-120	1	0-30
83-32-9	MSD Acenaphthene	119	0.00	U 82.4	69	35-117	1	0-30
51-28-5	MSD 2,4-Dinitrophenol	119	0.00	U 92.6	78	27-122	1	0-30
132-64-9	MSD Dibenzofuran	119	0.00	U 80.0	67	38-113	1	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	119	0.00	U 91.0	76	40-128	1	0-30
84-66-2	MSD Diethylphthalate	119	0.00	U 92.9	78	43-127	1	0-30
100-02-7	MSD 4-Nitrophenol	119	0.00	U 45.2	38	17-85	1	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-148084MSD

Matrix: W

Lab Sample ID 1203926331

Instrument: MSDA.I

Analysis Date: 11/28/2017 14:36

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

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	119	0.00 U	81.2	68	39-117	1	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	119	0.00 U	84.2	71	39-121	2	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	119	0.00 U	100	84	30-133	0	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	119	0.00 U	102	85	32-126	0	0-30
122-39-4	MSD Diphenylamine	119	0.00 U	81.8	69	37-118	2	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	119	0.00 U	83.7	70	38-120	0	0-30
101-55-3	MSD 4-Bromophenylphenylether	119	0.00 U	84.0	71	39-121	0	0-30
118-74-1	MSD Hexachlorobenzene	119	0.00 U	84.8	71	40-118	0	0-30
87-86-5	MSD Pentachlorophenol	119	0.00 U	115	96	35-121	0	0-30
85-01-8	MSD Phenanthrene	119	0.00 U	84.7	71	40-115	1	0-30
120-12-7	MSD Anthracene	119	0.00 U	86.2	72	38-120	0	0-30
84-74-2	MSD Di-n-butylphthalate	119	0.00 U	94.3	79	41-128	2	0-30
206-44-0	MSD Fluoranthene	119	0.00 U	87.5	74	41-119	2	0-30
129-00-0	MSD Pyrene	119	0.00 U	87.8	74	35-128	1	0-30
85-68-7	MSD Butylbenzylphthalate	119	0.00 U	96.9	81	40-129	0	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	119	0.00 U	96.6	81	38-131	0	0-30
56-55-3	MSD Benzo(a)anthracene	119	0.00 U	86.3	72	39-120	3	0-30
218-01-9	MSD Chrysene	119	0.00 U	90.5	76	41-124	3	0-30
117-84-0	MSD Di-n-octylphthalate	119	0.00 U	86.5	73	37-134	0	0-30
205-99-2	MSD Benzo(b)fluoranthene	119	0.00 U	88.0	74	31-122	1	0-30
207-08-9	MSD Benzo(k)fluoranthene	119	0.00 U	90.5	76	33-123	0	0-30
50-32-8	MSD Benzo(a)pyrene	119	0.00 U	83.7	70	32-118	2	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1001

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-148084MSD

Matrix: W

Lab Sample ID 1203926331

Instrument: MSDA.I

Analysis Date: 11/28/2017 14:36

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1721439

Inj. Vol: 1 uL

Batch ID: 1721440

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
193-39-5	MSD Indeno(1,2,3-cd)pyrene	119	0.00	U	77.8	65	27-121	12	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	119	0.00	U	78.9	66	30-125	12	0-30
191-24-2	MSD Benzo(ghi)perylene	119	0.00	U	76.7	64	24-126	10	0-30
123-91-1	MSD 1,4-Dioxane	119	0.00	U	68.0	57	24-110	2	0-30
930-55-2	MSD N-Nitrosopyrrolidine	119	0.00	U	90.0	76	47-119	2	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	119	0.00	U	67.6	57	32-101	2	0-30
1912-24-9	MSD Atrazine	119	0.00	U	93.8	79	42-129	3	0-30
92-87-5	MSD Benzidine	238	0.00	U	61.1	26	15-130	60 *	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	119	0.00	U	74.9	63	34-124	7	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	119	0.00	U	68.6	58	26-102	1	0-30



## Method Blank Summary

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SDG Number:	2018-1001	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1721439	Instrument ID:	MSDA.I	Data File:	112817.s\Ak2807.D
Lab Sample ID:	1203926328	Prep Date:	11/24/2017 02:40	Analyzed:	11/28/17 12:49
Column:	DB-5ms				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1721439	1203926329	112817.s\Ak2808.D	11/28/17	1315
02 CAMO-18-148084	438413004	112817.s\Ak2809.D	11/28/17	1342
03 CAMO-18-148084MS	1203926330	112817.s\Ak2810.D	11/28/17	1409
04 CAMO-18-148084MSD	1203926331	112817.s\Ak2811.D	11/28/17	1436

# Quality Control Data

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

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SDG Number: 2018-1001

Lab Sample ID: 1203926328

Client Sample: QC for batch 1721439

Client ID: MB for batch 1721439

Batch ID: 1721440

Run Date: 11/28/2017 12:49

Prep Date: 11/24/2017 02:40

Data File: 112817.s\Ak2807.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.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

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

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SDG Number: 2018-1001

Lab Sample ID: 1203926328

Client Sample: QC for batch 1721439

Client ID: MB for batch 1721439

Batch ID: 1721440

Run Date: 11/28/2017 12:49

Prep Date: 11/24/2017 02:40

Data File: 112817.s\Ak2807.D

Matrix: WATER

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.I

Analyst: JMB3

Aliquot: 1000 mL

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
207-08-9	Benzo(k)fluoranthene	U	0.300	ug/L	0.300	1.00
65-85-0	Benzoic acid	U	6.00	ug/L	6.00	20.0
100-51-6	Benzyl alcohol	U	3.00	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate	U	3.00	ug/L	3.00	10.0
218-01-9	Chrysene	U	0.300	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate	U	3.00	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate	U	3.00	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene	U	0.300	ug/L	0.300	1.00
132-64-9	Dibenzofuran	U	3.00	ug/L	3.00	10.0
84-66-2	Diethylphthalate	U	3.00	ug/L	3.00	10.0
131-11-3	Dimethylphthalate	U	3.00	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine	U	3.00	ug/L	3.00	10.0
206-44-0	Fluoranthene	U	0.300	ug/L	0.300	1.00
86-73-7	Fluorene	U	0.300	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene	U	3.00	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene	U	3.00	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene	U	3.00	ug/L	3.00	10.0
67-72-1	Hexachloroethane	U	3.00	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.300	ug/L	0.300	1.00
78-59-1	Isophorone	U	3.50	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.00	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi-n-propylamine	U	3.00	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.00	ug/L	3.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
98-95-3	Nitrobenzene	U	3.00	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol	U	3.00	ug/L	3.00	10.0
85-01-8	Phenanthrene	U	0.300	ug/L	0.300	1.00
108-95-2	Phenol	U	3.00	ug/L	3.00	10.0
129-00-0	Pyrene	U	0.300	ug/L	0.300	1.00
110-86-1	Pyridine	U	3.00	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.00	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane	U	3.00	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether	U	3.00	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.00	ug/L	3.00	10.0

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

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<b>SDG Number:</b> 2018-1001	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 1203926328	
<b>Client Sample:</b> QC for batch 1721439	<b>Client:</b> ARSL004
<b>Client ID:</b> MB for batch 1721439	<b>Method:</b> SW846 3510C/8270D
<b>Batch ID:</b> 1721440	<b>Inst:</b> MSDA.I
<b>Run Date:</b> 11/28/2017 12:49	<b>Analyst:</b> JMB3
<b>Prep Date:</b> 11/24/2017 02:40	<b>Aliquot:</b> 1000 mL
<b>Data File:</b> 112817.s\Ak2807.D	<b>Column:</b> DB-5ms
	<b>Project:</b> QC
	<b>SOP Ref:</b> GL-OA-E-009
	<b>Dilution:</b> 1
	<b>Inj. Vol:</b> 1 uL
	<b>Final Volume:</b> 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
	<i>m-Nitroaniline</i>					
95-48-7	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
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	U	3.00	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	76.7	100	ug/L	77	(32%-124%)
2-Fluorobiphenyl	32.4	50.0	ug/L	65	(32%-112%)
2-Fluorophenol	35.4	100	ug/L	35	(15%-88%)
Nitrobenzene-d5	40.3	50.0	ug/L	81	(36%-115%)
Phenol-d5	22.1	100	ug/L	22	(15%-91%)
p-Terphenyl-d14	44.0	50.0	ug/L	88	(36%-121%)

**Tentatively Identified Compound Summary**

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

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

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203926329  
**Client Sample:** QC for batch 1721439  
**Client ID:** LCS for batch 1721439  
**Batch ID:** 1721440  
**Run Date:** 11/28/2017 13:15  
**Prep Date:** 11/24/2017 02:40  
**Data File:** 112817.s\Ak2808.D

**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.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		29.2	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		29.7	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		30.6	ug/L	3.00	10.0
122-66-7	Azobenzene		37.8	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		28.9	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		29.3	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		20.0	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		32.4	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		36.6	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		36.4	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		37.4	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		35.8	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		27.8	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		34.6	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		37.8	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		37.1	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		32.2	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		31.9	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		40.8	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		31.0	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		38.8	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		36.8	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		34.9	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		33.6	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		46.0	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		33.7	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		10.4	ug/L	3.00	10.0
83-32-9	Acenaphthene		35.6	ug/L	0.300	1.00
208-96-8	Acenaphthylene		34.4	ug/L	0.300	1.00
62-53-3	Aniline		31.6	ug/L	4.20	10.0
120-12-7	Anthracene		36.8	ug/L	0.300	1.00
1912-24-9	Atrazine		43.1	ug/L	3.00	10.0
92-87-5	Benzidine		64.5	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		38.0	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		36.4	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		36.0	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		40.6	ug/L	0.300	1.00

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

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203926329  
**Client Sample:** QC for batch 1721439  
**Client ID:** LCS for batch 1721439  
**Batch ID:** 1721440  
**Run Date:** 11/28/2017 13:15  
**Prep Date:** 11/24/2017 02:40  
**Data File:** 112817.s\Ak2808.D

**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.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		37.1	ug/L	0.300	1.00
65-85-0	Benzoic acid	J	16.4	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		28.9	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		42.7	ug/L	3.00	10.0
218-01-9	Chrysene		39.7	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		40.7	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		35.2	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		42.8	ug/L	0.300	1.00
132-64-9	Dibenzofuran		33.5	ug/L	3.00	10.0
84-66-2	Diethylphthalate		39.4	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		39.4	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		39.5	ug/L	3.00	10.0
206-44-0	Fluoranthene		36.6	ug/L	0.300	1.00
86-73-7	Fluorene		33.2	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		36.4	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		26.8	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		19.3	ug/L	3.00	10.0
67-72-1	Hexachloroethane		27.1	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		41.6	ug/L	0.300	1.00
78-59-1	Isophorone		37.4	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		18.8	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		41.0	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		34.1	ug/L	3.00	10.0
91-20-3	Naphthalene		32.7	ug/L	0.300	1.00
98-95-3	Nitrobenzene		37.8	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		48.1	ug/L	3.00	10.0
85-01-8	Phenanthrene		35.9	ug/L	0.300	1.00
108-95-2	Phenol		10.8	ug/L	3.00	10.0
129-00-0	Pyrene		38.3	ug/L	0.300	1.00
110-86-1	Pyridine		18.3	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		38.8	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		39.2	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		40.0	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		39.7	ug/L	3.00	10.0

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<b>SDG Number:</b> 2018-1001	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 1203926329	
<b>Client Sample:</b> QC for batch 1721439	<b>Client:</b> ARSL004
<b>Client ID:</b> LCS for batch 1721439	<b>Method:</b> SW846 3510C/8270D
<b>Batch ID:</b> 1721440	<b>Inst:</b> MSDA.I
<b>Run Date:</b> 11/28/2017 13:15	<b>Analyst:</b> JMB3
<b>Prep Date:</b> 11/24/2017 02:40	<b>Aliquot:</b> 1000 mL
<b>Data File:</b> 112817.s\Ak2808.D	<b>Column:</b> DB-5ms
	<b>Project:</b> QC
	<b>SOP Ref:</b> GL-OA-E-009
	<b>Dilution:</b> 1
	<b>Inj. Vol:</b> 1 uL
	<b>Final Volume:</b> 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		26.8	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		41.9	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		25.6	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		39.0	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		36.5	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	76.7	100	ug/L	77	(32%-124%)
2-Fluorobiphenyl	33.7	50.0	ug/L	67	(32%-112%)
2-Fluorophenol	33.7	100	ug/L	34	(15%-88%)
Nitrobenzene-d5	38.3	50.0	ug/L	77	(36%-115%)
Phenol-d5	21.1	100	ug/L	21	(15%-91%)
p-Terphenyl-d14	42.3	50.0	ug/L	85	(36%-121%)



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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203926330  
**Client Sample:** QC for batch 1721439  
**Client ID:** CAMO-18-148084MS  
**Batch ID:** 1721440  
**Run Date:** 11/28/2017 14:09  
**Prep Date:** 11/24/2017 02:40  
**Data File:** 112817.s\Ak2810.D

**Date Collected:** 11/17/2017 10:59  
**Date Received:** 11/21/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 420 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		66.3	ug/L	7.14	23.8
120-82-1	1,2,4-Trichlorobenzene		68.2	ug/L	7.14	23.8
95-50-1	1,2-Dichlorobenzene		68.8	ug/L	7.14	23.8
122-66-7	Azobenzene		84.1	ug/L	7.14	23.8
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		65.4	ug/L	7.14	23.8
106-46-7	1,4-Dichlorobenzene		66.4	ug/L	7.14	23.8
123-91-1	1,4-Dioxane		67.0	ug/L	7.14	23.8
90-12-0	1-Methylnaphthalene		74.0	ug/L	0.714	2.38
58-90-2	2,3,4,6-Tetrachlorophenol		90.1	ug/L	7.14	23.8
95-95-4	2,4,5-Trichlorophenol		86.6	ug/L	7.14	23.8
88-06-2	2,4,6-Trichlorophenol		86.9	ug/L	7.14	23.8
120-83-2	2,4-Dichlorophenol		87.2	ug/L	7.14	23.8
105-67-9	2,4-Dimethylphenol		71.1	ug/L	7.14	23.8
51-28-5	2,4-Dinitrophenol		93.3	ug/L	11.9	47.6
121-14-2	2,4-Dinitrotoluene		93.6	ug/L	7.14	23.8
606-20-2	2,6-Dinitrotoluene		87.3	ug/L	7.14	23.8
91-58-7	2-Chloronaphthalene		71.9	ug/L	0.976	2.38
95-57-8	2-Chlorophenol		83.8	ug/L	7.14	23.8
534-52-1	2-Methyl-4,6-dinitrophenol		102	ug/L	7.14	23.8
91-57-6	2-Methylnaphthalene		71.5	ug/L	0.714	2.38
88-75-5	2-Nitrophenol		92.7	ug/L	7.14	23.8
91-94-1	3,3'-Dichlorobenzidine		80.0	ug/L	7.14	23.8
101-55-3	4-Bromophenylphenylether		83.6	ug/L	7.14	23.8
59-50-7	Parachlorometa cresol		88.9	ug/L	7.14	23.8
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		108	ug/L	7.86	23.8
7005-72-3	4-Chlorophenylphenylether		82.2	ug/L	7.14	23.8
100-02-7	4-Nitrophenol		44.7	ug/L	7.14	23.8
83-32-9	Acenaphthene		81.5	ug/L	0.714	2.38
208-96-8	Acenaphthylene		78.3	ug/L	0.714	2.38
62-53-3	Aniline		81.5	ug/L	10.0	23.8
120-12-7	Anthracene		86.2	ug/L	0.714	2.38
1912-24-9	Atrazine		97.1	ug/L	7.14	23.8
92-87-5	Benzidine		114	ug/L	9.29	23.8
56-55-3	Benzo(a)anthracene		88.8	ug/L	0.714	2.38
50-32-8	Benzo(a)pyrene		85.3	ug/L	0.714	2.38
205-99-2	Benzo(b)fluoranthene		87.0	ug/L	0.714	2.38
191-24-2	Benzo(ghi)perylene		85.0	ug/L	0.714	2.38

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203926330  
**Client Sample:** QC for batch 1721439  
**Client ID:** CAMO-18-148084MS  
**Batch ID:** 1721440  
**Run Date:** 11/28/2017 14:09  
**Prep Date:** 11/24/2017 02:40  
**Data File:** 112817.s\Ak2810.D

**Date Collected:** 11/17/2017 10:59  
**Date Received:** 11/21/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 420 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		90.5	ug/L	0.714	2.38
65-85-0	Benzoic acid		119	ug/L	14.3	47.6
100-51-6	Benzyl alcohol		85.2	ug/L	7.14	23.8
85-68-7	Butylbenzylphthalate		96.8	ug/L	7.14	23.8
218-01-9	Chrysene		93.0	ug/L	0.714	2.38
84-74-2	Di-n-butylphthalate		95.9	ug/L	7.14	23.8
117-84-0	Di-n-octylphthalate		86.8	ug/L	7.14	23.8
53-70-3	Dibenzo(a,h)anthracene		88.6	ug/L	0.714	2.38
132-64-9	Dibenzofuran		79.2	ug/L	7.14	23.8
84-66-2	Diethylphthalate		94.0	ug/L	7.14	23.8
131-11-3	Dimethylphthalate		92.2	ug/L	7.14	23.8
88-85-7	Dinoseb	U	7.14	ug/L	7.14	23.8
122-39-4	Diphenylamine		83.3	ug/L	7.14	23.8
206-44-0	Fluoranthene		89.1	ug/L	0.714	2.38
86-73-7	Fluorene		80.5	ug/L	0.714	2.38
118-74-1	Hexachlorobenzene		84.7	ug/L	7.14	23.8
87-68-3	Hexachlorobutadiene		62.7	ug/L	7.14	23.8
77-47-4	Hexachlorocyclopentadiene		42.4	ug/L	7.14	23.8
67-72-1	Hexachloroethane		61.5	ug/L	7.14	23.8
193-39-5	Indeno(1,2,3-cd)pyrene		87.7	ug/L	0.714	2.38
78-59-1	Isophorone		86.1	ug/L	8.33	23.8
62-75-9	N-Methyl-N-nitrosomethylamine		64.0	ug/L	7.14	23.8
924-16-3	N-Nitrosodi-n-butylamine	U	7.14	ug/L	7.14	23.8
55-18-5	N-Nitrosodiethylamine	U	7.14	ug/L	7.14	23.8
621-64-7	N-Nitrosodi-n-propylamine		95.5	ug/L	7.14	23.8
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		92.1	ug/L	7.14	23.8
91-20-3	Naphthalene		74.4	ug/L	0.714	2.38
98-95-3	Nitrobenzene		86.9	ug/L	7.14	23.8
608-93-5	Pentachlorobenzene	U	7.14	ug/L	7.14	23.8
87-86-5	Pentachlorophenol		115	ug/L	7.14	23.8
85-01-8	Phenanthrene		85.2	ug/L	0.714	2.38
108-95-2	Phenol		51.5	ug/L	7.14	23.8
129-00-0	Pyrene		88.7	ug/L	0.714	2.38
110-86-1	Pyridine		52.3	ug/L	7.14	23.8
108-60-1	bis(2-Chloro-1-methylethyl)ether		90.3	ug/L	7.14	23.8
111-91-1	bis(2-Chloroethoxy)methane		90.2	ug/L	7.14	23.8
111-44-4	bis(2-Chloroethyl) ether		91.5	ug/L	7.14	23.8
117-81-7	bis(2-Ethylhexyl)phthalate		96.7	ug/L	7.14	23.8

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<b>SDG Number:</b> 2018-1001	<b>Date Collected:</b> 11/17/2017 10:59	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203926330	<b>Date Received:</b> 11/21/2017 08:55	
<b>Client Sample:</b> QC for batch 1721439	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAMO-18-148084MS	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1721440	<b>Inst:</b> MSDA.I	<b>Dilution:</b> 1
<b>Run Date:</b> 11/28/2017 14:09	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 11/24/2017 02:40	<b>Aliquot:</b> 420 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> 112817.s\Ak2810.D	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		88.9	ug/L	8.81	23.8
99-09-2	3-Nitroaniline		108	ug/L	7.14	23.8
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		77.7	ug/L	7.14	23.8
88-74-4	2-Nitroaniline		92.9	ug/L	7.14	23.8
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		99.9	ug/L	7.14	23.8
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	184	238	ug/L	77	(32%-124%)
2-Fluorobiphenyl	64.3	119	ug/L	54	(32%-112%)
2-Fluorophenol	119	238	ug/L	50	(15%-88%)
Nitrobenzene-d5	80.8	119	ug/L	68	(36%-115%)
Phenol-d5	99.1	238	ug/L	42	(15%-91%)
p-Terphenyl-d14	101	119	ug/L	85	(36%-121%)

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203926331  
**Client Sample:** QC for batch 1721439  
**Client ID:** CAMO-18-148084MSD  
**Batch ID:** 1721440  
**Run Date:** 11/28/2017 14:36  
**Prep Date:** 11/24/2017 02:40  
**Data File:** 112817.s\Ak2811.D

**Date Collected:** 11/17/2017 10:59  
**Date Received:** 11/21/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 420 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		67.6	ug/L	7.14	23.8
120-82-1	1,2,4-Trichlorobenzene		68.6	ug/L	7.14	23.8
95-50-1	1,2-Dichlorobenzene		67.7	ug/L	7.14	23.8
122-66-7	Azobenzene		83.7	ug/L	7.14	23.8
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		64.1	ug/L	7.14	23.8
106-46-7	1,4-Dichlorobenzene		65.1	ug/L	7.14	23.8
123-91-1	1,4-Dioxane		68.0	ug/L	7.14	23.8
90-12-0	1-Methylnaphthalene		74.8	ug/L	0.714	2.38
58-90-2	2,3,4,6-Tetrachlorophenol		91.0	ug/L	7.14	23.8
95-95-4	2,4,5-Trichlorophenol		86.4	ug/L	7.14	23.8
88-06-2	2,4,6-Trichlorophenol		86.6	ug/L	7.14	23.8
120-83-2	2,4-Dichlorophenol		88.0	ug/L	7.14	23.8
105-67-9	2,4-Dimethylphenol		71.3	ug/L	7.14	23.8
51-28-5	2,4-Dinitrophenol		92.6	ug/L	11.9	47.6
121-14-2	2,4-Dinitrotoluene		92.9	ug/L	7.14	23.8
606-20-2	2,6-Dinitrotoluene		87.9	ug/L	7.14	23.8
91-58-7	2-Chloronaphthalene		73.1	ug/L	0.976	2.38
95-57-8	2-Chlorophenol		83.1	ug/L	7.14	23.8
534-52-1	2-Methyl-4,6-dinitrophenol		102	ug/L	7.14	23.8
91-57-6	2-Methylnaphthalene		71.8	ug/L	0.714	2.38
88-75-5	2-Nitrophenol		93.4	ug/L	7.14	23.8
91-94-1	3,3'-Dichlorobenzidine		74.9	ug/L	7.14	23.8
101-55-3	4-Bromophenylphenylether		84.0	ug/L	7.14	23.8
59-50-7	Parachlorometa cresol		88.4	ug/L	7.14	23.8
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		106	ug/L	7.86	23.8
7005-72-3	4-Chlorophenylphenylether		84.2	ug/L	7.14	23.8
100-02-7	4-Nitrophenol		45.2	ug/L	7.14	23.8
83-32-9	Acenaphthene		82.4	ug/L	0.714	2.38
208-96-8	Acenaphthylene		79.1	ug/L	0.714	2.38
62-53-3	Aniline		74.2	ug/L	10.0	23.8
120-12-7	Anthracene		86.2	ug/L	0.714	2.38
1912-24-9	Atrazine		93.8	ug/L	7.14	23.8
92-87-5	Benzidine		61.1	ug/L	9.29	23.8
56-55-3	Benzo(a)anthracene		86.3	ug/L	0.714	2.38
50-32-8	Benzo(a)pyrene		83.7	ug/L	0.714	2.38
205-99-2	Benzo(b)fluoranthene		88.0	ug/L	0.714	2.38
191-24-2	Benzo(ghi)perylene		76.7	ug/L	0.714	2.38

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**SDG Number:** 2018-1001  
**Lab Sample ID:** 1203926331  
**Client Sample:** QC for batch 1721439  
**Client ID:** CAMO-18-148084MSD  
**Batch ID:** 1721440  
**Run Date:** 11/28/2017 14:36  
**Prep Date:** 11/24/2017 02:40  
**Data File:** 112817.s\Ak2811.D

**Date Collected:** 11/17/2017 10:59  
**Date Received:** 11/21/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 420 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		90.5	ug/L	0.714	2.38
65-85-0	Benzoic acid		120	ug/L	14.3	47.6
100-51-6	Benzyl alcohol		85.5	ug/L	7.14	23.8
85-68-7	Butylbenzylphthalate		96.9	ug/L	7.14	23.8
218-01-9	Chrysene		90.5	ug/L	0.714	2.38
84-74-2	Di-n-butylphthalate		94.3	ug/L	7.14	23.8
117-84-0	Di-n-octylphthalate		86.5	ug/L	7.14	23.8
53-70-3	Dibenzo(a,h)anthracene		78.9	ug/L	0.714	2.38
132-64-9	Dibenzofuran		80.0	ug/L	7.14	23.8
84-66-2	Diethylphthalate		92.9	ug/L	7.14	23.8
131-11-3	Dimethylphthalate		91.3	ug/L	7.14	23.8
88-85-7	Dinoseb	U	7.14	ug/L	7.14	23.8
122-39-4	Diphenylamine		81.8	ug/L	7.14	23.8
206-44-0	Fluoranthene		87.5	ug/L	0.714	2.38
86-73-7	Fluorene		81.2	ug/L	0.714	2.38
118-74-1	Hexachlorobenzene		84.8	ug/L	7.14	23.8
87-68-3	Hexachlorobutadiene		61.5	ug/L	7.14	23.8
77-47-4	Hexachlorocyclopentadiene		42.2	ug/L	7.14	23.8
67-72-1	Hexachloroethane		61.3	ug/L	7.14	23.8
193-39-5	Indeno(1,2,3-cd)pyrene		77.8	ug/L	0.714	2.38
78-59-1	Isophorone		85.4	ug/L	8.33	23.8
62-75-9	N-Methyl-N-nitrosomethylamine		66.4	ug/L	7.14	23.8
924-16-3	N-Nitrosodi-n-butylamine	U	7.14	ug/L	7.14	23.8
55-18-5	N-Nitrosodiethylamine	U	7.14	ug/L	7.14	23.8
621-64-7	N-Nitrosodi-n-propylamine		93.3	ug/L	7.14	23.8
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		90.0	ug/L	7.14	23.8
91-20-3	Naphthalene		74.0	ug/L	0.714	2.38
98-95-3	Nitrobenzene		87.7	ug/L	7.14	23.8
608-93-5	Pentachlorobenzene	U	7.14	ug/L	7.14	23.8
87-86-5	Pentachlorophenol		115	ug/L	7.14	23.8
85-01-8	Phenanthrene		84.7	ug/L	0.714	2.38
108-95-2	Phenol		51.5	ug/L	7.14	23.8
129-00-0	Pyrene		87.8	ug/L	0.714	2.38
110-86-1	Pyridine		38.2	ug/L	7.14	23.8
108-60-1	bis(2-Chloro-1-methylethyl)ether		89.4	ug/L	7.14	23.8
111-91-1	bis(2-Chloroethoxy)methane		89.5	ug/L	7.14	23.8
111-44-4	bis(2-Chloroethyl) ether		91.3	ug/L	7.14	23.8
117-81-7	bis(2-Ethylhexyl)phthalate		96.6	ug/L	7.14	23.8

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

Page 3 of 3

<b>SDG Number:</b> 2018-1001	<b>Date Collected:</b> 11/17/2017 10:59	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203926331	<b>Date Received:</b> 11/21/2017 08:55	
<b>Client Sample:</b> QC for batch 1721439	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAMO-18-148084MSD	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1721440	<b>Inst:</b> MSDA.I	<b>Dilution:</b> 1
<b>Run Date:</b> 11/28/2017 14:36	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 11/24/2017 02:40	<b>Aliquot:</b> 420 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> 112817.s\Ak2811.D	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		87.5	ug/L	8.81	23.8
99-09-2	3-Nitroaniline		108	ug/L	7.14	23.8
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol		77.2	ug/L	7.14	23.8
88-74-4	2-Nitroaniline		92.0	ug/L	7.14	23.8
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline		100	ug/L	7.14	23.8
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	180	238	ug/L	76	(32%-124%)
2-Fluorobiphenyl	67.6	119	ug/L	57	(32%-112%)
2-Fluorophenol	119	238	ug/L	50	(15%-88%)
Nitrobenzene-d5	82.1	119	ug/L	69	(36%-115%)
Phenol-d5	97.2	238	ug/L	41	(15%-91%)
p-Terphenyl-d14	96.5	119	ug/L	81	(36%-121%)

# **Perchlorates by LCMSMS Analysis**

# Case Narrative



**Perchlorates by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1001  
Work Order #: 438413**

**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: 1723621

Prep Batch Number: 1723619

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
438413001	438413001 (CAMO-18-148067)
438413003	438413003 (CAMO-18-148068)
1203931745	Interference Check Sample (ICS)
1203931738	Method Blank (MB)
1203931739	Laboratory Control Sample (LCS)
1203931740	438413001(CAMO-18-148067) Matrix Spike (MS)
1203931741	438413001(CAMO-18-148067) Matrix Spike Duplicate (MSD)

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

**Preparation/Analytical Method Verification**

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-067 REV# 14.

## **Calibration Information**

### **Initial Calibration**

All initial calibration requirements have been met for this SDG. Due to software constraints, all Initial Calibration Blanks must be designated as IPB001.

### **ICV Requirements**

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

### **CCB Requirements**

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

### **CCV Requirements**

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

### **Low Level Standard (CRI) Requirements**

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

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

The LCS spike recoveries met the acceptance limits.

### **Interference Check Sample (ICS)**

The ICS spike recoveries met the acceptance criteria.

### **QC Sample Designation**

Client sample 438413001 (CAMO-18-148067) was chosen for matrix spike and matrix spike duplicate analysis.

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

One or more of the required spiking analytes were not within the acceptance limits in 1203931740 (CAMO-18-148067MS) and 1203931741 (CAMO-18-148067MSD). The recoveries of Perchlorate and Perchlorate 101 were 0%. The acceptance range is 75-125%. The non-conforming recoveries are due to the background concentration in the parent sample (438413001) and the need to dilute all at a 1:10 dilution prior to analysis.

### **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**

Samples 1203931740 (CAMO-18-148067MS), 1203931741 (CAMO-18-148067MSD) and 438413001 (CAMO-18-148067) were diluted to bring the over range concentrations within the calibration range.

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

Sample 438413003 (CAMO-18-148068) was re-analyzed to confirm potential carryover from the previous sample analysis. The re-analysis data are reported.

## **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: 2018-1001 GEL Work Order: 438413

#### 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: Michael Penny

Date: 13 DEC 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: 1723619Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148067Date Received: 21-NOV-17GEL Job No (SDG): 2018-1001GEL Sample ID: 438413001Date Filtered: 05-DEC-17Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.5	2	11.9	ug/L		10	07-DEC-17 20:25	per1207045a
	Perchlorate Isotope Ratio			2.99			10	07-DEC-17 20:25	per1207045a
14797-73-0	Perchlorate-101	.5	2	11.9	ug/L		10	07-DEC-17 20:25	per1207045a
	Perchlorate-O(18)			3.67	ug/L		10	07-DEC-17 20:25	per1207045a

^ 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: 1723619Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148068Date Received: 21-NOV-17GEL Job No (SDG): 2018-1001GEL Sample ID: 438413003Date Filtered: 05-DEC-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	0.805	ug/L		1	07-DEC-17 20:52	per1207048a
	Perchlorate Isotope Ratio			3			1	07-DEC-17 20:52	per1207048a
14797-73-0	Perchlorate-101	.05	.2	0.802	ug/L		1	07-DEC-17 20:52	per1207048a
	Perchlorate-O(18)			0.404	ug/L		1	07-DEC-17 20:52	per1207048a

^ 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):** 2018-1001

**Extract Batch Code:** 1723619

**Date Filtered:** 05-DEC-17

**Matrix:** WATER

**Sample ID:** 1203931739

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.202	ug/L	101		85 - 115
Perchlorate Isotope Ratio		2.85				-
Perchlorate-101	0.200	.212	ug/L	106		85 - 115
Perchlorate-O(18)		.471	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):** 2018-1001

**Extract Batch Code:** 1723619

**Date Extracted:** 05-DEC-17

**GEL MS/PS ID:** 1203931740

**Client ID:** CAMO-18-148067

**GEL MSD/PSD ID:** 1203931741

**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	11.9	ug/L	11.6	0 *	11.2	0 *	4	30	75 - 125
Perchlorate Isotope Ratio	0	2.99		2.99		2.99		0		-
Perchlorate-101	0.200	11.9	ug/L	11.6	0 *	11.2	0 *	4	30	75 - 125
Perchlorate-O(18)	0	3.67	ug/L	3.87		3.68		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: 1723619Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 05-DEC-17GEL Job No (SDG): 2018-1001GEL Sample ID: 1203931738Date Filtered: 05-DEC-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	07-DEC-17 15:38	per1207013a
	Perchlorate Isotope Ratio						1	07-DEC-17 15:38	per1207013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	07-DEC-17 15:38	per1207013a
	Perchlorate-O(18)			0.474	ug/L		1	07-DEC-17 15:38	per1207013a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1723619Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 05-DEC-17GEL Job No (SDG): 2018-1001GEL Sample ID: 1203931739Date Filtered: 05-DEC-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	0.202	ug/L		1	07-DEC-17 15:47	per1207014a
	Perchlorate Isotope Ratio			2.85			1	07-DEC-17 15:47	per1207014a
14797-73-0	Perchlorate-101	.05	.2	0.212	ug/L		1	07-DEC-17 15:47	per1207014a
	Perchlorate-O(18)			0.471	ug/L		1	07-DEC-17 15:47	per1207014a

^ 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: 1723619Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-1001GEL Sample ID: 1203931745Date Filtered: 05-DEC-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	0.225	ug/L		1	07-DEC-17 15:56	per1207015a
	Perchlorate Isotope Ratio			2.9			1	07-DEC-17 15:56	per1207015a
14797-73-0	Perchlorate-101	.05	.2	0.232	ug/L		1	07-DEC-17 15:56	per1207015a
	Perchlorate-O(18)			0.475	ug/L		1	07-DEC-17 15:56	per1207015a

^ 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: 1723619Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148067MSDate Received: 21-NOV-17GEL Job No (SDG): 2018-1001GEL Sample ID: 1203931740Date Filtered: 05-DEC-17Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.5	2	11.6	ug/L		10	07-DEC-17 20:34	per1207046a
	Perchlorate Isotope Ratio			2.99			10	07-DEC-17 20:34	per1207046a
14797-73-0	Perchlorate-101	.5	2	11.6	ug/L		10	07-DEC-17 20:34	per1207046a
	Perchlorate-O(18)			3.87	ug/L		10	07-DEC-17 20:34	per1207046a

^ 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: 1723619Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148067MSDDate Received: 21-NOV-17GEL Job No (SDG): 2018-1001GEL Sample ID: 1203931741Date Filtered: 05-DEC-17Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.5	2	11.2	ug/L		10	07-DEC-17 20:43	per1207047a
	Perchlorate Isotope Ratio			2.99			10	07-DEC-17 20:43	per1207047a
14797-73-0	Perchlorate-101	.5	2	11.2	ug/L		10	07-DEC-17 20:43	per1207047a
	Perchlorate-O(18)			3.68	ug/L		10	07-DEC-17 20:43	per1207047a

^ 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 #: 2018-1001**  
**Work Order #: 438413**

<b>Sample ID</b>	<b>Client ID</b>
438413001	CAMO-18-148067
438413002	CAMO-18-148083
438413003	CAMO-18-148068
438413005	CAMO-18-148084
1203925414	Method Blank (MB) <b>ICP</b>
1203925415	Laboratory Control Sample (LCS)
1203925418	438413001(CAMO-18-148067L) Serial Dilution (SD)
1203925416	438413001(CAMO-18-148067D) Sample Duplicate (DUP)
1203925417	438413001(CAMO-18-148067S) Matrix Spike (MS)
1203925388	Method Blank (MB) <b>ICP-MS</b>
1203925389	Laboratory Control Sample (LCS)
1203925392	438413001(CAMO-18-148067L) Serial Dilution (SD)
1203925390	438413001(CAMO-18-148067D) Sample Duplicate (DUP)
1203925391	438413001(CAMO-18-148067S) Matrix Spike (MS)
1203933642	Method Blank (MB) <b>CVAA</b>
1203933643	Laboratory Control Sample (LCS)
1203933646	438413001(CAMO-18-148067L) Serial Dilution (SD)
1203933644	438413001(CAMO-18-148067D) Sample Duplicate (DUP)
1203933645	438413001(CAMO-18-148067S) Matrix Spike (MS)

**Sample Analysis**

Samples 438413001,002,003 and 005 in this SDG were analyzed for metals and mercury on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1721113, 1721102, 1724370 and 1726878
<b>Prep Batch :</b>	1721112, 1721101 and 1724365
<b>Standard Operating Procedures:</b>	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
<b>Analytical Method:</b>	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
<b>Prep Method :</b>	SW846 3005A and EPA 245.1/245.2 Prep

**Preparation/Analytical Method Verification**

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

## **System Configuration**

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

The Metals analysis-ICP was performed on a 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 300X 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. 438413001 (CAMO-18-148067) and 438413003 (CAMO-18-148068)-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: 438413001 (CAMO-18-148067)-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**

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL/MDL for CVAA, 50X the IDL/MDL for ICP and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

Analyte	Sample	Value
Potassium	1203925418 (CAMO-18-148067SDILT)	12.3 *(0%-10%)

#### **Technical Information**

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

GEL assigns holding times based on the associated methodology. Holding time is measured by comparison of the date and time of sample collection to the date and time of sample preparation and analysis. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

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

All procedures were performed as stated in the SOP.

##### **Sample Dilutions**

The samples in this SDG did not require dilutions.

##### **Preparation Information**

The samples in this SDG were not diluted and were prepared according to the cited SOP.

#### **Miscellaneous Information**

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

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

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

##### **Additional Comments**

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

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

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

#### **Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2018-1001 GEL Work Order: 438413

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

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

#### Review/Validation

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

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

Signature:



Name: Nik-Cole Elmore

Date: 18 DEC 2017

Title: Data Validator



# **Sample Data Summary**

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

**SDG No:** 2018-1001**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 438413001**BASIS:** As Received**DATE COLLECTED** 17-NOV-17**CLIENT ID:** CAMO-18-148067**LEVEL:** Low**DATE RECEIVED** 21-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	12/08/17 10:13	120817W1-9	1724370

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

SDG No: 2018-1001

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 438413001

BASIS: As Received

DATE COLLECTED 17-NOV-17

CLIENT ID: CAMO-18-148067

LEVEL: Low

DATE RECEIVED 21-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	12/13/17 07:35	121317-1	1721113
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	12/07/17 21:11	171207-2	1721102
7440-38-2	Arsenic	2.78	ug/L	J	2	5	5	1	MS	PRB	12/07/17 21:11	171207-2	1721102
7440-39-3	Barium	17.7	ug/L		1	5	5	1	P	HSC	12/13/17 07:35	121317-1	1721113
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/13/17 07:35	121317-1	1721113
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	12/13/17 07:35	121317-1	1721113
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	12/07/17 21:11	171207-2	1721102
7440-70-2	Calcium	11400	ug/L		50	200	200	1	P	HSC	12/13/17 07:35	121317-1	1721113
7440-47-3	Chromium	21.6	ug/L		3	10	10	1	MS	PRB	12/07/17 21:11	171207-2	1721102
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/13/17 07:35	121317-1	1721113
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	12/13/17 07:35	121317-1	1721113
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	12/13/17 07:35	121317-1	1721113
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	12/07/17 21:11	171207-2	1721102
7439-95-4	Magnesium	3480	ug/L		110	300	300	1	P	HSC	12/13/17 07:35	121317-1	1721113
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	12/13/17 07:35	121317-1	1721113
7439-98-7	Molybdenum	1.33	ug/L		0.2	0.5	0.5	1	MS	PRB	12/07/17 21:11	171207-2	1721102
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	PRB	12/07/17 21:11	171207-2	1721102
7440-09-7	Potassium	2840	ug/L	E	50	150	150	1	P	HSC	12/13/17 07:35	121317-1	1721113
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	PRB	12/07/17 21:11	171207-2	1721102
7631-86-9	Silica	63300	ug/L		53	213	213	1	P	HSC	12/13/17 07:35	121317-1	1721113
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	12/07/17 21:11	171207-2	1721102
7440-23-5	Sodium	9540	ug/L		100	300	300	1	P	HSC	12/13/17 07:35	121317-1	1721113
7440-24-6	Strontium	52.8	ug/L		1	5	5	1	P	HSC	12/13/17 07:35	121317-1	1721113
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	12/07/17 21:11	171207-2	1721102
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	12/13/17 07:35	121317-1	1721113
7440-61-1	Uranium	0.259	ug/L		0.067	0.2	0.2	1	MS	PRB	12/08/17 09:18	171207-8	1721102
7440-62-2	Vanadium	4.77	ug/L	J	1	5	5	1	P	HSC	12/13/17 07:35	121317-1	1721113
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	12/13/17 07:35	121317-1	1721113

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

**SDG No:** 2018-1001**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 438413001**BASIS:** As Received**DATE COLLECTED** 17-NOV-17**CLIENT ID:** CAMO-18-148067**LEVEL:** Low**DATE RECEIVED** 21-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	42.8	mg/L		0.453	1.24	1.24	1		TXT1	12/15/17 14:08		1726878

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1721102	1721101	SW846 3005A	50	mL	50	mL	11/22/17	JXM8
1721113	1721112	SW846 3005A	50	mL	50	mL	11/22/17	JXM8
1724370	1724365	EPA 245.1/245.2 Prep	20	mL	20	mL	12/07/17	AXS5

**\*Analytical Methods:**

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

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

**SDG No:** 2018-1001**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 438413002**BASIS:** As Received**DATE COLLECTED** 17-NOV-17**CLIENT ID:** CAMO-18-148083**LEVEL:** Low**DATE RECEIVED** 21-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	12/08/17 10:21	120817W1-9	1724370

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1724370	1724365	EPA 245.1/245.2 Prep	20	mL	20	mL	12/07/17	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974

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

**SDG No:** 2018-1001**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 438413003**BASIS:** As Received**DATE COLLECTED** 17-NOV-17**CLIENT ID:** CAMO-18-148068**LEVEL:** Low**DATE RECEIVED** 21-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	12/08/17 10:23	120817W1-9	1724370

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

SDG No: 2018-1001

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 438413003

BASIS: As Received

DATE COLLECTED 17-NOV-17

CLIENT ID: CAMO-18-148068

LEVEL: Low

DATE RECEIVED 21-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	355	ug/L		68	200	200	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	12/07/17 21:27	171207-2	1721102
7440-38-2	Arsenic	2.49	ug/L	J	2	5	5	1	MS	PRB	12/07/17 21:27	171207-2	1721102
7440-39-3	Barium	8.26	ug/L		1	5	5	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	12/07/17 21:27	171207-2	1721102
7440-70-2	Calcium	206	ug/L		50	200	200	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-47-3	Chromium	260	ug/L		3	10	10	1	MS	PRB	12/07/17 21:27	171207-2	1721102
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	12/13/17 07:32	121317-1	1721113
7439-89-6	Iron	232	ug/L		30	100	100	1	P	HSC	12/13/17 07:32	121317-1	1721113
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	12/07/17 21:27	171207-2	1721102
7439-95-4	Magnesium	110	ug/L	U	110	300	300	1	P	HSC	12/13/17 07:32	121317-1	1721113
7439-96-5	Manganese	12.6	ug/L		2	10	10	1	P	HSC	12/13/17 07:32	121317-1	1721113
7439-98-7	Molybdenum	0.652	ug/L		0.2	0.5	0.5	1	MS	PRB	12/07/17 21:27	171207-2	1721102
7440-02-0	Nickel	4.4	ug/L		0.6	2	2	1	MS	PRB	12/07/17 21:27	171207-2	1721102
7440-09-7	Potassium	302	ug/L	E	50	150	150	1	P	HSC	12/13/17 07:32	121317-1	1721113
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	PRB	12/07/17 21:27	171207-2	1721102
7631-86-9	Silica	1510	ug/L		53	213	213	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	12/07/17 21:27	171207-2	1721102
7440-23-5	Sodium	1780	ug/L		100	300	300	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-24-6	Strontium	1.59	ug/L	J	1	5	5	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	12/07/17 21:27	171207-2	1721102
7440-31-5	Tin	3.02	ug/L	J	2.5	10	10	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-61-1	Uranium	0.786	ug/L		0.067	0.2	0.2	1	MS	PRB	12/08/17 09:26	171207-8	1721102
7440-62-2	Vanadium	1	ug/L	U	1	5	5	1	P	HSC	12/13/17 07:32	121317-1	1721113
7440-66-6	Zinc	10.9	ug/L		3.3	10	10	1	P	HSC	12/13/17 07:32	121317-1	1721113

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

**SDG No:** 2018-1001**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 438413003**BASIS:** As Received**DATE COLLECTED** 17-NOV-17**CLIENT ID:** CAMO-18-148068**LEVEL:** Low**DATE RECEIVED** 21-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	0.515	mg/L	J	0.453	1.24	1.24	1		TXT1	12/15/17 14:08		1726878

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1721102	1721101	SW846 3005A	50	mL	50	mL	11/22/17	JXM8
1721113	1721112	SW846 3005A	50	mL	50	mL	11/22/17	JXM8
1724370	1724365	EPA 245.1/245.2 Prep	20	mL	20	mL	12/07/17	AXS5

**\*Analytical Methods:**

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



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

**SDG No:** 2018-1001**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 438413005**BASIS:** As Received**DATE COLLECTED** 17-NOV-17**CLIENT ID:** CAMO-18-148084**LEVEL:** Low**DATE RECEIVED** 21-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	12/08/17 10:28	120817W1-9	1724370

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1724370	1724365	EPA 245.1/245.2 Prep	20	mL	20	mL	12/07/17	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974

# **Quality Control Summary**

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

SDG NO. 2018-1001

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>
1203925388	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
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Chromium	3	ug/L	+/-10	U	MS	3	10
1203925414	Aluminum	68	ug/L	+/-200	U	P	68	200
	Boron	15	ug/L	+/-50	U	P	15	50
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Iron	30	ug/L	+/-100	U	P	30	100
	Manganese	2	ug/L	+/-10	U	P	2	10
	Silica	53	ug/L	+/-213	U	P	53	213
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Strontium	1	ug/L	+/-5	U	P	1	5
	Sodium	100	ug/L	+/-300	U	P	100	300
	Potassium	50.7	ug/L	+/-150	J	P	50	150
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Copper	3	ug/L	+/-10	U	P	3	10
	Calcium	50	ug/L	+/-200	U	P	50	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Barium	1	ug/L	+/-5	U	P	1	5
1203933642	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.** 2018-1001 **Client ID:** CAMO-18-148067S

**Contract:** ESHL00114 **Level:** Low

**Matrix:** WATER **% Solids:**

**Sample ID:** 438413001 **Spike ID:** 1203925391

<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	48.4		1	U	50	96.6		MS
Arsenic	ug/L	75-125	48.9		2.78	J	50	92.3		MS
Cadmium	ug/L	75-125	47.9		0.3	U	50	95.8		MS
Chromium	ug/L	75-125	69.5		21.6		50	96		MS
Lead	ug/L	75-125	46.3		0.5	U	50	92.5		MS
Molybdenum	ug/L	75-125	51		1.33		50	99.3		MS
Nickel	ug/L	75-125	47.9		0.6	U	50	94.7		MS
Selenium	ug/L	75-125	46.4		2	U	50	92.4		MS
Silver	ug/L	75-125	48.6		0.3	U	50	97.2		MS
Thallium	ug/L	75-125	43.5		0.6	U	50	87.1		MS
Uranium	ug/L	75-125	48		0.259		50	95.5		MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2018-1001 Client ID CAMO-18-148067S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 438413001 Spike ID: 1203925417

<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>
Boron	ug/L	75-125	497		15	U	500	97.1		P
Calcium	ug/L	75-125	16000		11400		5000	91.6		P
Cobalt	ug/L	75-125	495		1	U	500	99.1		P
Copper	ug/L	75-125	514		3	U	500	103		P
Iron	ug/L	75-125	4750		30	U	5000	95		P
Magnesium	ug/L	75-125	8240		3480		5000	95.3		P
Manganese	ug/L	75-125	503		2	U	500	101		P
Potassium	ug/L	75-125	7700		2840		5000	97.4		P
Silica	ug/L		72900		63300		10700	89.6	N/A	P
Sodium	ug/L	75-125	13900		9540		5000	88		P
Strontium	ug/L	75-125	544		52.8		500	98.2		P
Tin	ug/L	75-125	509		2.5	U	500	102		P
Vanadium	ug/L	75-125	514		4.77	J	500	102		P
Zinc	ug/L	75-125	486		3.3	U	500	96.8		P
Aluminum	ug/L	75-125	4740		68	U	5000	94.4		P
Barium	ug/L	75-125	500		17.7		500	96.5		P
Beryllium	ug/L	75-125	487		1	U	500	97.4		P

\*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2018-1001 Client ID CAMO-18-148067S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 438413001 Spike ID: 1203933645

<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	2.05		0.067	U	2	101		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

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

SDG No.: 2018-1001

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-18-148067D

Matrix: WATER

Level: Low

Sample ID: 438413001

Duplicate ID: 1203925390

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	2.78 J		2.58 J		7.49		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-10	21.6		21.5		.0418		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.33		1.38		3.46		MS
Nickel	ug/L		0.6 U		0.6 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.259		0.257		.775		MS

\*Analytical Methods:

MS SW846 3005A/6020A

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

SDG No.: 2018-1001

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-18-148067D

Matrix: WATER

Level: Low

Sample ID: 438413001

Duplicate ID: 1203925416

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-5	17.7		17.6		.0963		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	11400		11600		1.53		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%	3480		3540		1.68		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	2840		2870		1.27		P
Silica	ug/L	+/-20%	63300		64200		1.48		P
Sodium	ug/L	+/-20%	9540		9720		1.87		P
Strontium	ug/L	+/-20%	52.8		53.6		1.48		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	4.77 J		4.57 J		4.28		P
Zinc	ug/L		3.3 U		3.3 U				P

\*Analytical Methods:

P SW846 3005A/6010C



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

**SDG No.:** 2018–1001**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAMO–18–148067D**Matrix:** WATER**Level:** Low**Sample ID:** 438413001**Duplicate ID:** 1203933644**Percent Solids for Dup:** N/A

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

\*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2018-1001

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>
1203925389								
	Arsenic	ug/L	50	50.1		100	80-120	MS
	Cadmium	ug/L	50	49.8		99.5	80-120	MS
	Antimony	ug/L	50	49.1		98.2	80-120	MS
	Chromium	ug/L	50	49.6		99.3	80-120	MS
	Lead	ug/L	50	48.9		97.9	80-120	MS
	Molybdenum	ug/L	50	49.8		99.7	80-120	MS
	Nickel	ug/L	50	49.4		98.8	80-120	MS
	Selenium	ug/L	50	51		102	80-120	MS
	Silver	ug/L	50	50.4		101	80-120	MS
	Thallium	ug/L	50	46.1		92.3	80-120	MS
	Uranium	ug/L	50	49.5		99	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2018-1001

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>
1203925415								
	Aluminum	ug/L	5000	4780		95.5	80-120	P
	Barium	ug/L	500	488		97.5	80-120	P
	Beryllium	ug/L	500	484		96.7	80-120	P
	Boron	ug/L	500	487		97.3	80-120	P
	Calcium	ug/L	5000	4840		96.8	80-120	P
	Cobalt	ug/L	500	494		98.9	80-120	P
	Copper	ug/L	500	489		97.9	80-120	P
	Iron	ug/L	5000	4770		95.3	80-120	P
	Magnesium	ug/L	5000	4900		98.1	80-120	P
	Manganese	ug/L	500	490		98	80-120	P
	Potassium	ug/L	5000	4870		97.5	80-120	P
	Silica	ug/L	10700	9870		92.2	80-120	P
	Sodium	ug/L	5000	4810		96.3	80-120	P
	Strontium	ug/L	500	487		97.5	80-120	P
	Tin	ug/L	500	483		96.6	80-120	P
	Vanadium	ug/L	500	487		97.5	80-120	P
	Zinc	ug/L	500	481		96.2	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-1001

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>
1203933643	Mercury	ug/L	2	2.05		103	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2018-1001 **Client ID:** CAMO-18-148067L

**Contract:** ESHL00114

**Matrix:** LIQUID **Level:** Low

**Sample ID:** 438413001 **Serial Dilution ID:** 1203925392

<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	2.78	J	10	U	1.365			MS
Cadmium	.3	U	1.5	U				MS
Chromium	21.6		21.5	J	.167			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.33		1.44	J	7.946			MS
Nickel	.6	U	3	U				MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.259		.335		29.344			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

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## Serial Dilution Sample Summary

SDG NO. 2018-1001

Client ID: CAMO-18-148067L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 438413001

Serial Dilution ID: 1203925418

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	17.7		17.2	J	2.791			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	11400		11800		3.147		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3480		3550		2.174			P
Manganese	2	U	10	U				P
Potassium	2840		3190		12.327	E	10	P
Silica	63300		63700		.698		10	P
Sodium	9540		9780		2.438		10	P
Strontium	52.8		51.5		2.5		10	P
Tin	2.5	U	17.4	J				P
Vanadium	4.77	J	5	U	16.057			P
Zinc	3.3	U	19.6	J				P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2018-1001 **Client ID:** CAMO-18-148067L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 438413001 **Serial Dilution ID:** 1203933646

<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 #: 2018-1001  
Work Order #: 438413**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1720555

**Method:** SW 9060 Total Organic Carbon

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413002	CAMO-18-148083
438413005	CAMO-18-148084
1203927018	Method Blank (MB)
1203927019	Laboratory Control Sample (LCS)
1203927021	438305002(CASA-18-147963) Sample Duplicate (DUP)
1203927023	438305002(CASA-18-147963) 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 438305002 (CASA-18-147963) 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**

<b>Product:</b>	<b>Cyanide and Total</b>		
<b>Analytical Batch:</b>	1720228	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1720227	<b>Method:</b>	EPA 335.4

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413002	CAMO-18-148083
438413005	CAMO-18-148084
1203923112	Method Blank (MB)
1203923113	Laboratory Control Sample (LCS)
1203923114	438005001(WST05-18-148667) Sample Duplicate (DUP)
1203923116	438005001(WST05-18-148667) Matrix Spike (MS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 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 438005001 (WST05-18-148667) 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:** Ion Chromatography

**Analytical Batch:** 1721837

**Method:** WSP-ANIONS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413001	CAMO-18-148067
438413003	CAMO-18-148068
1203927309	Method Blank (MB)
1203927310	Laboratory Control Sample (LCS)
1203927311	438413001(CAMO-18-148067) Sample Duplicate (DUP)
1203927312	438413001(CAMO-18-148067) 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 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) Designation**

Sample 438413001 (CAMO-18-148067) 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 Dilutions**

The following sample 438413003 (CAMO-18-148068) was 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.

Analyte	<b>438413</b>
	<b>003</b>
Chloride	2X
Sulfate	2X

#### **Sample Re-analysis**

Samples 1203927309 (MB), 1203927310 (LCS), 1203927311 (CAMO-18-148067DUP), 1203927312 (CAMO-18-148067PS), 438413001 (CAMO-18-148067) and 438413003 (CAMO-18-148068) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

### **Miscellaneous Information**

#### **Manual Integrations**

Samples 1203927311 (CAMO-18-148067DUP), 1203927312 (CAMO-18-148067PS), 438413001 (CAMO-18-148067) and 438413003 (CAMO-18-148068) were manually integrated to correctly position the baseline

as set in the calibration standards.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Ammonia Nitrogen</b>		
<b>Analytical Batch:</b>	1721221	<b>Method:</b>	NH3
<b>Prep Batch :</b>	1721220	<b>Method:</b>	EPA 350.1 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413001	CAMO-18-148067
438413003	CAMO-18-148068
1203925719	Method Blank (MB)
1203925720	Laboratory Control Sample (LCS)
1203925722	438206003(CAMO-18-147990) Sample Duplicate (DUP)
1203925725	438206003(CAMO-18-147990) 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. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1203925719 (MB)	Nitrogen, Ammonia	0.0348 between (0.017 - 0.05)

##### **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 438206003 (CAMO-18-147990) was selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Ammonia	1203925725 (CAMO-18-147990MS)	113* (90%-110%)

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

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

#### **Technical Information**

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

##### **Holding Times**

All samples in this SDG met the specified holding time.

##### **Sample Preservation/Integrity**

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

##### **Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

Samples 1203925719 (MB) and 1203925720 (LCS) 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:

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1721225	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1721224	<b>Method:</b>	EPA 351.2 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413002	CAMO-18-148083
438413005	CAMO-18-148084
1203925737	Method Blank (MB)
1203925738	Laboratory Control Sample (LCS)
1203925739	438413002(CAMO-18-148083) Sample Duplicate (DUP)
1203925741	438413002(CAMO-18-148083) 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 438413002 (CAMO-18-148083) 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**

Sample1203925738 (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:

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



### **Method/Analysis Information**

**Product:** Nitrate Nitrite by Cadmium Reduction

**Analytical Batch:** 1721226

**Method:** NO3NO2

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413001	CAMO-18-148067
438413003	CAMO-18-148068
1203925743	Method Blank (MB)
1203925744	Laboratory Control Sample (LCS)
1203925745	438413001(CAMO-18-148067) Sample Duplicate (DUP)
1203925748	438413001(CAMO-18-148067) 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 438413001 (CAMO-18-148067) 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 1203925745 (CAMO-18-148067DUP), 1203925748 (CAMO-18-148067PS) and 438413001 (CAMO-18-148067) 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.

Analyte	<b>438413</b>
	<b>001</b>
Nitrogen, Nitrate/Nitrite	5X

**Sample Re-analysis**

Samples 1203925745 (CAMO-18-148067DUP), 1203925748 (CAMO-18-148067PS), 438413001 (CAMO-18-148067) and 438413003 (CAMO-18-148068) 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**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1721223	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1721222	<b>Method:</b>	EPA 365.4 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413001	CAMO-18-148067
438413003	CAMO-18-148068
1203925727	Method Blank (MB)
1203925728	Laboratory Control Sample (LCS)
1203925729	438413001(CAMO-18-148067) Sample Duplicate (DUP)
1203925731	438413001(CAMO-18-148067) 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 438413001 (CAMO-18-148067) 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**

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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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:** 1720543

**Method:** TDS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413001	CAMO-18-148067
438413003	CAMO-18-148068
1203923971	Method Blank (MB)
1203923972	Laboratory Control Sample (LCS)
1203923973	438300001(CAMO-18-148065) 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 438300001 (CAMO-18-148065) 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	1203923973 (CAMO-18-148065DUP)	7.27* (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:** 1721096

**Method:** EPA120.1 Specific Conductivity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413001	CAMO-18-148067
438413003	CAMO-18-148068
1203925380	Laboratory Control Sample (LCS)
1203925382	438005001(WST05-18-148667) 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

### **Calibration Verification Information**

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

### **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 438005001 (WST05-18-148667) 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:** 1721541 **Method:** PH

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413001	CAMO-18-148067
438413003	CAMO-18-148068
1203926489	Laboratory Control Sample (LCS)
1203926490	438206003(CAMO-18-147990) Sample Duplicate (DUP)
1203926491	438505010(CAMO-18-148064) Sample Duplicate (DUP)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Initial Standardization**

The titrant was properly standardized

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

#### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Samples 438206003 (CAMO-18-147990) and 438505010 (CAMO-18-148064) were selected for QC analysis.

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

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

**Technical Information**

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

**Holding Times**

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

Sample	Analyte	Value
1203926490 (CAMO-18-147990DUP)	pH	Received 17-NOV-17, out of holding 15-NOV-17
1203926491 (CAMO-18-148064DUP)	pH	Received 22-NOV-17, out of holding 20-NOV-17
438413001 (CAMO-18-148067)	pH	Received 21-NOV-17, out of holding 17-NOV-17
438413003 (CAMO-18-148068)	pH	Received 21-NOV-17, out of holding 17-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:** 1721540      **Method:** EPA 310.1 Total Alkalinity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
438413001	CAMO-18-148067
438413003	CAMO-18-148068
1203926482	Laboratory Control Sample (LCS)
1203926485	438206003(CAMO-18-147990) Sample Duplicate (DUP)
1203926488	438206003(CAMO-18-147990) 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 438206003 (CAMO-18-147990) 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:

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**Certification Statement**

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

## 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: 2018-1001 GEL Work Order: 438413

#### 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: Kristen Mizzell

Date: 14 DEC 2017

Title: Team Leader

# **Sample Data Summary**



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: December 14, 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: 2018-1001

Client Sample ID: CAMO-18-148067  
Sample ID: 438413001  
Matrix: W  
Collect Date: 17-NOV-17 12:42  
Receive Date: 21-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	MAR1	11/29/17	0203	1721837	1
Fluoride		0.249	0.033	0.100	mg/L		1					
Chloride		2.94	0.067	0.200	mg/L		1	MXL2	12/01/17	0127	1721837	2
Sulfate		5.39	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	11/27/17	1030	1721221	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		1.97	0.085	0.250	mg/L		5	AXH3	11/24/17	0928	1721226	4
PO4 "As Received"												
Phosphorus, Total as P		0.614	0.020	0.050	mg/L	1.00	1	KLP1	11/28/17	1137	1721223	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		131	3.40	14.3	mg/L			VH1	11/22/17	1146	1720543	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		56.9	1.45	4.00	mg/L			RXB5	11/29/17	1505	1721540	7
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		165	1.00	1.00	umhos/cm		1	HXC1	11/27/17	1355	1721096	8
PH "As Received"												
pH at Temp 19.3C	H	7.71	0.010	0.100	SU		1	RXB5	11/29/17	1503	1721541	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	11/27/17	0700	1721220
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	11/28/17	0930	1721222

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Address : TA-00, SM1237, Rm104C

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

Client SDG: 2018-1001

Client Sample ID: CAMO-18-148067  
Sample ID: 438413001

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:300.0											
3	EPA:350.1											
4	EPA:353.2											
5	EPA 365.4 1974											
6	EPA:160.1											
7	EPA:310.1											
8	EPA:120.1											
9	EPA 150.1 1982											

### 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

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## Certificate of Analysis

Report Date: December 14, 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: 2018-1001

Client Sample ID: CAMO-18-148083  
Sample ID: 438413002  
Matrix: W  
Collect Date: 17-NOV-17 12:42  
Receive Date: 21-NOV-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

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	J	0.397	0.330	1.00	mg/L		1	TSM	11/30/17	2334	1720555	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	11/22/17	0902	1720228	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.228	0.033	0.100	mg/L	1.00	1	KLP1	11/28/17	1329	1721225	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/22/17	0739	1720227
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	11/28/17	0930	1721224

The following Analytical Methods were performed:

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

### Notes:

Column headers are defined as follows:

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

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: December 14, 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: 2018-1001

Client Sample ID: CAMO-18-148068  
Sample ID: 438413003  
Matrix: W  
Collect Date: 17-NOV-17 10:59  
Receive Date: 21-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	J	0.128	0.067	0.200	mg/L		1	MAR1	11/29/17	0336	1721837	1
Fluoride		0.104	0.033	0.100	mg/L		1					
Chloride		14.7	0.134	0.400	mg/L		2	MXL2	12/01/17	0259	1721837	2
Sulfate		26.4	0.266	0.800	mg/L		2					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0206	0.017	0.050	mg/L	1.00	1	KLP1	11/27/17	1031	1721221	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.0685	0.017	0.050	mg/L		1	AXH3	11/24/17	0741	1721226	4
PO4 "As Received"												
Phosphorus, Total as P	U	ND	0.020	0.050	mg/L	1.00	1	KLP1	11/28/17	1140	1721223	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		197	3.40	14.3	mg/L			VH1	11/22/17	1146	1720543	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		66.1	1.45	4.00	mg/L			RXB5	11/29/17	1507	1721540	7
Carbonate alkalinity (CaCO3)	J	2.42	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		272	1.00	1.00	umhos/cm		1	HXC1	11/27/17	1356	1721096	8
PH "As Received"												
pH at Temp 19.4C	H	8.46	0.010	0.100	SU		1	RXB5	11/29/17	1505	1721541	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	11/27/17	0700	1721220
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	11/28/17	0930	1721222

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## Certificate of Analysis

Report Date: December 14, 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: 2018-1001

Client Sample ID: CAMO-18-148068  
Sample ID: 438413003

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:300.0											
3	EPA:350.1											
4	EPA:353.2											
5	EPA 365.4 1974											
6	EPA:160.1											
7	EPA:310.1											
8	EPA:120.1											
9	EPA 150.1 1982											

### 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

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## Certificate of Analysis

Report Date: December 14, 2017

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-1001

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148084

Project: ESHL00114

Sample ID: 438413005

Client ID: ARSL004

Matrix: W

Collect Date: 17-NOV-17 10:59

Receive Date: 21-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	12/01/17	1152	1720555	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	11/22/17	0908	1720228	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/28/17	1331	1721225	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/22/17	0739	1720227
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	11/28/17	0930	1721224

The following Analytical Methods were performed:

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

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

Lc/LC: Critical Level

DL: Detection Limit

PF: Prep Factor

MDA: Minimum Detectable Activity

RL: Reporting Limit

MDC: Minimum Detectable Concentration

SQL: Sample Quantitation Limit

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: December 14, 2017

Page 1 of 6

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

Contact: Ms. Nita Patel

Workorder: 438413

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1720555										
QC1203927021	438305002	DUP									
Total Organic Carbon Average		J	0.550	J	0.514	mg/L	6.77	^	(+/-1.00)	TSM	11/30/17 20:59
QC1203927019	LCS										
Total Organic Carbon Average	10.0				9.96	mg/L			99.6	(80%-120%)	11/30/17 12:35
QC1203927018	MB										
Total Organic Carbon Average			U		ND	mg/L					11/30/17 12:24
QC1203927023	438305002	PS									
Total Organic Carbon Average	10.0	J	0.550		10.7	mg/L			101	(75%-125%)	11/30/17 21:43
<b>Flow Injection Analysis</b>											
Batch	1720228										
QC1203923114	438005001	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A			AXH3	11/22/17 08:33
QC1203923113	LCS										
Cyanide, Total	50.0				49.6	ug/L			99.2	(90%-110%)	11/22/17 08:31
QC1203923112	MB										
Cyanide, Total			U		ND	ug/L					11/22/17 08:30
QC1203923116	438005001	MS									
Cyanide, Total	100	U	ND		106	ug/L			106	(90%-110%)	11/22/17 08:38
<b>Ion Chromatography</b>											
Batch	1721837										
QC1203927311	438413001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A			MAR1	11/29/17 02:34



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## QC Summary

Workorder: 438413

Page 2 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1721837										
Chloride		2.94		2.93	mg/L	0.388		(0%-20%)	MXL2	12/01/17	01:58
Fluoride		0.249		0.214	mg/L	15.1	^	(+/-0.100)	MAR1	11/29/17	02:34
Sulfate		5.39		5.41	mg/L	0.377		(0%-20%)	MXL2	12/01/17	01:58
QC1203927310 LCS											
Bromide	1.25			1.24	mg/L		99.2	(80%-120%)	MAR1	11/28/17	23:28
Chloride	5.00			4.72	mg/L		94.3	(80%-120%)	MXL2	11/30/17	22:52
Fluoride	2.50			2.59	mg/L		104	(80%-120%)	MAR1	11/28/17	23:28
Sulfate	10.0			9.77	mg/L		97.7	(80%-120%)	MXL2	11/30/17	22:52
QC1203927309 MB											
Bromide			U	ND	mg/L				MAR1	11/28/17	22:57
Chloride			U	ND	mg/L				MXL2	11/30/17	22:21
Fluoride			U	ND	mg/L				MAR1	11/28/17	22:57
Sulfate			U	ND	mg/L				MXL2	11/30/17	22:21
QC1203927312 438413001 PS											
Bromide	1.25	U	ND	1.16	mg/L		87.7	(75%-125%)	MAR1	11/29/17	03:05
Chloride	5.00		2.94	8.22	mg/L		106	(75%-125%)	MXL2	12/01/17	02:28
Fluoride	2.50		0.249	2.50	mg/L		90.2	(75%-125%)	MAR1	11/29/17	03:05
Sulfate	10.0		5.39	15.9	mg/L		105	(75%-125%)	MXL2	12/01/17	02:28

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## QC Summary

Workorder: 438413

Page 3 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1721221										
QC1203925722	438206003	DUP									
Nitrogen, Ammonia	J	0.0326		0.055	mg/L	51.1	^	(+/-0.050)	KLP1	11/27/17	10:25
QC1203925720	LCS										
Nitrogen, Ammonia	1.00			1.10	mg/L		110	(90%-110%)		11/27/17	10:07
QC1203925719	MB										
Nitrogen, Ammonia		J		0.0348	mg/L					11/27/17	10:06
QC1203925725	438206003	MS									
Nitrogen, Ammonia	1.00	J	0.0326	1.16	mg/L		113*	(90%-110%)		11/27/17	10:26
Batch	1721223										
QC1203925729	438413001	DUP									
Phosphorus, Total as P		0.614		0.578	mg/L	6.04		(0%-27%)	KLP1	11/28/17	11:38
QC1203925728	LCS										
Phosphorus, Total as P	1.00			1.07	mg/L		107	(80%-124%)		11/28/17	11:34
QC1203925727	MB										
Phosphorus, Total as P		U		ND	mg/L					11/28/17	11:33
QC1203925731	438413001	MS									
Phosphorus, Total as P	1.00		0.614	1.56	mg/L		94.6	(63%-139%)		11/28/17	11:39
Batch	1721225										
QC1203925739	438413002	DUP									
Nitrogen, Total Kjeldahl		0.228		0.273	mg/L	18	^	(+/-0.100)	KLP1	11/28/17	13:29
QC1203925738	LCS										
Nitrogen, Total Kjeldahl	1.00			1.07	mg/L		107	(90%-110%)		11/28/17	13:37
QC1203925737	MB										
Nitrogen, Total Kjeldahl		U		ND	mg/L					11/28/17	13:24

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## QC Summary

Workorder: 438413

Page 4 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1721225										
QC1203925741	438413002	MS									
Nitrogen, Total Kjeldahl	1.00	0.228		1.18	mg/L		95.2	(90%-110%)	KLP1	11/28/17	13:30
Batch	1721226										
QC1203925745	438413001	DUP									
Nitrogen, Nitrate/Nitrite		1.97		1.98	mg/L	0.506		(0%-20%)	AXH3	11/24/17	09:30
QC1203925744	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.03	mg/L		103	(90%-110%)		11/24/17	06:05
QC1203925743	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					11/24/17	06:03
QC1203925748	438413001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.394		1.43	mg/L		104	(90%-110%)		11/24/17	09:31
<b>Solids Analysis</b>											
Batch	1720543										
QC1203923973	438300001	DUP									
Total Dissolved Solids		163		151	mg/L	7.27*		(0%-5%)	VH1	11/22/17	11:42
QC1203923972	LCS										
Total Dissolved Solids	300			287	mg/L		95.7	(95%-105%)		11/22/17	11:40
QC1203923971	MB										
Total Dissolved Solids			U	ND	mg/L					11/22/17	11:39
<b>Titration and Ion Analysis</b>											
Batch	1721096										
QC1203925382	438005001	DUP									
Conductivity		190		188	umhos/cm	1.22		(0%-10%)	HXC1	11/27/17	13:23
QC1203925380	LCS										
Conductivity	1410			1390	umhos/cm		98.4	(95%-105%)		11/27/17	13:19

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## QC Summary

Workorder: 438413

Page 5 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1721540										
QC1203926485 438206003 DUP											
Alkalinity, Total as CaCO3		U	ND	U	ND	mg/L	N/A		RXB5	11/29/17	14:49
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1203926482 LCS											
Alkalinity, Total as CaCO3	100				107	mg/L		107 (90%-110%)		11/29/17	14:19
QC1203926488 438206003 MS											
Alkalinity, Total as CaCO3	100	U	ND		108	mg/L		107 (80%-120%)		11/29/17	14:50
Batch	1721541										
QC1203926490 438206003 DUP											
pH		H	6.47	H	6.29	SU	2.82	(0%-5%)	RXB5	11/29/17	14:46
QC1203926491 438505010 DUP											
pH		H	8.07	H	8.08	SU	0.124	(0%-5%)		11/29/17	15:13
QC1203926489 LCS											
pH	7.00				7.00	SU		100 (99%-101%)		11/29/17	14:18

### Notes:

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

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**Workorder: 438413**[illegible]

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 #: 2018-1001  
Work Order #: 438413**

**Method/Analysis Information**

**Product:** Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1722107

<b>Sample ID</b>	<b>Client ID</b>
438413005	CAMO-18-148084
1203927924	Method Blank (MB)
1203927926	Laboratory Control Sample (LCS)
1203927925	438505002(CAMO-18-148077) 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 1203927924 (MB) and 1203927926 (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: 438505002 (CAMO-18-148077). The QC was from ARSL work order 438505.

**Duplication Criteria between QC Sample and Duplicate Sample**

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

**RDL Met**

The method RDL has been met.

**Technical Information:****Holding Time**

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

**Negative > 3 sigma TPU**

Sample result are not more negative than three sigma TPU.

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

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:****Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** ISOPU  
**Analytical Method:** HASL-300:ISOPU  
**Analytical Batch Number:** 1722108

<b>Sample ID</b>	<b>Client ID</b>
438413005	CAMO-18-148084
1203927927	Method Blank (MB)
1203927929	Laboratory Control Sample (LCS)
1203927928	438505002(CAMO-18-148077) 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 1203927927 (MB) and 1203927929 (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: 438505002 (CAMO-18-148077). The QC was from ARSL work order 438505.

**Duplication Criteria between QC Sample and Duplicate Sample**

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

**RDL Met**

The method RDL has been met.

**Technical Information:****Holding Time**

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

**Negative > 3 sigma TPU**

Sample result are not more negative than three sigma TPU.

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

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:****Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information****Product:****IsoU**

Analytical Method:

HASL-300:ISOU

Analytical Batch Number:

1722109

**Sample ID**

438413005

1203927930

**Client ID**

CAMO-18-148084

Method Blank (MB)

1203927932 Laboratory Control Sample (LCS)  
1203927931 438505002(CAMO-18-148077) 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 Calibrations were performed in December 2017 and 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 1203927930 (MB) and 1203927932 (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
1203927930 (MB)	Uranium-233/234, Uranium-235/236 and Uranium-238	Blank result > 1.65 CSU

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

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

Sample	Analyte	Value
1203927930 (MB)	Uranium-235/236 and Uranium-238	Blank result > DL

##### **Tracer/Carrier Yield**

All yields met the required acceptance limits.

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

The LCS spike recoveries met the acceptance limits.

**Designated QC**

The following sample was used for QC: 438505002 (CAMO-18-148077). The QC was from ARSL work order 438505.

**Duplication Criteria between QC Sample and Duplicate Sample**

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

**RDL Met**

The method RDL has been met.

**Technical Information:****Holding Time**

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

**Negative > 3 sigma TPU**

Sample result are not more negative than three sigma TPU.

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

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

**Recounts**

Sample 1203927930 (MB) was given additional clean-up steps and recounted in order to improve the resolution. 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**

The Method blank, 1203927930 (MB), did not meet achieve 400 tracer counts; however, the client tracer yield recovery requirements and detection limits were met.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** Gammaspec

Analytical Method: EPA:901.1

Analytical Batch Number: 1721213

<b>Sample ID</b>	<b>Client ID</b>
438413005	CAMO-18-148084

1203925710	Method Blank (MB)
1203925712	Laboratory Control Sample (LCS)
1203925711	438413005(CAMO-18-148084) 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, July 2017 and May 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: 438413005 (CAMO-18-148084). The QC was from ARSL work order 438413.

##### **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**

<b>Product:</b>	<b>WSP-GrossA/B</b>
Analytical Method:	EPA 900.0/SW846 9310
Analytical Batch Number:	1722977

<b>Sample ID</b>	<b>Client ID</b>
438413005	CAMO-18-148084
1203930061	Method Blank (MB)
1203930065	Laboratory Control Sample (LCS)
1203930062	438505006(CAMO-18-148078) Sample Duplicate (DUP)
1203930063	438505006(CAMO-18-148078) Matrix Spike (MS)
1203930064	438505006(CAMO-18-148078) 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 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 1203930061 (MB) and 1203930065 (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: 438505006 (CAMO-18-148078). The QC was from ARSL work order 438505.

#### **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**

None of the samples in this sample set were recounted.

#### **Miscellaneous Information:**

#### **Sample-Specific MDA/MDC**

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

#### **Additional Comments**

The matrix spike and matrix spike duplicate, 1203930063 (CAMO-18-148078MS) and 1203930064 (CAMO-18-148078MSD), aliquots were reduced to conserve sample volume.

#### **Qualifier Information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

**Product:** GFPC, Sr90, liquid

Analytical Method: EPA:905.0

Analytical Batch Number: 1723383

<b>Sample ID</b>	<b>Client ID</b>
438413005	CAMO-18-148084
1203931117	Method Blank (MB)
1203931120	Laboratory Control Sample (LCS)
1203931118	438505011(CAMO-18-148080) Sample Duplicate (DUP)
1203931119	438505011(CAMO-18-148080) 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 1203931117 (MB) and 1203931120 (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: 438505011 (CAMO-18-148080). The QC was from ARSL work order 438505.

**Matrix Spike (MS) Recovery**

The MS spike recoveries met acceptance limits.

**Duplication Criteria between QC Sample and Duplicate Sample**

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

**RDL Met**

The method RDL has been met.

**Technical Information:****Holding Time**

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

**Negative > 3 sigma TPU**

Sample result are not more negative than three sigma TPU.

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

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

**Recounts**

None of the samples in this sample set were recounted.

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

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

**Additional Comments**

The matrix spike, 1203931119 (CAMO-18-148080MS), aliquot was 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.

## **GEL LABORATORIES LLC**

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### **Qualifier Definition Report for**

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

Client SDG: 2018-1001 GEL Work Order: 438413

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

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

#### **Review/Validation**

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

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

**Signature:**



**Name: Kate Gellatly**

**Date: 15 DEC 2017**

**Title: Analyst I**

# **Sample Data Summary**

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: December 15, 2017

Client Sample ID: CAMO-18-148084  
Sample ID: 438413005  
Matrix: W  
Collect Date: 17-NOV-17  
Receive Date: 21-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.
<b>Rad Alpha Spec Analysis</b>															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	-0.00206	+/-0.00744	0.0367	0.0156	+/-0.00744	0.050	pCi/L			MXS2	12/04/17	1357	1722107	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.00903	+/-0.00639	0.0333	0.0136	+/-0.0064	0.050	pCi/L			MXS2	12/04/17	1357	1722108	2
Plutonium-239/240	U	-0.00677	+/-0.00677	0.0476	0.0207	+/-0.00677	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.706	+/-0.0497	0.167	0.0791	+/-0.0617	1.00	pCi/L			MXS2	12/04/17	1549	1722109	3
Uranium-235/236		0.179	+/-0.0279	0.0724	0.0306	+/-0.0294	1.00	pCi/L							
Uranium-238		0.326	+/-0.0345	0.098	0.0444	+/-0.0384	0.500	pCi/L							
<b>Rad Gamma Spec Analysis</b>															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	-0.411	+/-1.33	4.77	2.10	+/-1.33	8.00	pCi/L			BSW1	11/30/17	0737	1721213	4
Cobalt-60	U	0.709	+/-1.42	5.89	2.51	+/-1.43	8.00	pCi/L							
Neptunium-237	U	-0.128	+/-2.79	10.1	4.67	+/-2.79		pCi/L							
Potassium-40	U	-29.9	+/-21.2	64.9	28.1	+/-22.3		pCi/L							
Sodium-22	U	-0.0118	+/-1.28	5.19	2.17	+/-1.28		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.237	+/-0.116	0.487	0.217	+/-0.116	0.500	pCi/L			KSD1	12/09/17	1725	1723383	5
<i>WSP-GrossA/B "As Received"</i>															
Beta		2.23	+/-0.704	1.94	0.814	+/-0.731	3.00	pCi/L			AXH4	12/06/17	1101	1722977	6
Alpha	U	2.53	+/-1.01	2.66	0.917	+/-1.03	3.00	pCi/L			AXH4	12/06/17	1530	1722977	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"	1722107	93.7	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1722108	76.6	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1722109	65.5	(50%-105%)

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148084

Sample ID: 438413005

Project: ESHL00114

Client ID: ARSL004

Report Date: December 15, 2017

Parameter	Qualifier	Result Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Strontium Carrier		GFPC, Sr90, liquid "As Received"						1723383	73.9	(50%-105%)				

### Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

# **Quality Control Summary**



# GEL LABORATORIES LLC

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## QC Summary

Report Date: December 15, 2017

Page 1 of 6

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

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 438413

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1722107										
QC1203927925	438505002	DUP									
Americium-241	U	0.00689	U	0.00975	pCi/L	0.109		(0-1)	MXS2	12/04/17	13:57
	Uncert:	+/-0.00608		+/-0.00703							
	TPU:	+/-0.00609		+/-0.00704							
**Americium-243 Tracer	2.62	2.01		2.18	pCi/L		83	(50%-105%)			
	Uncert:	+/-0.0774		+/-0.0713							
	TPU:	+/-0.140		+/-0.134							
QC1203927926	LCS										
Americium-241	1.97			1.90	pCi/L		96.6	(80%-120%)	MXS2	12/04/17	13:57
	Uncert:			+/-0.0592							
	TPU:			+/-0.103							
**Americium-243 Tracer	2.10			1.95	pCi/L		93	(50%-105%)			
	Uncert:			+/-0.0612							
	TPU:			+/-0.112							
QC1203927924	MB										
Americium-241			U	0.00659	pCi/L				MXS2	12/04/17	13:57
	Uncert:			+/-0.00616							
	TPU:			+/-0.00617							
**Americium-243 Tracer	2.10			1.81	pCi/L		86.2	(50%-105%)			
	Uncert:			+/-0.0587							
	TPU:			+/-0.109							
Batch	1722108										
QC1203927928	438505002	DUP									
Plutonium-238	U	0.00652	U	0.0142	pCi/L	0.29		(0-1)	MXS2	12/04/17	16:37
	Uncert:	+/-0.00721		+/-0.0061							
	TPU:	+/-0.00721		+/-0.00613							
Plutonium-239/240	U	0.00217	U	0.00407	pCi/L	0.0639		(0-1)			
	Uncert:	+/-0.00841		+/-0.00643							
	TPU:	+/-0.00841		+/-0.00644							
**Plutonium-242 Tracer	2.47	1.95		2.00	pCi/L		81.3	(50%-105%)			
	Uncert:	+/-0.0739		+/-0.071							
	TPU:	+/-0.125		+/-0.122							
QC1203927929	LCS										
Plutonium-238			U	-1.97E-09	pCi/L			(80%-120%)	MXS2	12/04/17	16:37
	Uncert:			+/-0.00628							
	TPU:			+/-0.00628							
Plutonium-239/240	1.98			1.88	pCi/L		95.3	(80%-120%)			
	Uncert:			+/-0.0532							
	TPU:			+/-0.0912							
**Plutonium-242 Tracer	1.97			1.64	pCi/L		83.3	(50%-105%)			
	Uncert:			+/-0.0543							
	TPU:			+/-0.0946							

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 438413

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Parname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1722108										
QC1203927927	MB										
Plutonium-238			U	0.00192	pCi/L				MXS2	12/04/17	16:37
				Uncert:							
				TPU:							
Plutonium-239/240			U	0.0077	pCi/L						
				Uncert:							
				TPU:							
**Plutonium-242 Tracer	1.97			1.48	pCi/L		74.8	(50%-105%)			
				Uncert:							
				TPU:							
Batch	1722109										
QC1203927931	438505002	DUP									
Uranium-234		0.363		0.349	pCi/L	0.0946		(0-1)	MXS2	12/04/17	15:49
		Uncert:		+/-0.0312							
		TPU:		+/-0.0358							
Uranium-235/236		0.0768		0.0902	pCi/L	0.178		(0-1)			
		Uncert:		+/-0.0162							
		TPU:		+/-0.0166							
Uranium-238		0.172		0.216	pCi/L	0.418		(0-1)			
		Uncert:		+/-0.0219							
		TPU:		+/-0.0234							
**Uranium-232 Tracer	2.62	1.92		1.77	pCi/L		67.5	(50%-105%)			
		Uncert:		+/-0.0808							
		TPU:		+/-0.150							
QC1203927932	LCS										
Uranium-234				2.49	pCi/L				MXS2	12/04/17	15:49
		Uncert:		+/-0.0725							
		TPU:		+/-0.142							
Uranium-235/236				0.219	pCi/L						
		Uncert:		+/-0.0246							
		TPU:		+/-0.0269							
Uranium-238	2.70			2.79	pCi/L		103	(80%-120%)			
		Uncert:		+/-0.0764							
		TPU:		+/-0.157							
**Uranium-232 Tracer	2.09			1.73	pCi/L		82.8	(50%-105%)			
		Uncert:		+/-0.0669							
		TPU:		+/-0.123							
QC1203927930	MB										
Uranium-234			U	0.0966	pCi/L				MXS2	12/11/17	17:07
		Uncert:		+/-0.0271							
		TPU:		+/-0.0278							
Uranium-235/236			U	0.0479	pCi/L						
		Uncert:		+/-0.0196							
		TPU:		+/-0.0199							
Uranium-238			U	0.0635	pCi/L						
		Uncert:		+/-0.0214							
		TPU:		+/-0.0218							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1722109										
*Uranium-232 Tracer	2.09			1.32	pCi/L		63	(50%-105%)			
	Uncert:			+/-0.109							
	TPU:			+/-0.173							
Rad Gamma Spec											
Batch	1721213										
QC1203925711	438413005	DUP									
Cesium-137	U	-0.411	U	-1.22	pCi/L	0.16		(0-1)	BSW1	11/30/17	10:00
	Uncert:	+/-1.33		+/-1.17							
	TPU:	+/-1.33		+/-1.21							
Cobalt-60	U	0.709	U	-0.428	pCi/L	0.249		(0-1)			
	Uncert:	+/-1.42		+/-0.849							
	TPU:	+/-1.43		+/-0.855							
Neptunium-237	U	-0.128	U	0.0875	pCi/L	0.0208		(0-1)			
	Uncert:	+/-2.79		+/-2.39							
	TPU:	+/-2.79		+/-2.39							
Potassium-40	U	-29.9	U	-35.3	pCi/L	0.0644		(0-1)			
	Uncert:	+/-21.2		+/-17.7							
	TPU:	+/-22.3		+/-19.6							
Sodium-22	U	-0.0118	U	0.496	pCi/L	0.11		(0-1)			
	Uncert:	+/-1.28		+/-1.01							
	TPU:	+/-1.28		+/-1.02							
QC1203925712	LCS										
Americium-241	34300			37500	pCi/L		109	(80%-120%)	BSW1	11/30/17	08:31
	Uncert:			+/-469							
	TPU:			+/-1520							
Cesium-137	13000			13400	pCi/L		103	(80%-120%)			
	Uncert:			+/-160							
	TPU:			+/-583							
Cobalt-60	11200			12000	pCi/L		107	(80%-120%)			
	Uncert:			+/-168							
	TPU:			+/-571							
Neptunium-237			U	32.5	pCi/L						
	Uncert:			+/-51.4							
	TPU:			+/-51.9							
Potassium-40			U	24.4	pCi/L						
	Uncert:			+/-120							
	TPU:			+/-120							
Sodium-22			U	-14.3	pCi/L						
	Uncert:			+/-16.0							
	TPU:			+/-16.3							
QC1203925710	MB										
Cesium-137			U	0.456	pCi/L				BSW1	11/30/17	07:38
	Uncert:			+/-0.870							
	TPU:			+/-0.876							
Cobalt-60			U	0.908	pCi/L						
	Uncert:			+/-0.853							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1721213										
Neptunium-237	TPU:			+/-0.880							
			U	1.35	pCi/L						
	Uncert:			+/-1.56							
Potassium-40	TPU:			+/-1.60							
			U	6.29	pCi/L						
	Uncert:			+/-14.5							
Sodium-22	TPU:			+/-14.5							
			U	-0.469	pCi/L						
	Uncert:			+/-0.616							
TPU:				+/-0.626							
<b>Rad Gas Flow</b>											
Batch	1722977										
QC1203930062	438505006	DUP									
Alpha	U	0.535	U	2.38	pCi/L	0.579		(0-1)	AXH4	12/06/17	15:30
	Uncert:			+/-0.923							
	TPU:			+/-0.945							
Beta		2.36		3.35	pCi/L	0.301		(0-1)		12/06/17	11:02
	Uncert:			+/-0.835							
	TPU:			+/-0.884							
QC1203930065	LCS										
Alpha	12.1			11.3	pCi/L		93.7	(80%-120%)	AXH4	12/06/17	15:30
	Uncert:			+/-0.573							
	TPU:			+/-1.10							
Beta	47.3			49.1	pCi/L		104	(80%-120%)		12/06/17	11:02
	Uncert:			+/-0.877							
	TPU:			+/-4.19							
QC1203930061	MB										
Alpha			U	-0.0329	pCi/L				AXH4	12/06/17	15:30
	Uncert:			+/-0.0865							
	TPU:			+/-0.0865							
Beta			U	-0.0528	pCi/L					12/06/17	11:02
	Uncert:			+/-0.101							
	TPU:			+/-0.101							
QC1203930063	438505006	MS									
Alpha	242	U	0.535	219	pCi/L		90.8	(75%-125%)	AXH4	12/06/17	15:30
	Uncert:			+/-11.7							
	TPU:			+/-22.2							
Beta	946		2.36	995	pCi/L		105	(75%-125%)		12/06/17	11:02
	Uncert:			+/-18.7							
	TPU:			+/-85.0							
QC1203930064	438505006	MSD									
Alpha	242	U	0.535	223	pCi/L	0.0418	92.3	(0-1)	AXH4	12/06/17	15:30
	Uncert:			+/-11.6							
	TPU:			+/-22.0							
Beta	946		2.36	979	pCi/L	0.0461	103	(0-1)		12/06/17	11:02
	Uncert:			+/-18.0							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1722977										
		TPU:	+/-0.756	+/-85.3							
Batch	1723383										
QC1203931118	438505011	DUP									
Strontium-90		U	-0.0943	U	0.104	pCi/L	0.407	(0-1)	KSD1	12/09/17	17:27
		Uncert:	+/-0.112	+/-0.131							
		TPU:	+/-0.112	+/-0.131							
**Strontium Carrier		7.85	6.50	5.70	mg		72.6	(50%-105%)			
QC1203931120	LCS										
Strontium-90		23.7		19.9	pCi/L		83.9	(80%-120%)	KSD1	12/09/17	17:28
		Uncert:		+/-0.546							
		TPU:		+/-1.68							
**Strontium Carrier		7.85		7.10	mg		90.4	(50%-105%)			
QC1203931117	MB										
Strontium-90			U	0.0784	pCi/L				KSD1	12/09/17	17:27
		Uncert:		+/-0.0778							
		TPU:		+/-0.0781							
**Strontium Carrier		7.85		7.20	mg		91.7	(50%-105%)			
QC1203931119	438505011	MS									
Strontium-90		237	U	-0.0943	194	pCi/L	82	(75%-125%)	KSD1	12/09/17	17:28
		Uncert:		+/-0.112	+/-5.53						
		TPU:		+/-0.112	+/-17.0						
**Strontium Carrier		7.85	6.50	6.80	mg		86.6	(50%-105%)			

### 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

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

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

\*\* Indicates analyte is a surrogate/tracer compound.

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

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

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