

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:

[illegible]

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 11620

EVENT NAME: LA/Pueblo Cr December Monthly  
MY2018 Q1

SAMPLE ID: CAMO-18-150344

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/14/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1340		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-50 S1		FIELD PREP:	F	
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	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP- GENINORG+PerChlorate	1 LITER POLY	1	ICE		
	WSP- NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

## 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 \_\_\_\_\_

KT 12/14/17

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 12/14/17 1430	RECEIVED BY (Printed Name) (Signature)	MATT ENGERT <i>[Signature]</i>	Date/Time 12-14-17 1430
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time



**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 11620

EVENT NAME: LA/Pueblo Cr December Monthly  
MY2018 Q1

SAMPLE ID: CAMO-18-150345

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/14/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1212		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-50 S2		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- GENINORG+PerChlorat e	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 \_\_\_\_\_ HH:MM \_\_\_\_\_ Discharge Rate \_\_\_\_\_ Dissolved Oxygen \_\_\_\_\_  
 Groundwater Elevation \_\_\_\_\_ Oxidation-Reduction Potential \_\_\_\_\_ Period Purge Volume \_\_\_\_\_  
 pH \_\_\_\_\_ Purge Volume \_\_\_\_\_ Specific Conductance \_\_\_\_\_  
 Temperature \_\_\_\_\_ Total Volume Pumped \_\_\_\_\_ Turbidity \_\_\_\_\_

KT 12/14/17

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>Katrina Tow</i>	Date/Time 12/14/17 1430	RECEIVED BY (Printed Name) (Signature)	Sherwood <i>Sherwood</i>	Date/Time 12/14/17 1430
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11620

EVENT NAME: LA/Pueblo Cr December Monthly  
MY2018 Q1

SAMPLE ID: CAMO-18-150347

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/14/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1051		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	SIMR-2		FIELD PREP:	F	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 12/14/2017 1145	RECEIVED BY (Printed Name) (Signature)	Date/Time 12/14/17 1145
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time



**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 11620

EVENT NAME: LA/Pueblo Cr December Monthly  
MY2018 Q1

SAMPLE ID: CAMO-18-150352

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/14/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1340		MEDIA:	NA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-50 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 30 ft from running diesel generator

LOCATION COMMENTS: windy,  $\approx$  10 mph

## FIELD PARAMETERS:

Sample Time	1340	HH:MM	Discharge Rate	2.67	Dissolved Oxygen	7.15
Groundwater Elevation	5830.43		Oxidation-Reduction Potential	186.2	Period Purge Volume	NA
pH	7.79		Purge Volume	146.85	Specific Conductance	191.5
Temperature	20.4		Total Volume Pumped	208.26	Turbidity	0.19

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>Katrina Tow</i>	Date/Time 12/14/17 1430	RECEIVED BY (Printed Name) (Signature)	MAT ENGELST <i>MAT ENGELST</i>	Date/Time 12-14-17 1430
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 11620

EVENT NAME: LA/Pueblo Cr December Monthly  
MY2018 Q1

SAMPLE ID: CAMO-18-150353

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/14/2017 <del>12/12</del>	OK	FIELD MATRIX:	WG	KT 12/14/17 <del>NA</del> OK
TIME COLLECTED (HH:MM):	1212 KT 12/14/17		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-50 S2		FIELD PREP:	UF	
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	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 30 ft. from running diesel generator

LOCATION COMMENTS: windy,  $\approx$  10 mph

## FIELD PARAMETERS:

Sample Time	1212	HH:MM	Discharge Rate	2.52	Dissolved Oxygen	8.00
Groundwater Elevation	5831.43		Oxidation-Reduction Potential	178.8	Period Purge Volume	NA
pH	7.99		Purge Volume	315.00	Specific Conductance	135.0
Temperature	19.7		Total Volume Pumped	375.48	Turbidity	0.43

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>Katrina Tow</i>	Date/Time 12/14/17 1430	RECEIVED BY (Printed Name) (Signature)	G. Sherwood <i>G. Sherwood</i>	Date/Time 12/14/17 1430
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11620

EVENT NAME: LA/Pueblo Cr December Monthly  
MY2018 Q1

SAMPLE ID: CAMO-18-150355

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/14/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1051		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	SIMR-2		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

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

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	1051	HH:MM	Discharge Rate	3.66	Dissolved Oxygen	7.24
Groundwater Elevation	5832.41		Oxidation-Reduction Potential	235.1	Period Purge Volume	NA
pH	7.85		Purge Volume	175.68	Specific Conductance	130.6
Temperature	19.4		Total Volume Pumped	223.26	Turbidity	0.78

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Tanner Bonham	Date/Time 12/14/2017 1145	RECEIVED BY (Printed Name) (Signature)	Ranee Onstott	Date/Time 12/14/17 1145
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 12/01/2017



**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 11620

EVENT NAME: LA/Pueblo Cr December Monthly  
MY2018 Q1

SAMPLE ID: CAMO-18-150363

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/14/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1340		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-50 S1		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	FD	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP- GENINORG+PerChlorat e	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 \_\_\_\_\_ HH:MM \_\_\_\_\_ Discharge Rate \_\_\_\_\_ Dissolved Oxygen \_\_\_\_\_  
 Groundwater Elevation \_\_\_\_\_ Oxidation-Reduction Potential \_\_\_\_\_ Period Purge Volume \_\_\_\_\_  
 pH \_\_\_\_\_ Purge Volume \_\_\_\_\_ Specific Conductance \_\_\_\_\_  
 Temperature \_\_\_\_\_ Total Volume Pumped \_\_\_\_\_ Turbidity \_\_\_\_\_

KT 12/14/17

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 12/14/17 1430	RECEIVED BY (Printed Name) (Signature)	MATT ENGLERST <i>[Signature]</i>	Date/Time 12-14-17 1430
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 11620

EVENT NAME: LA/Pueblo Cr December Monthly  
MY2018 Q1

SAMPLE ID: CAMO-18-150364

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/14/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1340		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-50 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FD	
TOP DEPTH:	↓		SAMPLE USAGE:	QC	
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: None

LOCATION COMMENTS: None

## 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 \_\_\_\_\_

KT 12/14/17

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>Katrina Tow</i>	Date/Time 12/14/17 1430	RECEIVED BY (Printed Name) (Signature)	MATT ENGLERT <i>M. Englert</i>	Date/Time 12-14-17 1430
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11620

EVENT NAME: LA/Pueblo Cr December Monthly  
MY2018 Q1

SAMPLE ID: CAMO-18-150383

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	12/14/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	0750		MEDIA:	NA	
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-50 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	PEB	
TOP DEPTH:	↓		SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8082-PCB	1 LITER AMBER GLASS	3	ICE	Y	NA
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-8330B-NMED HEXP	1 LITER AMBER GLASS	3	ICE		
	WSP-All Metals	1 LITER POLY	1	HNO3 ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-DRO	1 LITER AMBER GLASS	2	ICE		
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-HexCr	125 ML POLY	1	ICE	12/15/17	
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP- NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4		
	WSP-RAD	1 GAL POLY	1	HNO3		

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11620

EVENT NAME: LA/Pueblo Cr December Monthly  
MY2018 Q1

SAMPLE ID: CAMO-18-150383

WORK ORDER:

NA	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	Y	NA
----	-------------	--------------------	---	-------	---	----

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

## 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 \_\_\_\_\_

KT 12/14/17

COLLECTED BY (PRINT):

M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 12/14/17 1430	RECEIVED BY (Printed Name) (Signature)	MATT ENGELT <i>[Signature]</i>	Date/Time 12-14-17 1401430 ME
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time



Sampling Plan ID/Name: R-50 51 + 52COC: 2018-1290

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		X
Alpha ≥ 125	AND Alpha ≥ 1,250,000	AT other locations		X
Beta ≥ 1,500	AND Beta ≥ 15,000,000	AT any location		X
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.				X
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.				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 field screening measurements of alpha and beta activity.				X

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		
• 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 Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, 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	12/14/17
(Signature) <i>Katrina Tow</i>	1430

R-50 screen 1 &amp; 2

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) MATT ENGLERT	12-14-17
(Signature) <i>Matt Englert</i>	1430

ER-SOP-10094, R1, Attachment



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		X
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		X
• 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.			

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 Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, 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) <u>Tonger Bonham</u>	<u>12/14/2017</u>
(Signature) <u>[Signature]</u>	<u>1145</u>

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) <u>Ranee Ostott</u>	<u>12/14/17</u>
(Signature) <u>[Signature]</u>	<u>1145</u>



## DATA VALIDATION REPORT

Chain Of Custody No. 2018-1290

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
440209	EPA:120.1	3	1			
440209	EPA:150.1	3	1			
440209	EPA:160.1	3	1			
440209	EPA:170.0	6	2			
440209	EPA:245.2	6	2			
440209	EPA:300.0	3	1			
440209	EPA:310.1	3	1			
440209	EPA:335.4	3	1			
440209	EPA:350.1	3	1			
440209	EPA:351.2	3	1			
440209	EPA:353.2	3	1			
440209	EPA:365.4	3	1			
440209	EPA:900					
440209	EPA:901.1					
440209	EPA:905.0					
440209	HASL-300:AM-241					
440209	HASL-300:ISOPU					
440209	HASL-300:ISOU					
440209	SM:A2340B	3	1			
440209	SW-846:6010C	3	1			
440209	SW-846:6020	3	1			
440209	SW-846:6850	3	1			
440209	SW-846:8015B					
440209	SW-846:8082					
440209	SW-846:8260B					
440209	SW-846:8270D					
440209	SW-846:8330B					
440209	SW-846:9060	3	1			

## DATA VALIDATION REPORT

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
440209	EPA:120.1	1727071	1727071	3	1									1			1				
440209	EPA:150.1	1727518	1727518	3	1									1			2				
440209	EPA:160.1	1727218	1727218	3	1				1					1			1				
440209	EPA:170.0	NA	NA	6	2																
440209	EPA:245.2	1729947	1729945	6	2				1	1				1			1				
440209	EPA:300.0	1729986	1729986	3	1				1					1			1				
440209	EPA:310.1	1727515	1727515	3	1					2				1			2				
440209	EPA:335.4	1726578	1726577	3	1				1	1				1			1				
440209	EPA:350.1	1727026	1727025	3	1				1	1				1			1				
440209	EPA:351.2	1726143	1726142	3	1				1	2				1			2				
440209	EPA:353.2	1727041	1727041	3	1				1					1			1				
440209	EPA:365.4	1727032	1727029	3	1				1	1				1			1				
440209	EPA:900	1727116	1727116						1	1	1			1			1				
440209	EPA:901.1	1727008	1727008						1					1			1				
440209	EPA:905.0	1727972	1727972						1	1				1			1				
440209	HASL-300:AM-241	1727284	1727284						1					1			1				
440209	HASL-300:ISOPU	1727285	1727285						1					1			1				
440209	HASL-300:ISOU	1727286	1727286						1					1			1				
440209	SM:A2340B	1731623	1731623	3	1																
440209	SW-846:6010C	1726995	1726994	3	1				1	1				1			1				
440209	SW-846:6020	1727000	1726999	3	1				1	1				1			1				
440209	SW-846:6850	1727162	1727161	3	1				1	1	1			1							
440209	SW-846:8015B	1727267	1727266						1	1	1			1							
440209	SW-846:8082	1730491	1730488						1	1	1			1							
440209	SW-846:8260B	1728901	1728901						1					2							
440209	SW-846:8270D	1727262	1727260						1	1	1			1							
440209	SW-846:8330B	1727070	1727069						1	1	1			1							
440209	SW-846:9060	1727146	1727146	3	1				1					1			1				

2. Distribution Of Analytes In EDD.



## 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	CALA-18-150103	1203940621	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-150344	440209001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-150345	440209008	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-150347	440209010	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-150363	440209003	FD	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-150383	440209006	PEB	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203940620	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-150344	440209001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-150345	440209008	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-150347	440209010	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-150363	440209003	FD	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-150383	440209006	PEB	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-18-150366	1203941752	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-18-150418	1203941753	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203941751	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-150344	440209001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-150345	440209008	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-150347	440209010	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-150363	440209003	FD	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-150383	440209006	PEB	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWR-18-149018	1203940990	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203940988	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203940987	MB	1	0	0	0
EPA:170.0	VOC	CAMO-18-150344	440209001	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-150345	440209008	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-150347	440209010	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-150352	440209002	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-150353	440209009	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-150355	440209011	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-150363	440209003	FD	1	0	0	0
EPA:170.0	VOC	CAMO-18-150364	440209004	FD	1	0	0	0
EPA:170.0	VOC	CAMO-18-150383	440209005	PEB	1	0	0	0
EPA:245.2	INORGANIC	CALA-18-148967	1203948030	DUP	1	0	0	0
EPA:245.2	INORGANIC	CALA-18-148967	1203948032	MS	0	0	1	0
EPA:245.2	INORGANIC	CAMO-18-150344	440209001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-150345	440209008	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-150347	440209010	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-150352	440209002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-150353	440209009	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-150355	440209011	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:245.2	INORGANIC	CAMO-18-150363	440209003	FD	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-150364	440209004	FD	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-150383	440209006	PEB	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203948029	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203948028	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-150344	440209001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-150345	440209008	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-150347	440209010	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-150363	440209003	FD	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-150383	440209006	PEB	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWR-18-149018	1203948152	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203948151	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203948150	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-150344	440209001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-150345	440209008	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-150347	440209010	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-150363	440209003	FD	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-150383	440209006	PEB	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-150366	1203941745	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-150366	1203941748	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-150418	1203941746	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-150418	1203941749	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203941744	LCS	0	0	1	0
EPA:335.4	INORGANIC	CALA-18-148968	1203939474	DUP	1	0	0	0
EPA:335.4	INORGANIC	CALA-18-148968	1203939476	MS	0	0	1	0
EPA:335.4	INORGANIC	CAMO-18-150352	440209002	REG	1	0	0	0
EPA:335.4	INORGANIC	CAMO-18-150353	440209009	REG	1	0	0	0
EPA:335.4	INORGANIC	CAMO-18-150355	440209011	REG	1	0	0	0
EPA:335.4	INORGANIC	CAMO-18-150364	440209004	FD	1	0	0	0
EPA:335.4	INORGANIC	CAMO-18-150383	440209006	PEB	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203939472	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203939471	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CALA-18-148967	1203940540	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CALA-18-148967	1203940541	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-150344	440209001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-150345	440209008	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-150347	440209010	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-150363	440209003	FD	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-150383	440209006	PEB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203940539	LCS	0	0	1	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:350.1	GENERAL CHEMISTRY	MB	1203940538	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-150352	440209002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-150353	440209009	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-150355	440209011	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-150364	440209004	FD	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-150383	440209006	PEB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-148918	1203938300	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-148918	1203938302	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-148943	1203938299	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-148943	1203938301	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203938298	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203938297	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-150344	440209001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-150345	440209008	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-150347	440209010	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-150363	440209003	FD	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-150383	440209006	PEB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CTU6B-18-147900	1203940582	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203940581	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203940580	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CALA-18-148967	1203940550	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CALA-18-148967	1203940552	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-150344	440209001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-150345	440209008	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-150347	440209010	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-150363	440209003	FD	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-150383	440209006	PEB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203940549	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203940548	MB	1	0	0	0
EPA:900	RAD	CAMO-18-150383	440209006	PEB	2	0	0	0
EPA:900	RAD	CAWR-18-150421	1203940722	DUP	2	0	0	0
EPA:900	RAD	CAWR-18-150421	1203940723	MS	0	0	2	0
EPA:900	RAD	CAWR-18-150421	1203940724	MSD	0	0	2	0
EPA:900	RAD	LCS	1203940725	LCS	0	0	2	0
EPA:900	RAD	MB	1203940721	MB	2	0	0	0
EPA:901.1	RAD	CAMO-18-150383	440209006	PEB	5	0	0	0
EPA:901.1	RAD	CAWR-18-150421	1203940480	DUP	5	0	0	0
EPA:901.1	RAD	LCS	1203940481	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203940479	MB	5	0	0	0
EPA:905.0	RAD	CAMO-18-150383	440209006	PEB	1	0	0	0



## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:905.0	RAD	CAWR-18-150421	1203942901	DUP	1	0	0	0
EPA:905.0	RAD	CAWR-18-150421	1203942902	MS	0	0	1	0
EPA:905.0	RAD	LCS	1203942903	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203942900	MB	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-150383	1203941156	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-150383	440209006	PEB	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203941157	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203941155	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-150383	1203941159	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-150383	440209006	PEB	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203941160	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203941158	MB	2	0	0	0
HASL-300:ISOU	RAD	CAMO-18-150383	1203941162	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAMO-18-150383	440209006	PEB	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203941163	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203941161	MB	3	0	0	0
SM:A2340B	INORGANIC	CAMO-18-150344	440209001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-18-150345	440209008	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-18-150347	440209010	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-18-150363	440209003	FD	1	0	0	0
SM:A2340B	INORGANIC	CAMO-18-150383	440209006	PEB	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-150344	1203940452	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-150344	1203940453	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAMO-18-150344	440209001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-150345	440209008	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-150347	440209010	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-150363	440209003	FD	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-150383	440209006	PEB	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203940451	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203940450	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-18-150344	1203940462	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-150344	1203940463	MS	0	0	11	0
SW-846:6020	INORGANIC	CAMO-18-150344	440209001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-150345	440209008	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-150347	440209010	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-150363	440209003	FD	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-150383	440209006	PEB	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203940461	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203940460	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CALA-18-150103	1203940854	MS	0	0	1	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6850	LCMS/MS PERCHLORATE	CALA-18-150103	1203940855	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-150344	440209001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-150345	440209008	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-150347	440209010	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-150363	440209003	FD	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-150383	440209006	PEB	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203940853	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203940852	MB	1	0	0	0
SW-846:8015B	TPH	CAMO-18-150383	1203941101	MS	0	1	1	0
SW-846:8015B	TPH	CAMO-18-150383	1203941102	MSD	0	1	1	0
SW-846:8015B	TPH	CAMO-18-150383	440209006	PEB	1	1	0	0
SW-846:8015B	TPH	LCS	1203941100	LCS	0	1	1	0
SW-846:8015B	TPH	MB	1203941099	MB	1	1	0	0
SW-846:8082	PESTPCB	CAMO-18-150383	440209005	PEB	8	2	0	0
SW-846:8082	PESTPCB	CAWR-18-150421	1203949425	MS	0	2	2	0
SW-846:8082	PESTPCB	CAWR-18-150421	1203949426	MSD	0	2	2	0
SW-846:8082	PESTPCB	LCS	1203949424	LCS	0	2	2	0
SW-846:8082	PESTPCB	MB	1203949423	MB	8	2	0	0
SW-846:8260B	VOC	CAMO-18-150383	440209006	PEB	80	3	0	0
SW-846:8260B	VOC	LCS	1203945322	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203945323	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203945321	MB	80	3	0	0
SW-846:8270D	SVOC	CALA-18-150401	1203941089	MS	0	6	76	0
SW-846:8270D	SVOC	CALA-18-150401	1203941090	MSD	0	6	76	0
SW-846:8270D	SVOC	CAMO-18-150383	440209006	PEB	80	6	0	0
SW-846:8270D	SVOC	LCS	1203941088	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203941087	MB	80	6	0	0
SW-846:8330B	LCMS/MS HIGH	CALA-18-148968	1203940618	MS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CALA-18-148968	1203940619	MSD	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAMO-18-150383	440209007	PEB	20	1	0	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203940617	LCS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	MB	1203940616	MB	20	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-150352	440209002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-150353	440209009	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-150355	440209011	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-150364	440209004	FD	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-150383	440209006	PEB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWR-18-150421	1203940824	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203940823	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203940822	MB	1	0	0	0



## DATA VALIDATION REPORT

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203940987	METHOD BLANK	EPA:160.1	W	Total Dissolved Solids	7.14	J	mg/L	14.3
MB	1203948150	METHOD BLANK	EPA:300.0	W	Sulfate	0.146	J	mg/L	0.400

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-18-150344	1203948150	METHOD BLANK	EPA:300.0	Sulfate	0.146	mg/L	14.0		0.400	Y	5	100	Y
CAMO-18-150363	1203948150	METHOD BLANK	EPA:300.0	Sulfate	0.146	mg/L	14.0		0.400	Y	5	100	Y
CAMO-18-150345	1203948150	METHOD BLANK	EPA:300.0	Sulfate	0.146	mg/L	2.73		0.400	Y	5	100	Y
CAMO-18-150347	1203948150	METHOD BLANK	EPA:300.0	Sulfate	0.146	mg/L	3.02		0.400	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

## DATA VALIDATION REPORT

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAWA-18-148918	1203938302		EPA:351.2	Total Kjeldahl Nitrogen	1726142	12-20-2017	W	129		110	90	10		
CAWA-18-148943	1203938301		EPA:351.2	Total Kjeldahl Nitrogen	1726142	12-20-2017	W	114		110	90	10		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

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	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
-------------	------------	-----------------	----------------	--------------------	------------------	-------------------	----------------	---------------	----------------------	-------------------------	-------------	------------	-----------	---------------	--------------	------------	--------------------	------------	-------------	---------	-----------------	------------------------	----------

## DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-50 S1	2018-1290	CAMO-18-150344	REG	INIT	GENERAL CHEMISTRY	EPA:300.0	Sulfate		J+	I4a	Y	14.0	mg/L	14.0	mg/L			W	12/14/2017		1729986	VAL	Y
R-50 S2	2018-1290	CAMO-18-150345	REG	INIT	GENERAL CHEMISTRY	EPA:300.0	Sulfate		J+	I4a	Y	2.73	mg/L	2.73	mg/L			W	12/14/2017		1729986	VAL	Y
SIMR-2	2018-1290	CAMO-18-150347	REG	INIT	GENERAL CHEMISTRY	EPA:300.0	Sulfate		J+	I4a	Y	3.02	mg/L	3.02	mg/L			W	12/14/2017		1729986	VAL	Y
R-50 S1	2018-1290	CAMO-18-150363	FD	INIT	GENERAL CHEMISTRY	EPA:300.0	Sulfate		J+	I4a	Y	14.0	mg/L	14.0	mg/L			W	12/14/2017		1729986	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00217	pCi/L	0.00217	pCi/L	0.0354	0.00574	W	12/14/2017		1727284	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	2.56	pCi/L	2.56	pCi/L	3.13	2.15	W	12/14/2017		1727008	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.194	pCi/L	0.194	pCi/L	3.27	0.813	W	12/14/2017		1727008	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	-0.479	pCi/L	-0.479	pCi/L	2.61	0.573	W	12/14/2017		1727116	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	0.204	pCi/L	0.204	pCi/L	1.20	0.357	W	12/14/2017		1727116	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-0.256	pCi/L	-0.256	pCi/L	6.15	1.68	W	12/14/2017		1727008	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.00228	pCi/L	-0.00228	pCi/L	0.0459	0.00509	W	12/14/2017		1727285	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.00683	pCi/L	0.00683	pCi/L	0.0494	0.00821	W	12/14/2017		1727285	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5a	N	25.1	pCi/L	25.1	pCi/L	25.0	13.3	W	12/14/2017		1727008	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	0.0257	pCi/L	0.0257	pCi/L	3.29	0.840	W	12/14/2017		1727008	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.0817	pCi/L	-0.0817	pCi/L	0.359	0.0855	W	12/14/2017		1727972	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	HASL-300:ISOU	Uranium-234	U	U	R5	N	0.0799	pCi/L	0.0799	pCi/L	0.118	0.015	W	12/14/2017		1727286	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0282	pCi/L	0.0282	pCi/L	0.0552	0.0113	W	12/14/2017		1727286	VAL	Y
R-50 S1	2018-1290	CAMO-18-150383	PEB	INIT	RAD	HASL-300:ISOU	Uranium-238	U	U	R5	N	0.0297	pCi/L	0.0297	pCi/L	0.0583	0.00995	W	12/14/2017		1727286	VAL	Y

### Reason Code

### Description

I4a	The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was >5x
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualify. The analyte is detected in the sample.
R5	Analyte is not detected because the amount reported is less than the MDC.
R5a	The analyte should be regarded as rejected because spectral interferences prevent positive identification of the analytes.
U_LAB	The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.



## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-150344	R-50 S1	REG	EPA:120.1	0	1
CAMO-18-150344	R-50 S1	REG	EPA:150.1	0	1
CAMO-18-150344	R-50 S1	REG	EPA:160.1	0	1
CAMO-18-150344	R-50 S1	REG	EPA:170.0	0	1
CAMO-18-150344	R-50 S1	REG	EPA:245.2	0	1
CAMO-18-150344	R-50 S1	REG	EPA:300.0	0	4
CAMO-18-150344	R-50 S1	REG	EPA:310.1	0	2
CAMO-18-150344	R-50 S1	REG	EPA:350.1	0	1
CAMO-18-150344	R-50 S1	REG	EPA:353.2	0	1
CAMO-18-150344	R-50 S1	REG	EPA:365.4	0	1
CAMO-18-150344	R-50 S1	REG	SM:A2340B	0	1
CAMO-18-150344	R-50 S1	REG	SW-846:6010C	0	17
CAMO-18-150344	R-50 S1	REG	SW-846:6020	0	11
CAMO-18-150344	R-50 S1	REG	SW-846:6850	0	1
CAMO-18-150345	R-50 S2	REG	EPA:120.1	0	1
CAMO-18-150345	R-50 S2	REG	EPA:150.1	0	1
CAMO-18-150345	R-50 S2	REG	EPA:160.1	0	1
CAMO-18-150345	R-50 S2	REG	EPA:170.0	0	1
CAMO-18-150345	R-50 S2	REG	EPA:245.2	0	1
CAMO-18-150345	R-50 S2	REG	EPA:300.0	0	4
CAMO-18-150345	R-50 S2	REG	EPA:310.1	0	2
CAMO-18-150345	R-50 S2	REG	EPA:350.1	0	1
CAMO-18-150345	R-50 S2	REG	EPA:353.2	0	1
CAMO-18-150345	R-50 S2	REG	EPA:365.4	0	1
CAMO-18-150345	R-50 S2	REG	SM:A2340B	0	1
CAMO-18-150345	R-50 S2	REG	SW-846:6010C	0	17
CAMO-18-150345	R-50 S2	REG	SW-846:6020	0	11
CAMO-18-150345	R-50 S2	REG	SW-846:6850	0	1
CAMO-18-150347	SIMR-2	REG	EPA:120.1	0	1
CAMO-18-150347	SIMR-2	REG	EPA:150.1	0	1
CAMO-18-150347	SIMR-2	REG	EPA:160.1	0	1
CAMO-18-150347	SIMR-2	REG	EPA:170.0	0	1
CAMO-18-150347	SIMR-2	REG	EPA:245.2	0	1
CAMO-18-150347	SIMR-2	REG	EPA:300.0	0	4
CAMO-18-150347	SIMR-2	REG	EPA:310.1	0	2
CAMO-18-150347	SIMR-2	REG	EPA:350.1	0	1
CAMO-18-150347	SIMR-2	REG	EPA:353.2	0	1

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-150347	SIMR-2	REG	EPA:365.4	0	1
CAMO-18-150347	SIMR-2	REG	SM:A2340B	0	1
CAMO-18-150347	SIMR-2	REG	SW-846:6010C	0	17
CAMO-18-150347	SIMR-2	REG	SW-846:6020	0	11
CAMO-18-150347	SIMR-2	REG	SW-846:6850	0	1
CAMO-18-150352	R-50 S1	REG	EPA:170.0	0	1
CAMO-18-150352	R-50 S1	REG	EPA:245.2	0	1
CAMO-18-150352	R-50 S1	REG	EPA:335.4	0	1
CAMO-18-150352	R-50 S1	REG	EPA:351.2	0	1
CAMO-18-150352	R-50 S1	REG	SW-846:9060	0	1
CAMO-18-150353	R-50 S2	REG	EPA:170.0	0	1
CAMO-18-150353	R-50 S2	REG	EPA:245.2	0	1
CAMO-18-150353	R-50 S2	REG	EPA:335.4	0	1
CAMO-18-150353	R-50 S2	REG	EPA:351.2	0	1
CAMO-18-150353	R-50 S2	REG	SW-846:9060	0	1
CAMO-18-150355	SIMR-2	REG	EPA:170.0	0	1
CAMO-18-150355	SIMR-2	REG	EPA:245.2	0	1
CAMO-18-150355	SIMR-2	REG	EPA:335.4	0	1
CAMO-18-150355	SIMR-2	REG	EPA:351.2	0	1
CAMO-18-150355	SIMR-2	REG	SW-846:9060	0	1
CAMO-18-150363	R-50 S1	FD	EPA:120.1	0	1
CAMO-18-150363	R-50 S1	FD	EPA:150.1	0	1
CAMO-18-150363	R-50 S1	FD	EPA:160.1	0	1
CAMO-18-150363	R-50 S1	FD	EPA:170.0	0	1
CAMO-18-150363	R-50 S1	FD	EPA:245.2	0	1
CAMO-18-150363	R-50 S1	FD	EPA:300.0	0	4
CAMO-18-150363	R-50 S1	FD	EPA:310.1	0	2
CAMO-18-150363	R-50 S1	FD	EPA:350.1	0	1
CAMO-18-150363	R-50 S1	FD	EPA:353.2	0	1
CAMO-18-150363	R-50 S1	FD	EPA:365.4	0	1
CAMO-18-150363	R-50 S1	FD	SM:A2340B	0	1
CAMO-18-150363	R-50 S1	FD	SW-846:6010C	0	17
CAMO-18-150363	R-50 S1	FD	SW-846:6020	0	11
CAMO-18-150363	R-50 S1	FD	SW-846:6850	0	1
CAMO-18-150364	R-50 S1	FD	EPA:170.0	0	1
CAMO-18-150364	R-50 S1	FD	EPA:245.2	0	1
CAMO-18-150364	R-50 S1	FD	EPA:335.4	0	1

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-150364	R-50 S1	FD	EPA:351.2	0	1
CAMO-18-150364	R-50 S1	FD	SW-846:9060	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:120.1	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:150.1	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:160.1	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:170.0	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:245.2	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:300.0	0	4
CAMO-18-150383	R-50 S1	PEB	EPA:310.1	0	2
CAMO-18-150383	R-50 S1	PEB	EPA:335.4	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:350.1	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:351.2	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:353.2	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:365.4	0	1
CAMO-18-150383	R-50 S1	PEB	EPA:900	0	2
CAMO-18-150383	R-50 S1	PEB	EPA:901.1	0	5
CAMO-18-150383	R-50 S1	PEB	EPA:905.0	0	1
CAMO-18-150383	R-50 S1	PEB	HASL-300:AM-241	0	1
CAMO-18-150383	R-50 S1	PEB	HASL-300:ISOPU	0	2
CAMO-18-150383	R-50 S1	PEB	HASL-300:ISOU	0	3
CAMO-18-150383	R-50 S1	PEB	SM:A2340B	0	1
CAMO-18-150383	R-50 S1	PEB	SW-846:6010C	0	17
CAMO-18-150383	R-50 S1	PEB	SW-846:6020	0	11
CAMO-18-150383	R-50 S1	PEB	SW-846:6850	0	1
CAMO-18-150383	R-50 S1	PEB	SW-846:8015B	0	1
CAMO-18-150383	R-50 S1	PEB	SW-846:8082	0	8
CAMO-18-150383	R-50 S1	PEB	SW-846:8260B	0	80
CAMO-18-150383	R-50 S1	PEB	SW-846:8270D	0	80
CAMO-18-150383	R-50 S1	PEB	SW-846:8330B	0	20
CAMO-18-150383	R-50 S1	PEB	SW-846:9060	0	1



January 11, 2018

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

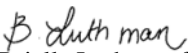
Re: LANL- WQH Water Samples  
Work Order: 440209  
SDG: 2018-1290

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on December 16, 2017, and analyzed for Diesel Range Organics, Explosives by LCMSMS, GC Semivolatile PCB, 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,

  
Brielle Luthman for  
Valerie Davis  
Project Manager

Chain of Custody: 2018-1290  
Enclosures



**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 440209**  
**SDG: 2018-1290**

## Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	5
Data Review Qualifier Flag Definition Sheet.....	9
Volatile Analysis.....	12
Case Narrative.....	13
Sample Data Summary.....	18
Quality Control Summary.....	22
Quality Control Data.....	40
Semi-Volatile Analysis.....	62
Case Narrative.....	63
Sample Data Summary.....	68
Quality Control Summary.....	72
Quality Control Data.....	87
Perchlorates by LCMSMS Analysis.....	100
Case Narrative.....	101
Sample Data Summary.....	107
Quality Control Summary.....	113
Quality Control Data.....	116
Explosives by LCMSMS Analysis.....	122
Case Narrative.....	123



Sample Data Summary.....	128
Quality Control Summary.....	131
Quality Control Data.....	135
FID Diesel Range Organics Analysis.....	149
Case Narrative.....	150
Sample Data Summary.....	155
Quality Control Summary.....	157
Quality Control Data.....	163
PCB Analysis.....	168
Case Narrative.....	169
Sample Data Summary.....	174
Quality Control Summary.....	176
Quality Control Data.....	182
Metals Analysis.....	187
Case Narrative.....	188
Sample Data Summary.....	194
Quality Control Summary.....	214
General Chem Analysis.....	228
Case Narrative.....	229
Sample Data Summary.....	261
Quality Control Summary.....	276

Radiological Analysis.....	283
Case Narrative.....	284
Sample Data Summary.....	298
Quality Control Summary.....	301

# Case Narrative



**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 440209  
SDG # : 2018-1290**

**January 11, 2018**

**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 December 16, 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>
440209001	CAMO-18-150344
440209002	CAMO-18-150352
440209003	CAMO-18-150363
440209004	CAMO-18-150364
440209005	CAMO-18-150383
440209006	CAMO-18-150383
440209007	CAMO-18-150383
440209008	CAMO-18-150345
440209009	CAMO-18-150353
440209010	CAMO-18-150347
440209011	CAMO-18-150355

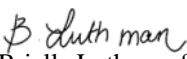
**Case Narrative**

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: Diesel Range Organics, Explosives by LCMSMS, GC Semivolatile PCB, 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.

  
Brielle Luthman for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 11 January 2018**

<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	LA180011
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	SC000122017-25
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# **Chain of Custody and Supporting Documentation**





## SAMPLE RECEIPT & REVIEW FORM

Client: <b>ARSL</b>		SDG/AR/COC/Work Order: <b>440209</b>	
Received By: <b>H. Taylor</b>		Date Received: <b>12/6/17</b>	
Carrier and Tracking Number		Circle Applicable: FedEx Express   FedEx Ground   UPS   Field Services   Courier   Other <b>5908 1783 3459-3</b> <b>3460-3</b> <b>3448-3</b>	
Suspected Hazard Information		Yes	No
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked or classified as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is package, COC, and/or Samples marked HAZ?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample Receipt Criteria		Yes	NA
1 Shipping containers received intact and sealed?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
2 Chain of custody documents included with shipment?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Daily check performed and passed on IR temperature gun?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Sample containers intact and sealed?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
6 Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
7 Do any samples require Volatile Analysis?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
8 Samples received within holding time?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
9 Sample ID's on COC match ID's on bottles?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
10 Date & time on COC match date & time on bottles?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
11 Number of containers received match number indicated on COC?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
12 Are sample containers identifiable as GEL provided?		<input type="checkbox"/>	<input checked="" type="checkbox"/>
13 COC form is properly signed in relinquished/received sections?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Comments (Use Continuation Form if needed):			

ORIGIN ID:SAFA (505) 665-3966  
KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03

ACTWGT: 48.0 LB MAN  
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545  
UNITED STATES US

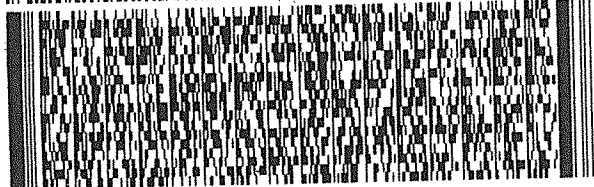
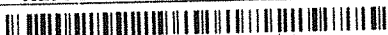
BILL SENDER

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

**CHARLESTON SC 29407**

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



FedEx  
Express



J1513150813011W

2 of 3

MPS# 5908 1783 3459

Mstr# 5908 1783 3448

0201

**XO RBWA**

29407  
SC-US CHS

**SATURDAY 12:00P**  
**PRIORITY OVERNIGHT**



RT 707 1 R

SHIP DATE: 15DEC17  
ACTWGT: 47.0 LB MAN  
CAD: 0014176/CAFE2916

BILL SENDER

ORIGIN ID:SAFA (505) 665-3966  
KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03

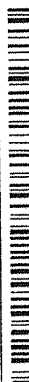
LOS ALAMOS, NM 87545  
UNITED STATES US

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

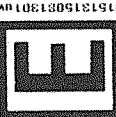
**CHARLESTON SC 29407**

(843) 666-8171

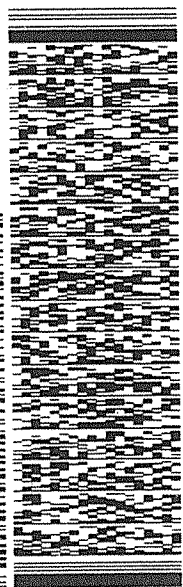
REF: 21PD0ASRGW04BAGWS0



FedEx  
Express



J1513150813011W



ORIGIN ID:SAFA (505) 665-3966  
KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

ACTWGT: 50.0 LB MAN  
CAD: 0014176/CAFE2916

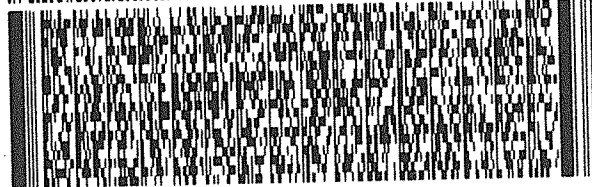
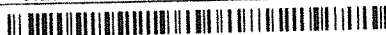
BILL SENDER

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

**CHARLESTON SC 29407**

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



FedEx  
Express



J1513150813011W

3 of 3

MPS# 5908 1783 3460

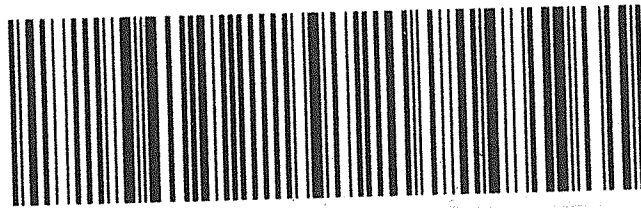
Mstr# 5908 1783 3448

0201

**XO RBWA**

29407  
SC-US CHS

**SATURDAY 12:00P**  
**PRIORITY OVERNIGHT**



**SATURDAY 12:00P**  
**PRIORITY OVERNIGHT**

1 of 3

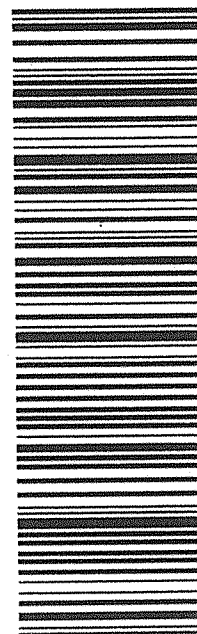
TRK# 5908 1783 3448

0201

## MASTER ##

**XO RBWA**

29407  
SC-US CHS



Part # 156148V-434 RIT2 06/15

# **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 #: 2018-1290  
Work Order #: 440209**

**Method/Analysis Information**

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

Analytical Method: SW-846:8260B

Analytical Batch  
Number: 1728901

**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>
440209006	CAMO-18-150383
1203945321	Method Blank (MB)
1203945322	Laboratory Control Sample (LCS)
1203945323	Laboratory Control Sample (LCS)
1203945324	440209006(CAMO-18-150383) Post Spike (PS)
1203945325	440209006(CAMO-18-150383) Post Spike (PS)
1203945326	440209006(CAMO-18-150383) Post Spike Duplicate (PSD)
1203945327	440209006(CAMO-18-150383) 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**

The blanks analyzed with this SDG met the acceptance criteria.

**Surrogate Recoveries**

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

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**QC Sample Designation**

Sample 440209006 (CAMO-18-150383) 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 sample 440209006 (CAMO-18-150383) 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>
VOA1.I	Hewlett Packard 5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	RTX-624	Restek, 60m x 0.25mm x 1.4um	Trap 10

**Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2018-1290 GEL Work Order: 440209

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

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

#### Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 11 JAN 2018

Title: Data Validator



# **Sample Data Summary**

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

Page 1 of 3

SDG Number: 2018-1290

Lab Sample ID: 440209006

Date Collected: 12/14/2017 07:50

Date Received: 12/16/2017 09:30

Matrix: W

Client ID: CAMO-18-150383

Batch ID: 1728901

Run Date: 12/27/2017 12:32

Prep Date: 12/27/2017 12:32

Data File: 122717V1\10307.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

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

**SDG Number:** 2018-1290  
**Lab Sample ID:** 440209006  
  
**Client ID:** CAMO-18-150383  
**Batch ID:** 1728901  
**Run Date:** 12/27/2017 12:32  
**Prep Date:** 12/27/2017 12:32  
**Data File:** 122717V1\10307.D

**Date Collected:** 12/14/2017 07:50  
**Date Received:** 12/16/2017 09:30  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA1.I  
**Analyst:** PXY1  
  
**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: 2018-1290

Lab Sample ID: 440209006

Date Collected: 12/14/2017 07:50

Date Received: 12/16/2017 09:30

Matrix: W

Client ID: CAMO-18-150383

Batch ID: 1728901

Run Date: 12/27/2017 12:32

Prep Date: 12/27/2017 12:32

Data File: 122717V1\10307.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	44.6	50.0	ug/L 89	(71%-134%)
Bromofluorobenzene	60.7	50.0	ug/L 121	(70%-131%)
Toluene-d8	42.0	50.0	ug/L 84	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000056-40-6	Glycine	10.3	83.8	ug/L	3	J
000541-05-9	Cyclotrisiloxane, hexamethyl-	14.549	14.6	ug/L	86	NJ

# **Quality Control Summary**

---

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

Page 1 of 1

**SDG Number: 2018-1290****Matrix Type: LIQUID**

---

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203945322	LCS for batch 1728901	88	84	109
1203945323	LCS for batch 1728901	88	84	114
1203945321	MB for batch 1728901	89	85	118
440209006	CAMO-18-150383	89	84	121
1203945324	CAMO-18-150383PS	88	83	109
1203945326	CAMO-18-150383PSD	83	82	108
1203945325	CAMO-18-150383PS	85	84	111
1203945327	CAMO-18-150383PSD	85	82	111

---

**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: 2018-1290

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1728901

Matrix: WATER

Lab Sample ID 1203945322

Instrument: VOA1.I

Analysis Date: 12/27/2017 10:37

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	90.0	90	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1330	106	61-125
67-64-1	LCS Acetone	250	0.0	287	115	48-157
74-88-4	LCS Iodomethane	250	0.0	256	103	72-128
75-15-0	LCS Carbon disulfide	250	0.0	225	90	69-138
108-05-4	LCS Vinyl acetate	250	0.0	284	114	67-125
78-93-3	LCS 2-Butanone	250	0.0	267	107	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	221	88	66-124
591-78-6	LCS 2-Hexanone	250	0.0	280	112	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	64.8	130	40-160
74-87-3	LCS Chloromethane	50.0	0.0	52.3	105	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	54.5	109	65-137
74-83-9	LCS Bromomethane	50.0	0.0	63.6	127	63-137
75-00-3	LCS Chloroethane	50.0	0.0	55.3	111	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	64.8	130	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	56.7	113	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	50.7	101	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	47.3	95	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	47.0	94	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	52.4	105	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	52.2	104	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	53.0	106	75-123

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-1290

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1728901

Matrix: WATER

Lab Sample ID 1203945322

Instrument: VOA1.I

Analysis Date: 12/27/2017 10:37

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

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	52.7	105	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	54.7	109	76-125
67-66-3	LCS Chloroform	50.0	0.0	55.4	111	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	55.3	111	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	49.4	99	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	58.9	118	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	59.6	119	74-122
71-43-2	LCS Benzene	50.0	0.0	47.9	96	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	53.9	108	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	51.3	103	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	57.1	114	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	58.6	117	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	50.2	100	78-131
108-88-3	LCS Toluene	50.0	0.0	43.7	87	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	47.7	95	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	47.3	95	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	46.2	92	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	47.1	94	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	52.7	105	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	50.5	101	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	45.0	90	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	44.2	88	73-125

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-1290

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1728901

Matrix: WATER

Lab Sample ID 1203945322

Instrument: VOA1.I

Analysis Date: 12/27/2017 10:37

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	44.7	89	74-126
100-42-5	LCS Styrene	50.0	0.0	44.9	90	72-130
75-25-2	LCS Bromoform	50.0	0.0	51.7	103	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	41.0	82	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	44.2	88	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	50.2	100	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	44.9	90	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	40.4	81	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	42.6	85	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	43.1	86	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	42.2	84	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	42.1	84	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	42.5	85	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	41.4	83	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	42.6	85	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	43.6	87	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	44.7	89	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	41.9	84	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	49.9	100	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	49.8	100	72-136
91-20-3	LCS Naphthalene	50.0	0.0	51.0	102	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	52.1	104	70-130

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-1290

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1728901

Matrix: WATER

Lab Sample ID 1203945322

Instrument: VOA1.I

Analysis Date: 12/27/2017 10:37

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

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	47.7	95	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	51.2	102	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	44.2	88	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5420	108	63-138

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-1290

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1728901

Matrix: WATER

Lab Sample ID 1203945323

Instrument: VOA1.I

Analysis Date: 12/27/2017 11:35

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

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	260	104	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	292	117	61-148
107-05-1	LCS	Allyl chloride	250	0.0	267	107	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	267	107	65-122
107-12-0	LCS	Propionitrile	250	0.0	255	102	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	268	107	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	262	105	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	214	86	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2580	103	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	53.5	107	66-147

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-1290

Sample Type: Post Spike

Client ID: CAMO-18-150383PS

Matrix: W

Lab Sample ID 1203945324

Instrument: VOA1.I

Analysis Date: 12/27/2017 18:46

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

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	88.2	88	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1210	96	56-131
67-64-1	PS Acetone	250	0.00 U	117	47	25-155
74-88-4	PS Iodomethane	250	0.00 U	256	103	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	223	89	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	264	106	48-133
78-93-3	PS 2-Butanone	250	0.00 U	149	60	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	208	83	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	190	76	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	63.1	126	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	53.2	106	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	54.4	109	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	62.7	125	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	53.2	106	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	61.3	123	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	56.8	114	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	49.6	99	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	48.0	96	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	46.9	94	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	52.3	105	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	52.1	104	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	53.4	107	69-127



Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-1290

Sample Type: Post Spike

Client ID: CAMO-18-150383PS

Matrix: W

Lab Sample ID 1203945324

Instrument: VOA1.I

Analysis Date: 12/27/2017 18:46

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	PS 2,2-Dichloropropane	50.0	0.00 U	50.2	100	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	55.1	110	71-130
67-66-3	PS Chloroform	50.0	0.00 U	55.6	111	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	53.5	107	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	48.3	97	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	56.7	113	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	59.6	119	69-130
71-43-2	PS Benzene	50.0	0.00 U	47.9	96	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	52.7	105	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	51.4	103	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	57.1	114	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	58.9	118	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	50.4	101	70-134
108-88-3	PS Toluene	50.0	0.00 U	42.6	85	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	47.0	94	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	47.9	96	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	46.4	93	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	46.0	92	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	53.9	108	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	49.9	100	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	44.7	89	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	43.4	87	61-130

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 3 of 8

SDG Number: 2018-1290

Sample Type: Post Spike

Client ID: CAMO-18-150383PS

Matrix: W

Lab Sample ID 1203945324

Instrument: VOA1.I

Analysis Date: 12/27/2017 18:46

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

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	45.1	90	62-131
100-42-5	PS Styrene	50.0	0.00 U	45.1	90	59-135
75-25-2	PS Bromoform	50.0	0.00 U	50.9	102	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	39.4	79	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	42.4	85	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	48.1	96	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	44.9	90	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	39.6	79	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	41.4	83	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	42.2	84	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	40.9	82	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	42.1	84	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	42.3	85	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	40.9	82	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	41.4	83	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	42.9	86	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	43.5	87	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	41.2	82	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	44.9	90	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	48.8	98	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	47.1	94	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	47.2	94	52-135

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 4 of 8

SDG Number: 2018-1290

Sample Type: Post Spike

Client ID: CAMO-18-150383PS

Matrix: W

Lab Sample ID 1203945324

Instrument: VOA1.I

Analysis Date: 12/27/2017 18:46

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

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	46.6	93	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	51.5	103	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	44.3	89	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	4890	98	60-140

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 5 of 8

SDG Number: 2018-1290

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-150383PSD

Matrix: W

Lab Sample ID 1203945326

Instrument: VOA1.I

Analysis Date: 12/27/2017 19:14

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

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 86.7	87	59-132	2	0-20
75-05-8	PSD Acetonitrile	1250	0.00	U 1110	89	56-131	8	0-20
67-64-1	PSD Acetone	250	0.00	U 110	44	25-155	6	0-20
74-88-4	PSD Iodomethane	250	0.00	U 248	99	66-133	3	0-20
75-15-0	PSD Carbon disulfide	250	0.00	U 216	86	61-141	3	0-20
108-05-4	PSD Vinyl acetate	250	0.00	U 250	100	48-133	6	0-20
78-93-3	PSD 2-Butanone	250	0.00	U 139	55	25-143	7	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00	U 200	80	61-127	4	0-20
591-78-6	PSD 2-Hexanone	250	0.00	U 179	72	33-138	6	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00	U 58.5	117	33-164	8	0-20
74-87-3	PSD Chloromethane	50.0	0.00	U 51.9	104	53-139	2	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00	U 53.3	107	58-140	2	0-20
74-83-9	PSD Bromomethane	50.0	0.00	U 61.2	122	59-146	2	0-20
75-00-3	PSD Chloroethane	50.0	0.00	U 52.3	105	65-129	2	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00	U 57.8	116	65-141	6	0-20
60-29-7	PSD Ethyl ether	50.0	0.00	U 54.3	109	69-127	5	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00	U 47.5	95	59-130	4	0-20
75-09-2	PSD Methylene chloride	50.0	0.00	U 46.8	94	62-123	3	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00	U 45.0	90	69-132	4	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00	U 50.5	101	65-127	4	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00	U 50.0	100	67-127	4	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00	U 51.5	103	69-127	4	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 6 of 8

SDG Number: 2018-1290

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-150383PSD

Matrix: W

Lab Sample ID 1203945326

Instrument: VOA1.I

Analysis Date: 12/27/2017 19:14

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

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 48.1	96	66-137	4	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 52.9	106	71-130	4	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 52.9	106	71-129	5	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 51.5	103	69-139	4	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 45.8	92	67-130	5	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 54.3	109	66-143	4	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 56.2	112	69-130	6	0-20
71-43-2	PSD Benzene	50.0	0.00	U 46.2	92	66-125	4	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 50.6	101	65-131	4	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 49.5	99	67-127	4	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 54.1	108	72-129	5	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 55.9	112	70-138	5	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 47.7	95	70-134	5	0-20
108-88-3	PSD Toluene	50.0	0.00	U 41.8	84	60-126	2	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 45.2	90	69-135	4	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 46.5	93	66-125	3	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 44.8	90	67-124	4	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 45.7	91	60-130	1	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 51.8	104	68-143	4	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 48.2	96	71-127	4	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 43.8	88	64-124	2	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 42.8	86	61-130	1	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 7 of 8

SDG Number: 2018-1290

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-150383PSD

Matrix: W

Lab Sample ID 1203945326

Instrument: VOA1.I

Analysis Date: 12/27/2017 19:14

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

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 44.4	89	62-131	2	0-20
100-42-5	PSD Styrene	50.0	0.00	U 44.1	88	59-135	2	0-20
75-25-2	PSD Bromoform	50.0	0.00	U 49.4	99	64-138	3	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00	U 39.3	79	55-133	0	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00	U 41.5	83	62-129	2	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00	U 47.2	94	70-124	2	0-20
108-86-1	PSD Bromobenzene	50.0	0.00	U 43.7	87	62-124	3	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00	U 38.8	78	50-133	2	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00	U 40.6	81	53-135	2	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00	U 40.8	82	56-128	3	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00	U 40.5	81	53-130	1	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00	U 41.3	83	55-135	2	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00	U 41.1	82	53-132	3	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00	U 40.3	81	50-138	1	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00	U 40.5	81	49-138	2	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00	U 42.3	85	56-126	1	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00	U 42.5	85	55-125	2	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00	U 40.6	81	43-142	1	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00	U 42.7	85	62-141	5	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00	U 46.9	94	40-147	4	0-20
91-20-3	PSD Naphthalene	50.0	0.00	U 44.5	89	62-134	6	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00	U 43.9	88	52-135	7	0-20



Volatile  
Quality Control Summary  
Spike Recovery Report

Page 8 of 8

SDG Number: 2018-1290

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-150383PSD

Matrix: W

Lab Sample ID 1203945326

Instrument: VOA1.I

Analysis Date: 12/27/2017 19:14

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
120-82-1	PSD 1,2,4-Trichlorobenzene	50.0	0.00	U	44.3	89	50-133	5	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00	U	50.2	100	71-133	2	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00	U	43.2	86	60-125	3	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00	U	4470	89	60-140	9	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 2

SDG Number: 2018-1290

Sample Type: Post Spike

Client ID: CAMO-18-150383PS

Matrix: W

Lab Sample ID 1203945325

Instrument: VOA1.I

Analysis Date: 12/27/2017 19:43

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	PS	Acrolein	250	0.00	U	244	98	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00	U	256	103	57-149
107-05-1	PS	Allyl chloride	250	0.00	U	250	100	54-128
107-13-1	PS	Acrylonitrile	250	0.00	U	261	105	59-129
107-12-0	PS	Propionitrile	250	0.00	U	249	100	58-131
126-98-7	PS	Methacrylonitrile	250	0.00	U	262	105	59-134
80-62-6	PS	Methyl methacrylate	250	0.00	U	258	103	62-135
97-63-2	PS	Ethyl methacrylate	250	0.00	U	215	86	60-136
78-83-1	PS	Isobutyl alcohol	2500	0.00	U	2360	94	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00	U	48.4	97	63-146

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 2

SDG Number: 2018-1290

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-150383PSD

Matrix: W

Lab Sample ID 1203945327

Instrument: VOA1.I

Analysis Date: 12/27/2017 20:12

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1728901

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	245	98	49-141	0	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00	U	254	102	57-149	1	0-20
107-05-1	PSD Allyl chloride	250	0.00	U	252	101	54-128	1	0-20
107-13-1	PSD Acrylonitrile	250	0.00	U	265	106	59-129	1	0-20
107-12-0	PSD Propionitrile	250	0.00	U	250	100	58-131	0	0-20
126-98-7	PSD Methacrylonitrile	250	0.00	U	257	103	59-134	2	0-20
80-62-6	PSD Methyl methacrylate	250	0.00	U	259	104	62-135	1	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00	U	209	84	60-136	3	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00	U	2310	92	60-143	2	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00	U	48.0	96	63-146	1	0-20

## Method Blank Summary

Page 1 of 1

SDG Number:	2018-1290	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1728901	Instrument ID:	VOA1.I	Data File:	122717V1\10306A.D
Lab Sample ID:	1203945321	Prep Date:	12/27/2017 12:03	Analyzed:	12/27/17 12:03
Column:	DB-624				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1728901	1203945322	122717V1\10303A.D	12/27/17	1037
02 LCS for batch 1728901	1203945323	122717V1\10305A.D	12/27/17	1135
03 CAMO-18-150383	440209006	122717V1\10307.D	12/27/17	1232
04 CAMO-18-150383PS	1203945324	122717V1\10320.D	12/27/17	1846
05 CAMO-18-150383PSD	1203945326	122717V1\10321.D	12/27/17	1914
06 CAMO-18-150383PS	1203945325	122717V1\10322.D	12/27/17	1943
07 CAMO-18-150383PSD	1203945327	122717V1\10323.D	12/27/17	2012

# Quality Control Data

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

Page 1 of 3

SDG Number: 2018-1290

Lab Sample ID: 1203945321

Client Sample: QC for batch 1728901

Client ID: MB for batch 1728901

Batch ID: 1728901

Run Date: 12/27/2017 12:03

Prep Date: 12/27/2017 12:03

Data File: 122717V1\10306A.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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



**Volatile  
Certificate of Analysis  
Sample Summary**

SDG Number: 2018-1290

Lab Sample ID: 1203945321

Client Sample: QC for batch 1728901

Client ID: MB for batch 1728901

Batch ID: 1728901

Run Date: 12/27/2017 12:03

Prep Date: 12/27/2017 12:03

Data File: 122717V1\10306A.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
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**

Page 3 of 3

SDG Number: 2018-1290

Lab Sample ID: 1203945321

Client Sample: QC for batch 1728901

Client ID: MB for batch 1728901

Batch ID: 1728901

Run Date: 12/27/2017 12:03

Prep Date: 12/27/2017 12:03

Data File: 122717V1\10306A.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	44.5	50.0	ug/L 89	(71%-134%)
Bromofluorobenzene	58.9	50.0	ug/L 118	(70%-131%)
Toluene-d8	42.3	50.0	ug/L 85	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	11.595	105	ug/L	0	J
000100-44-7	Benzyl chloride	18.497	8.72	ug/L	91	NJ

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

Page 1 of 3

SDG Number: 2018-1290

Lab Sample ID: 1203945322

Client Sample: QC for batch 1728901

Client ID: LCS for batch 1728901

Batch ID: 1728901

Run Date: 12/27/2017 10:37

Prep Date: 12/27/2017 10:37

Data File: 122717V1\10303A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		51.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		55.3	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		44.2	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.3	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		52.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		50.7	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		49.4	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		52.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		50.2	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		47.7	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		42.5	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		49.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		50.5	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		44.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		59.6	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		51.3	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		42.6	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		43.6	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		46.2	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		44.7	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		52.7	ug/L	0.300	1.00
78-93-3	2-Butanone		267	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		43.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		280	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		42.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		42.6	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		221	ug/L	1.50	5.00
67-64-1	Acetone		287	ug/L	1.50	10.0
75-05-8	Acetonitrile		1330	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		47.9	ug/L	0.300	1.00
108-86-1	Bromobenzene		44.9	ug/L	0.300	1.00
74-97-5	Bromochloromethane		54.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		58.6	ug/L	0.300	1.00
75-25-2	Bromoform		51.7	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203945322  
**Client Sample:** QC for batch 1728901  
**Client ID:** LCS for batch 1728901  
**Batch ID:** 1728901  
**Run Date:** 12/27/2017 10:37  
**Prep Date:** 12/27/2017 10:37  
**Data File:** 122717V1\10303A.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA1.I  
**Analyst:** PXY1  
  
**Column:** DB-624

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		63.6	ug/L	0.300	1.00
75-15-0	Carbon disulfide		225	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		58.9	ug/L	0.300	1.00
108-90-7	Chlorobenzene		45.0	ug/L	0.300	1.00
75-00-3	Chloroethane		55.3	ug/L	0.300	1.00
67-66-3	Chloroform		55.4	ug/L	0.300	1.00
74-87-3	Chloromethane		52.3	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		52.7	ug/L	0.300	1.00
74-95-3	Dibromomethane		57.1	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		64.8	ug/L	0.300	1.00
60-29-7	Ethyl ether		56.7	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		44.2	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		49.8	ug/L	0.300	1.00
74-88-4	Iodomethane		256	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		41.0	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		47.3	ug/L	1.00	10.0
91-20-3	Naphthalene		51.0	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		44.9	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		47.1	ug/L	0.300	1.00
108-88-3	Toluene		43.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		53.9	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		64.8	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		284	ug/L	1.50	5.00
75-01-4	Vinyl chloride		54.5	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		53.0	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		50.2	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		90.0	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5420	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		41.9	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		40.4	ug/L	0.300	1.00
95-47-6	o-Xylene		44.7	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		41.4	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

Page 3 of 3

SDG Number:	2018-1290	Matrix:	WATER
Lab Sample ID:	1203945322		
Client Sample:	QC for batch 1728901	Client:	ARSL004
Client ID:	LCS for batch 1728901	Method:	SW-846:8260B
Batch ID:	1728901	Inst:	VOA1.I
Run Date:	12/27/2017 10:37	Analyst:	PXY1
Prep Date:	12/27/2017 10:37		
Data File:	122717V1\10303A.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		47.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		42.1	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		52.4	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		47.7	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	44.2	50.0	ug/L	88	(71%-134%)
Bromofluorobenzene	54.7	50.0	ug/L	109	(70%-131%)
Toluene-d8	41.8	50.0	ug/L	84	(74%-124%)

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

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203945323  
**Client Sample:** QC for batch 1728901  
**Client ID:** LCS for batch 1728901  
**Batch ID:** 1728901  
**Run Date:** 12/27/2017 11:35  
**Prep Date:** 12/27/2017 11:35  
**Data File:** 122717V1\10305A.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA1.I  
**Analyst:** PXY1  
  
**Column:** DB-624

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		53.5	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		260	ug/L	1.50	5.00
107-13-1	Acrylonitrile		267	ug/L	1.50	5.00
107-05-1	Allyl chloride		267	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:** 2018-1290  
**Lab Sample ID:** 1203945323  
**Client Sample:** QC for batch 1728901  
**Client ID:** LCS for batch 1728901  
**Batch ID:** 1728901  
**Run Date:** 12/27/2017 11:35  
**Prep Date:** 12/27/2017 11:35  
**Data File:** 122717V1\10305A.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA1.I  
**Analyst:** PXY1  
  
**Column:** DB-624

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		214	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		2580	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		262	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		255	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		292	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

Page 3 of 3

SDG Number: 2018-1290

Lab Sample ID: 1203945323

Client Sample: QC for batch 1728901

Client ID: LCS for batch 1728901

Batch ID: 1728901

Run Date: 12/27/2017 11:35

Prep Date: 12/27/2017 11:35

Data File: 122717V1\10305A.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	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	43.9	50.0	ug/L 88	(71%-134%)
Bromofluorobenzene	57.0	50.0	ug/L 114	(70%-131%)
Toluene-d8	42.1	50.0	ug/L 84	(74%-124%)



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

<b>SDG Number:</b> 2018-1290	<b>Date Collected:</b> 12/14/2017 07:50	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203945324	<b>Date Received:</b> 12/16/2017 09:30	
<b>Client Sample:</b> QC for batch 1728901	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAMO-18-150383PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1728901	<b>Inst:</b> VOA1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/27/2017 18:46	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/27/2017 18:46		
<b>Data File:</b> 122717V1\10320.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		51.5	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		53.5	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		42.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.9	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		52.1	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		49.6	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		47.2	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		48.1	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		46.6	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		42.3	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		44.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		49.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		44.3	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		59.6	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		51.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		41.4	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		42.9	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		46.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		43.5	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		50.2	ug/L	0.300	1.00
78-93-3	2-Butanone		149	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		42.2	ug/L	0.300	1.00
591-78-6	2-Hexanone		190	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		40.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		41.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		208	ug/L	1.50	5.00
67-64-1	Acetone		117	ug/L	1.50	10.0
75-05-8	Acetonitrile		1210	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		47.9	ug/L	0.300	1.00
108-86-1	Bromobenzene		44.9	ug/L	0.300	1.00
74-97-5	Bromochloromethane		55.1	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		58.9	ug/L	0.300	1.00
75-25-2	Bromoform		50.9	ug/L	0.300	1.00

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

<b>SDG Number:</b> 2018-1290	<b>Date Collected:</b> 12/14/2017 07:50	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203945324	<b>Date Received:</b> 12/16/2017 09:30	
<b>Client Sample:</b> QC for batch 1728901	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAMO-18-150383PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1728901	<b>Inst:</b> VOA1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/27/2017 18:46	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/27/2017 18:46		
<b>Data File:</b> 122717V1\10320.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		62.7	ug/L	0.300	1.00
75-15-0	Carbon disulfide		223	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		56.7	ug/L	0.300	1.00
108-90-7	Chlorobenzene		44.7	ug/L	0.300	1.00
75-00-3	Chloroethane		53.2	ug/L	0.300	1.00
67-66-3	Chloroform		55.6	ug/L	0.300	1.00
74-87-3	Chloromethane		53.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		53.9	ug/L	0.300	1.00
74-95-3	Dibromomethane		57.1	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		63.1	ug/L	0.300	1.00
60-29-7	Ethyl ether		56.8	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		43.4	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		48.8	ug/L	0.300	1.00
74-88-4	Iodomethane		256	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		39.4	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		48.0	ug/L	1.00	10.0
91-20-3	Naphthalene		47.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		45.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.0	ug/L	0.300	1.00
108-88-3	Toluene		42.6	ug/L	0.300	1.00
79-01-6	Trichloroethylene		52.7	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		61.3	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		264	ug/L	1.50	5.00
75-01-4	Vinyl chloride		54.4	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		53.4	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		50.4	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		88.2	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4890	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		41.2	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		39.6	ug/L	0.300	1.00
95-47-6	o-Xylene		45.1	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		40.9	ug/L	0.300	1.00

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

Page 3 of 3

<b>SDG Number:</b>	<b>2018-1290</b>	<b>Date Collected:</b>	<b>12/14/2017 07:50</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203945324</b>	<b>Date Received:</b>	<b>12/16/2017 09:30</b>		
<b>Client Sample:</b>	<b>QC for batch 1728901</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAMO-18-150383PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1728901</b>	<b>Inst:</b>	<b>VOA1.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>12/27/2017 18:46</b>	<b>Analyst:</b>	<b>PXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>12/27/2017 18:46</b>				
<b>Data File:</b>	<b>122717V1\10320.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		46.9	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		42.1	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		52.3	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		47.0	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	44.1	50.0	ug/L	88	(71%-134%)
Bromofluorobenzene	54.5	50.0	ug/L	109	(70%-131%)
Toluene-d8	41.4	50.0	ug/L	83	(74%-124%)

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

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203945325  
**Client Sample:** QC for batch 1728901  
**Client ID:** CAMO-18-150383PS  
**Batch ID:** 1728901  
**Run Date:** 12/27/2017 19:43  
**Prep Date:** 12/27/2017 19:43  
**Data File:** 122717V1\10322.D

**Date Collected:** 12/14/2017 07:50  
**Date Received:** 12/16/2017 09:30  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA1.I  
**Analyst:** PXY1  
  
**Column:** DB-624

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		48.4	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		244	ug/L	1.50	5.00
107-13-1	Acrylonitrile		261	ug/L	1.50	5.00
107-05-1	Allyl chloride		250	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**

<b>SDG Number:</b> 2018-1290	<b>Date Collected:</b> 12/14/2017 07:50	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203945325	<b>Date Received:</b> 12/16/2017 09:30	
<b>Client Sample:</b> QC for batch 1728901	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAMO-18-150383PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1728901	<b>Inst:</b> VOA1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/27/2017 19:43	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/27/2017 19:43		
<b>Data File:</b> 122717V1\10322.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		215	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2360	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		262	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		258	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		249	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		256	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

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

Page 3 of 3

<b>SDG Number:</b>	<b>2018-1290</b>	<b>Date Collected:</b>	<b>12/14/2017 07:50</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203945325</b>	<b>Date Received:</b>	<b>12/16/2017 09:30</b>		
<b>Client Sample:</b>	<b>QC for batch 1728901</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAMO-18-150383PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1728901</b>	<b>Inst:</b>	<b>VOA1.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>12/27/2017 19:43</b>	<b>Analyst:</b>	<b>PXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>12/27/2017 19:43</b>				
<b>Data File:</b>	<b>122717V1\10322.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	42.4	50.0	ug/L	85	(71%-134%)
Bromofluorobenzene	55.3	50.0	ug/L	111	(70%-131%)
Toluene-d8	41.9	50.0	ug/L	84	(74%-124%)

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

<b>SDG Number:</b> 2018-1290	<b>Date Collected:</b> 12/14/2017 07:50	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203945326	<b>Date Received:</b> 12/16/2017 09:30	
<b>Client Sample:</b> QC for batch 1728901	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAMO-18-150383PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1728901	<b>Inst:</b> VOA1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/27/2017 19:14	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/27/2017 19:14		
<b>Data File:</b> 122717V1\10321.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		50.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		51.5	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		41.5	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		46.5	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		50.0	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		47.5	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		45.8	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		43.9	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		47.2	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		44.3	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		41.1	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		42.7	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		48.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		43.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		56.2	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		49.5	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		40.6	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		42.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		44.8	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		42.5	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		48.1	ug/L	0.300	1.00
78-93-3	2-Butanone		139	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		40.8	ug/L	0.300	1.00
591-78-6	2-Hexanone		179	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		40.5	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		40.5	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		200	ug/L	1.50	5.00
67-64-1	Acetone		110	ug/L	1.50	10.0
75-05-8	Acetonitrile		1110	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		46.2	ug/L	0.300	1.00
108-86-1	Bromobenzene		43.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		52.9	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		55.9	ug/L	0.300	1.00
75-25-2	Bromoform		49.4	ug/L	0.300	1.00

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

<b>SDG Number:</b> 2018-1290	<b>Date Collected:</b> 12/14/2017 07:50	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203945326	<b>Date Received:</b> 12/16/2017 09:30	
<b>Client Sample:</b> QC for batch 1728901	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAMO-18-150383PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1728901	<b>Inst:</b> VOA1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/27/2017 19:14	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/27/2017 19:14		
<b>Data File:</b> 122717V1\10321.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		61.2	ug/L	0.300	1.00
75-15-0	Carbon disulfide		216	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		54.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		43.8	ug/L	0.300	1.00
75-00-3	Chloroethane		52.3	ug/L	0.300	1.00
67-66-3	Chloroform		52.9	ug/L	0.300	1.00
74-87-3	Chloromethane		51.9	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		51.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		54.1	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		58.5	ug/L	0.300	1.00
60-29-7	Ethyl ether		54.3	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		42.8	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		46.9	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		39.3	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		46.8	ug/L	1.00	10.0
91-20-3	Naphthalene		44.5	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		44.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		45.7	ug/L	0.300	1.00
108-88-3	Toluene		41.8	ug/L	0.300	1.00
79-01-6	Trichloroethylene		50.6	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		57.8	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		250	ug/L	1.50	5.00
75-01-4	Vinyl chloride		53.3	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		51.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		47.7	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		86.7	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4470	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		40.6	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		38.8	ug/L	0.300	1.00
95-47-6	o-Xylene		44.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		40.3	ug/L	0.300	1.00



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

Page 3 of 3

<b>SDG Number:</b>	<b>2018-1290</b>	<b>Date Collected:</b>	<b>12/14/2017 07:50</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203945326</b>	<b>Date Received:</b>	<b>12/16/2017 09:30</b>		
<b>Client Sample:</b>	<b>QC for batch 1728901</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAMO-18-150383PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1728901</b>	<b>Inst:</b>	<b>VOA1.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>12/27/2017 19:14</b>	<b>Analyst:</b>	<b>PXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>12/27/2017 19:14</b>				
<b>Data File:</b>	<b>122717V1\10321.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		45.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		41.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		50.5	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		45.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	41.5	50.0	ug/L	83	(71%-134%)
Bromofluorobenzene	53.9	50.0	ug/L	108	(70%-131%)
Toluene-d8	41.1	50.0	ug/L	82	(74%-124%)

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

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203945327  
**Client Sample:** QC for batch 1728901  
**Client ID:** CAMO-18-150383PSD  
**Batch ID:** 1728901  
**Run Date:** 12/27/2017 20:12  
**Prep Date:** 12/27/2017 20:12  
**Data File:** 122717V1\10323.D

**Date Collected:** 12/14/2017 07:50  
**Date Received:** 12/16/2017 09:30  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA1.I  
**Analyst:** PXY1  
  
**Column:** DB-624

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		48.0	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		245	ug/L	1.50	5.00
107-13-1	Acrylonitrile		265	ug/L	1.50	5.00
107-05-1	Allyl chloride		252	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:** 2018-1290  
**Lab Sample ID:** 1203945327  
**Client Sample:** QC for batch 1728901  
**Client ID:** CAMO-18-150383PSD  
**Batch ID:** 1728901  
**Run Date:** 12/27/2017 20:12  
**Prep Date:** 12/27/2017 20:12  
**Data File:** 122717V1\10323.D

**Date Collected:** 12/14/2017 07:50  
**Date Received:** 12/16/2017 09:30  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA1.I  
**Analyst:** PXY1  
  
**Column:** DB-624

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
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		209	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		2310	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		257	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		259	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		250	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		254	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

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

Page 3 of 3

<b>SDG Number:</b>	<b>2018-1290</b>	<b>Date Collected:</b>	<b>12/14/2017 07:50</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203945327</b>	<b>Date Received:</b>	<b>12/16/2017 09:30</b>		
<b>Client Sample:</b>	<b>QC for batch 1728901</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAMO-18-150383PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1728901</b>	<b>Inst:</b>	<b>VOA1.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>12/27/2017 20:12</b>	<b>Analyst:</b>	<b>PXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>12/27/2017 20:12</b>				
<b>Data File:</b>	<b>122717V1\10323.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	42.5	50.0	ug/L 85	(71%-134%)
Bromofluorobenzene	55.4	50.0	ug/L 111	(70%-131%)
Toluene-d8	41.1	50.0	ug/L 82	(74%-124%)

# **Semi-Volatile Analysis**

# Case Narrative

**GC/MS Semivolatile  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1290  
Work Order #: 440209**

**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:	1727262
Prep Batch Number:	1727260

**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>
440209006	CAMO-18-150383
1203941087	Method Blank (MB)
1203941088	Laboratory Control Sample (LCS)
1203941089	440189007(CALA-18-150401) Matrix Spike (MS)
1203941090	440189007(CALA-18-150401) Matrix Spike Duplicate (MSD)

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

**Preparation/Analytical Method Verification**

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-009 REV# 39.

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

**Calibration Information**

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

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

#### **Initial Calibration**

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

#### **CCV Requirements**

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

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

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

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

##### **Surrogate Recoveries**

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

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recoveries met the acceptance limits.

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

Sample 440189007 (CALA-18-150401) 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 RPD values between the MS and MSD met the acceptance limits.

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

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

#### **Technical Information:**

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

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



**Preparation/Analytical Method Verification**

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

**Sample Dilutions**

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

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

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

**Miscellaneous Information:****Manual Integrations**

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

**TIC Comment**

Tentatively identified compounds (TIC) were requested for sample 440209006 (CAMO-18-150383) 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: 2018-1290 GEL Work Order: 440209

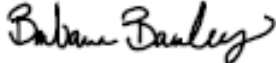
#### The Qualifiers in this report are defined as follows:

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

#### Review/Validation

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

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

Signature: 

Name: Barbara Bailey

Date: 09 JAN 2018

Title: Data Validator

# **Sample Data Summary**

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

Page 1 of 3

SDG Number: 2018-1290

Lab Sample ID: 440209006

Date Collected: 12/14/2017 07:50

Date Received: 12/16/2017 09:30

Matrix: W

Client ID: CAMO-18-150383

Batch ID: 1727262

Run Date: 12/19/2017 20:58

Prep Date: 12/19/2017 09:30

Data File: 121917.s\AL1924.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.I

Analyst: JMB3

Aliquot: 900 mL

Column: DB-5ms

Project: ESHL00114

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.33	ug/L	3.33	11.1
120-82-1	1,2,4-Trichlorobenzene	U	3.33	ug/L	3.33	11.1
95-50-1	1,2-Dichlorobenzene	U	3.33	ug/L	3.33	11.1
122-66-7	Azobenzene	U	3.33	ug/L	3.33	11.1
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.33	ug/L	3.33	11.1
106-46-7	1,4-Dichlorobenzene	U	3.33	ug/L	3.33	11.1
123-91-1	1,4-Dioxane	U	3.33	ug/L	3.33	11.1
90-12-0	1-Methylnaphthalene	U	0.333	ug/L	0.333	1.11
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.33	ug/L	3.33	11.1
95-95-4	2,4,5-Trichlorophenol	U	3.33	ug/L	3.33	11.1
88-06-2	2,4,6-Trichlorophenol	U	3.33	ug/L	3.33	11.1
120-83-2	2,4-Dichlorophenol	U	3.33	ug/L	3.33	11.1
105-67-9	2,4-Dimethylphenol	U	3.33	ug/L	3.33	11.1
51-28-5	2,4-Dinitrophenol	U	5.56	ug/L	5.56	22.2
121-14-2	2,4-Dinitrotoluene	U	3.33	ug/L	3.33	11.1
606-20-2	2,6-Dinitrotoluene	U	3.33	ug/L	3.33	11.1
91-58-7	2-Chloronaphthalene	U	0.456	ug/L	0.456	1.11
95-57-8	2-Chlorophenol	U	3.33	ug/L	3.33	11.1
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.33	ug/L	3.33	11.1
91-57-6	2-Methylnaphthalene	U	0.333	ug/L	0.333	1.11
88-75-5	2-Nitrophenol	U	3.33	ug/L	3.33	11.1
91-94-1	3,3'-Dichlorobenzidine	U	3.33	ug/L	3.33	11.1
101-55-3	4-Bromophenylphenylether	U	3.33	ug/L	3.33	11.1
59-50-7	Parachlorometa cresol	U	3.33	ug/L	3.33	11.1
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.67	ug/L	3.67	11.1
7005-72-3	4-Chlorophenylphenylether	U	3.33	ug/L	3.33	11.1
100-02-7	4-Nitrophenol	U	3.33	ug/L	3.33	11.1
83-32-9	Acenaphthene	U	0.333	ug/L	0.333	1.11
208-96-8	Acenaphthylene	U	0.333	ug/L	0.333	1.11
62-53-3	Aniline	U	4.67	ug/L	4.67	11.1
120-12-7	Anthracene	U	0.333	ug/L	0.333	1.11
1912-24-9	Atrazine	U	3.33	ug/L	3.33	11.1
92-87-5	Benzidine	U	4.33	ug/L	4.33	11.1
56-55-3	Benzo(a)anthracene	U	0.333	ug/L	0.333	1.11
50-32-8	Benzo(a)pyrene	U	0.333	ug/L	0.333	1.11
205-99-2	Benzo(b)fluoranthene	U	0.333	ug/L	0.333	1.11
191-24-2	Benzo(ghi)perylene	U	0.333	ug/L	0.333	1.11

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

Page 2 of 3

SDG Number: 2018-1290

Lab Sample ID: 440209006

Date Collected: 12/14/2017 07:50

Date Received: 12/16/2017 09:30

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSDA.I

Dilution: 1

Batch ID: 1727262

Analyst: JMB3

Inj. Vol: 1 uL

Run Date: 12/19/2017 20:58

Prep Date: 12/19/2017 09:30

Aliquot: 900 mL

Final Volume: 1 mL

Data File: 121917.s\AL1924.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.333	ug/L	0.333	1.11
65-85-0	Benzoic acid	U	6.67	ug/L	6.67	22.2
100-51-6	Benzyl alcohol	U	3.33	ug/L	3.33	11.1
85-68-7	Butylbenzylphthalate	U	3.33	ug/L	3.33	11.1
218-01-9	Chrysene	U	0.333	ug/L	0.333	1.11
84-74-2	Di-n-butylphthalate	U	3.33	ug/L	3.33	11.1
117-84-0	Di-n-octylphthalate	U	3.33	ug/L	3.33	11.1
53-70-3	Dibenzo(a,h)anthracene	U	0.333	ug/L	0.333	1.11
132-64-9	Dibenzofuran	U	3.33	ug/L	3.33	11.1
84-66-2	Diethylphthalate	U	3.33	ug/L	3.33	11.1
131-11-3	Dimethylphthalate	U	3.33	ug/L	3.33	11.1
88-85-7	Dinoseb	U	3.33	ug/L	3.33	11.1
122-39-4	Diphenylamine	U	3.33	ug/L	3.33	11.1
206-44-0	Fluoranthene	U	0.333	ug/L	0.333	1.11
86-73-7	Fluorene	U	0.333	ug/L	0.333	1.11
118-74-1	Hexachlorobenzene	U	3.33	ug/L	3.33	11.1
87-68-3	Hexachlorobutadiene	U	3.33	ug/L	3.33	11.1
77-47-4	Hexachlorocyclopentadiene	U	3.33	ug/L	3.33	11.1
67-72-1	Hexachloroethane	U	3.33	ug/L	3.33	11.1
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.333	ug/L	0.333	1.11
78-59-1	Isophorone	U	3.89	ug/L	3.89	11.1
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.33	ug/L	3.33	11.1
924-16-3	N-Nitrosodi-n-butylamine	U	3.33	ug/L	3.33	11.1
55-18-5	N-Nitrosodiethylamine	U	3.33	ug/L	3.33	11.1
621-64-7	N-Nitrosodi-n-propylamine	U	3.33	ug/L	3.33	11.1
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.33	ug/L	3.33	11.1
91-20-3	Naphthalene	U	0.333	ug/L	0.333	1.11
98-95-3	Nitrobenzene	U	3.33	ug/L	3.33	11.1
608-93-5	Pentachlorobenzene	U	3.33	ug/L	3.33	11.1
87-86-5	Pentachlorophenol	U	3.33	ug/L	3.33	11.1
85-01-8	Phenanthrene	U	0.333	ug/L	0.333	1.11
108-95-2	Phenol	U	3.33	ug/L	3.33	11.1
129-00-0	Pyrene	U	0.333	ug/L	0.333	1.11
110-86-1	Pyridine	U	3.33	ug/L	3.33	11.1
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.33	ug/L	3.33	11.1
111-91-1	bis(2-Chloroethoxy)methane	U	3.33	ug/L	3.33	11.1
111-44-4	bis(2-Chloroethyl) ether	U	3.33	ug/L	3.33	11.1
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.33	ug/L	3.33	11.1

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

Page 3 of 3

SDG Number: 2018-1290

Lab Sample ID: 440209006

Date Collected: 12/14/2017 07:50

Date Received: 12/16/2017 09:30

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1727262

Inst: MSDA.I

Dilution: 1

Run Date: 12/19/2017 20:58

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 12/19/2017 09:30

Aliquot: 900 mL

Final Volume: 1 mL

Data File: 121917.s\AL1924.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	4.11	ug/L	4.11	11.1
99-09-2	3-Nitroaniline	U	3.33	ug/L	3.33	11.1
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol	U	3.33	ug/L	3.33	11.1
88-74-4	2-Nitroaniline	U	3.33	ug/L	3.33	11.1
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline	U	3.33	ug/L	3.33	11.1
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	89.8	111	ug/L	81	(32%-124%)
2-Fluorobiphenyl	40.7	55.6	ug/L	73	(32%-112%)
2-Fluorophenol	52.4	111	ug/L	47	(15%-88%)
Nitrobenzene-d5	41.1	55.6	ug/L	74	(36%-115%)
Phenol-d5	32.5	111	ug/L	29	(15%-91%)
p-Terphenyl-d14	57.2	55.6	ug/L	103	(36%-121%)

**Tentatively Identified Compound Summary**

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

# **Quality Control Summary**

Semi-Volatile  
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-1290

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203941087	MB for batch 1727260	38	25	56	53	75	89
1203941088	LCS for batch 1727260	47	29	79	78	94	91
1203941089	CALA-18-150401MS	40	35	74	72	87	84
1203941090	CALA-18-150401MSD	38	35	74	72	87	86
440209006	CAMO-18-150383	47	29	74	73	81	103

## 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: 2018-1290

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1727260

Matrix: WATER

Lab Sample ID 1203941088

Instrument: MSDA.I

Analysis Date: 12/19/2017 16:55

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

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	22.9	46	30-88
110-86-1	LCS Pyridine	50.0	0.0	25.9	52	27-89
62-53-3	LCS Aniline	50.0	0.0	40.0	80	49-112
108-95-2	LCS Phenol	50.0	0.0	15.1	30	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	39.6	79	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	38.3	77	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	33.5	67	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	33.3	67	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	34.2	68	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)ether	50.0	0.0	37.0	74	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	34.8	70	44-102
95-48-7	LCS o-Cresol	50.0	0.0	33.4	67	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	35.1	70	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	40.3	81	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	32.7	65	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	38.3	77	53-115
78-59-1	LCS Isophorone	50.0	0.0	38.4	77	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	42.5	85	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	33.7	67	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	39.7	79	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	41.5	83	53-109
65-85-0	LCS Benzoic acid	100	0.0	30.7	31	21-74

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-1290

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1727260

Matrix: WATER

Lab Sample ID 1203941088

Instrument: MSDA.I

Analysis Date: 12/19/2017 16:55

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	LCS 4-Chloroaniline	50.0	0.0	51.7	103	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	34.9	70	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	41.7	83	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	35.3	71	42-103
91-20-3	LCS Naphthalene	50.0	0.0	35.1	70	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	36.3	73	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	23.2	46	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	41.5	83	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	41.9	84	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	37.8	76	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	42.6	85	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	52.1	104	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	44.5	89	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	42.9	86	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	45.8	92	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	39.7	79	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	42.5	85	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	37.7	75	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	41.7	83	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	44.0	88	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	45.2	90	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	15.1	30	15-137

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-1290

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1727260

Matrix: WATER

Lab Sample ID 1203941088

Instrument: MSDA.I

Analysis Date: 12/19/2017 16:55

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	LCS Fluorene	50.0	0.0	41.6	83	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	44.4	89	52-121
100-01-6	LCS 4-Nitroaniline	50.0	0.0	46.3	93	44-137
	<i>p</i> -Nitroaniline					
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	44.5	89	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	42.6	85	55-113
122-66-7	LCS Azobenzene	50.0	0.0	40.1	80	53-115
	<i>1,2-Diphenylhydrazine</i>					
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	43.3	87	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	42.8	86	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	46.6	93	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	42.2	84	55-110
120-12-7	LCS Anthracene	50.0	0.0	42.2	84	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	45.8	92	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	44.2	88	54-118
129-00-0	LCS Pyrene	50.0	0.0	39.3	79	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	46.0	92	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	43.4	87	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	43.4	87	57-112
218-01-9	LCS Chrysene	50.0	0.0	44.6	89	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	44.3	89	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	44.6	89	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	45.5	91	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	44.0	88	40-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-1290

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1727260

Matrix: WATER

Lab Sample ID 1203941088

Instrument: MSDA.I

Analysis Date: 12/19/2017 16:55

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

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	42.8	86	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	43.3	87	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	40.2	80	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	24.9	50	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	42.2	84	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	36.6	73	44-102
1912-24-9	LCS Atrazine	50.0	0.0	47.7	95	60-131
92-87-5	LCS Benzidine	100	0.0	66.1	66	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	41.7	83	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	35.4	71	39-99

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-1290

Sample Type: Matrix Spike

Client ID: CALA-18-150401MS

Matrix: W

Lab Sample ID 1203941089

Instrument: MSDA.I

Analysis Date: 12/19/2017 18:43

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

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	109	0.00 U	57.8	53	25-106
110-86-1	MS Pyridine	109	0.00 U	66.7	61	24-93
62-53-3	MS Aniline	109	0.00 U	42.0	39	37-113
108-95-2	MS Phenol	109	0.00 U	48.5	45	23-82
111-44-4	MS bis(2-Chloroethyl) ether	109	0.00 U	80.2	74	39-114
95-57-8	MS 2-Chlorophenol	109	0.00 U	71.3	66	37-108
541-73-1	MS 1,3-Dichlorobenzene	109	0.00 U	62.2	57	27-97
106-46-7	MS 1,4-Dichlorobenzene	109	0.00 U	62.2	57	28-97
95-50-1	MS 1,2-Dichlorobenzene	109	0.00 U	63.8	59	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)ether	109	0.00 U	74.8	69	32-127
100-51-6	MS Benzyl alcohol	109	0.00 U	78.3	72	37-116
95-48-7	MS o-Cresol	109	0.00 U	69.8	64	34-109
65794-96-9	MS m,p-Cresols	109	0.00 U	82.7	76	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	109	0.00 U	81.9	75	42-118
67-72-1	MS Hexachloroethane	109	0.00 U	61.3	56	29-94
98-95-3	MS Nitrobenzene	109	0.00 U	77.4	71	38-123
78-59-1	MS Isophorone	109	0.00 U	77.7	72	43-120
88-75-5	MS 2-Nitrophenol	109	0.00 U	88.2	81	39-115
105-67-9	MS 2,4-Dimethylphenol	109	0.00 U	66.1	61	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	109	0.00 U	80.8	74	42-118
120-83-2	MS 2,4-Dichlorophenol	109	0.00 U	82.6	76	40-111
65-85-0	MS Benzoic acid	217	0.00 U	122	56	17-95

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-1290

Sample Type: Matrix Spike

Client ID: CALA-18-150401MS

Matrix: W

Lab Sample ID 1203941089

Instrument: MSDA.I

Analysis Date: 12/19/2017 18:43

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	109	0.00 U	83.4	77	44-138
87-68-3	MS Hexachlorobutadiene	109	0.00 U	68.5	63	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	109	0.00 U	80.1	74	41-122
91-57-6	MS 2-Methylnaphthalene	109	0.00 U	69.1	64	29-109
91-20-3	MS Naphthalene	109	0.00 U	68.3	63	31-108
90-12-0	MS 1-Methylnaphthalene	109	0.00 U	71.9	66	33-112
77-47-4	MS Hexachlorocyclopentadiene	109	0.00 U	47.0	43	26-79
88-06-2	MS 2,4,6-Trichlorophenol	109	0.00 U	85.5	79	39-124
95-95-4	MS 2,4,5-Trichlorophenol	109	0.00 U	83.8	77	42-120
91-58-7	MS 2-Chloronaphthalene	109	0.00 U	74.5	69	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	109	0.00 U	86.3	79	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	109	0.00 U	107	99	42-144
131-11-3	MS Dimethylphthalate	109	0.00 U	91.7	84	45-128
606-20-2	MS 2,6-Dinitrotoluene	109	0.00 U	88.0	81	46-124
121-14-2	MS 2,4-Dinitrotoluene	109	0.00 U	94.8	87	45-125
208-96-8	MS Acenaphthylene	109	0.00 U	80.5	74	35-120
83-32-9	MS Acenaphthene	109	0.00 U	85.9	79	35-117
51-28-5	MS 2,4-Dinitrophenol	109	0.00 U	82.8	76	27-122
132-64-9	MS Dibenzofuran	109	0.00 U	84.1	77	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	109	0.00 U	92.8	85	40-128
84-66-2	MS Diethylphthalate	109	0.00 U	93.3	86	43-127
100-02-7	MS 4-Nitrophenol	109	0.00 U	54.6	50	17-85

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 3 of 8

SDG Number: 2018-1290

Sample Type: Matrix Spike

Client ID: CALA-18-150401MS

Matrix: W

Lab Sample ID 1203941089

Instrument: MSDA.I

Analysis Date: 12/19/2017 18:43

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS Fluorene	109	0.00 U	85.5	79	39-117
7005-72-3	MS 4-Chlorophenylphenylether	109	0.00 U	91.7	84	39-121
100-01-6	MS 4-Nitroaniline	109	0.00 U	97.8	90	30-133
534-52-1	MS 2-Methyl-4,6-dinitrophenol	109	0.00 U	95.8	88	32-126
122-39-4	MS Diphenylamine	109	0.00 U	80.8	74	37-118
122-66-7	MS Azobenzene	109	0.00 U	81.3	75	38-120
101-55-3	MS 4-Bromophenylphenylether	109	0.00 U	89.6	82	39-121
118-74-1	MS Hexachlorobenzene	109	0.00 U	88.0	81	40-118
87-86-5	MS Pentachlorophenol	109	0.00 U	97.4	90	35-121
85-01-8	MS Phenanthrene	109	0.00 U	87.0	80	40-115
120-12-7	MS Anthracene	109	0.00 U	87.2	80	38-120
84-74-2	MS Di-n-butylphthalate	109	0.00 U	92.8	85	41-128
206-44-0	MS Fluoranthene	109	0.00 U	91.8	84	41-119
129-00-0	MS Pyrene	109	0.00 U	82.4	76	35-128
85-68-7	MS Butylbenzylphthalate	109	0.00 U	91.0	84	40-129
117-81-7	MS bis(2-Ethylhexyl)phthalate	109	0.00 U	80.3	74	38-131
56-55-3	MS Benzo(a)anthracene	109	0.00 U	87.5	80	39-120
218-01-9	MS Chrysene	109	0.00 U	89.7	83	41-124
117-84-0	MS Di-n-octylphthalate	109	0.00 U	79.8	73	37-134
205-99-2	MS Benzo(b)fluoranthene	109	0.00 U	90.0	83	31-122
207-08-9	MS Benzo(k)fluoranthene	109	0.00 U	93.3	86	33-123
50-32-8	MS Benzo(a)pyrene	109	0.00 U	88.4	81	32-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 4 of 8

SDG Number: 2018-1290

Sample Type: Matrix Spike

Client ID: CALA-18-150401MS

Matrix: W

Lab Sample ID 1203941089

Instrument: MSDA.I

Analysis Date: 12/19/2017 18:43

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

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	109	0.00 U	76.7	71	27-121
53-70-3	MS Dibenzo(a,h)anthracene	109	0.00 U	75.9	70	30-125
191-24-2	MS Benzo(ghi)perylene	109	0.00 U	69.0	63	24-126
123-91-1	MS 1,4-Dioxane	109	0.00 U	67.8	62	24-110
930-55-2	MS N-Nitrosopyrrolidine	109	0.00 U	88.1	81	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	109	0.00 U	70.9	65	32-101
1912-24-9	MS Atrazine	109	0.00 U	97.2	89	42-129
92-87-5	MS Benzidine	217	0.00 U	101	46	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	109	0.00 U	80.3	74	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	109	0.00 U	67.0	62	26-102



Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 5 of 8

SDG Number: 2018-1290

Sample Type: Matrix Spike Duplicate

Client ID: CALA-18-150401MSD

Matrix: W

Lab Sample ID 1203941090

Instrument: MSDA.I

Analysis Date: 12/19/2017 19:10

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

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	109	0.00	U 63.8	59	25-106	10	0-30
110-86-1	MSD Pyridine	109	0.00	U 65.7	60	24-93	2	0-30
62-53-3	MSD Aniline	109	0.00	U 44.4	41	37-113	6	0-30
108-95-2	MSD Phenol	109	0.00	U 47.5	44	23-82	2	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	109	0.00	U 76.9	71	39-114	4	0-30
95-57-8	MSD 2-Chlorophenol	109	0.00	U 67.7	62	37-108	5	0-30
541-73-1	MSD 1,3-Dichlorobenzene	109	0.00	U 60.5	56	27-97	3	0-30
106-46-7	MSD 1,4-Dichlorobenzene	109	0.00	U 60.3	55	28-97	3	0-30
95-50-1	MSD 1,2-Dichlorobenzene	109	0.00	U 62.1	57	28-99	3	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)ether	109	0.00	U 72.4	67	32-127	3	0-30
100-51-6	MSD Benzyl alcohol	109	0.00	U 79.2	73	37-116	1	0-30
95-48-7	MSD o-Cresol	109	0.00	U 68.0	63	34-109	3	0-30
65794-96-9	MSD m,p-Cresols	109	0.00	U 80.7	74	36-120	3	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	109	0.00	U 80.0	74	42-118	2	0-30
67-72-1	MSD Hexachloroethane	109	0.00	U 60.5	56	29-94	1	0-30
98-95-3	MSD Nitrobenzene	109	0.00	U 76.5	70	38-123	1	0-30
78-59-1	MSD Isophorone	109	0.00	U 76.2	70	43-120	2	0-30
88-75-5	MSD 2-Nitrophenol	109	0.00	U 86.2	79	39-115	2	0-30
105-67-9	MSD 2,4-Dimethylphenol	109	0.00	U 65.4	60	39-107	1	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	109	0.00	U 79.1	73	42-118	2	0-30
120-83-2	MSD 2,4-Dichlorophenol	109	0.00	U 81.7	75	40-111	1	0-30
65-85-0	MSD Benzoic acid	217	0.00	U 125	58	17-95	3	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 6 of 8

SDG Number: 2018-1290

Sample Type: Matrix Spike Duplicate

Client ID: CALA-18-150401MSD

Matrix: W

Lab Sample ID 1203941090

Instrument: MSDA.I

Analysis Date: 12/19/2017 19:10

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

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	109	0.00 U	88.5	81	44-138	6	0-30
87-68-3	MSD Hexachlorobutadiene	109	0.00 U	69.2	64	26-98	1	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	109	0.00 U	78.6	72	41-122	2	0-30
91-57-6	MSD 2-Methylnaphthalene	109	0.00 U	69.8	64	29-109	1	0-30
91-20-3	MSD Naphthalene	109	0.00 U	67.7	62	31-108	1	0-30
90-12-0	MSD 1-Methylnaphthalene	109	0.00 U	72.0	66	33-112	0	0-30
77-47-4	MSD Hexachlorocyclopentadiene	109	0.00 U	50.9	47	26-79	8	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	109	0.00 U	84.4	78	39-124	1	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	109	0.00 U	82.5	76	42-120	1	0-30
91-58-7	MSD 2-Chloronaphthalene	109	0.00 U	75.7	70	29-113	2	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	109	0.00 U	85.3	78	41-121	1	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	109	0.00 U	105	96	42-144	2	0-30
131-11-3	MSD Dimethylphthalate	109	0.00 U	89.7	83	45-128	2	0-30
606-20-2	MSD 2,6-Dinitrotoluene	109	0.00 U	86.6	80	46-124	2	0-30
121-14-2	MSD 2,4-Dinitrotoluene	109	0.00 U	92.0	85	45-125	3	0-30
208-96-8	MSD Acenaphthylene	109	0.00 U	80.3	74	35-120	0	0-30
83-32-9	MSD Acenaphthene	109	0.00 U	85.1	78	35-117	1	0-30
51-28-5	MSD 2,4-Dinitrophenol	109	0.00 U	81.3	75	27-122	2	0-30
132-64-9	MSD Dibenzofuran	109	0.00 U	84.2	77	38-113	0	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	109	0.00 U	89.0	82	40-128	4	0-30
84-66-2	MSD Diethylphthalate	109	0.00 U	91.2	84	43-127	2	0-30
100-02-7	MSD 4-Nitrophenol	109	0.00 U	56.0	52	17-85	3	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 7 of 8

SDG Number: 2018-1290

Sample Type: Matrix Spike Duplicate

Client ID: CALA-18-150401MSD

Matrix: W

Lab Sample ID 1203941090

Instrument: MSDA.I

Analysis Date: 12/19/2017 19:10

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

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	109	0.00 U	85.3	79	39-117	0	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	109	0.00 U	90.5	83	39-121	1	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	109	0.00 U	97.0	89	30-133	1	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	109	0.00 U	95.8	88	32-126	0	0-30
122-39-4	MSD Diphenylamine	109	0.00 U	79.3	73	37-118	2	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	109	0.00 U	81.3	75	38-120	0	0-30
101-55-3	MSD 4-Bromophenylphenylether	109	0.00 U	88.7	82	39-121	1	0-30
118-74-1	MSD Hexachlorobenzene	109	0.00 U	87.7	81	40-118	0	0-30
87-86-5	MSD Pentachlorophenol	109	0.00 U	95.4	88	35-121	2	0-30
85-01-8	MSD Phenanthrene	109	0.00 U	86.7	80	40-115	0	0-30
120-12-7	MSD Anthracene	109	0.00 U	86.6	80	38-120	1	0-30
84-74-2	MSD Di-n-butylphthalate	109	0.00 U	92.5	85	41-128	0	0-30
206-44-0	MSD Fluoranthene	109	0.00 U	91.8	84	41-119	0	0-30
129-00-0	MSD Pyrene	109	0.00 U	81.8	75	35-128	1	0-30
85-68-7	MSD Butylbenzylphthalate	109	0.00 U	92.6	85	40-129	2	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	109	0.00 U	81.9	75	38-131	2	0-30
56-55-3	MSD Benzo(a)anthracene	109	0.00 U	88.1	81	39-120	1	0-30
218-01-9	MSD Chrysene	109	0.00 U	91.4	84	41-124	2	0-30
117-84-0	MSD Di-n-octylphthalate	109	0.00 U	82.9	76	37-134	4	0-30
205-99-2	MSD Benzo(b)fluoranthene	109	0.00 U	91.4	84	31-122	2	0-30
207-08-9	MSD Benzo(k)fluoranthene	109	0.00 U	94.0	86	33-123	1	0-30
50-32-8	MSD Benzo(a)pyrene	109	0.00 U	89.0	82	32-118	1	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 8 of 8

SDG Number: 2018-1290

Sample Type: Matrix Spike Duplicate

Client ID: CALA-18-150401MSD

Matrix: W

Lab Sample ID 1203941090

Instrument: MSDA.I

Analysis Date: 12/19/2017 19:10

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1727260

Inj. Vol: 1 uL

Batch ID: 1727262

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
193-39-5	MSD Indeno(1,2,3-cd)pyrene	109	0.00	U	77.5	71	27-121	1 0-30
53-70-3	MSD Dibenzo(a,h)anthracene	109	0.00	U	74.5	69	30-125	2 0-30
191-24-2	MSD Benzo(ghi)perylene	109	0.00	U	67.8	62	24-126	2 0-30
123-91-1	MSD 1,4-Dioxane	109	0.00	U	64.6	59	24-110	5 0-30
930-55-2	MSD N-Nitrosopyrrolidine	109	0.00	U	87.8	81	47-119	0 0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	109	0.00	U	72.6	67	32-101	2 0-30
1912-24-9	MSD Atrazine	109	0.00	U	95.6	88	42-129	2 0-30
92-87-5	MSD Benzidine	217	0.00	U	92.8	43	15-130	8 0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	109	0.00	U	80.7	74	34-124	1 0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	109	0.00	U	67.6	62	26-102	1 0-30

## Method Blank Summary

Page 1 of 1

SDG Number:	2018-1290	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1727260	Instrument ID:	MSDA.I	Data File:	121917.s\AL1914.D
Lab Sample ID:	1203941087	Prep Date:	12/19/2017 09:30	Analyzed:	12/19/17 16:28
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 1727260	1203941088	121917.s\AL1915.D	12/19/17	1655
02 CALA-18-150401MS	1203941089	121917.s\AL1919.D	12/19/17	1843
03 CALA-18-150401MSD	1203941090	121917.s\AL1920.D	12/19/17	1910
04 CAMO-18-150383	440209006	121917.s\AL1924.D	12/19/17	2058

# Quality Control Data

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

Page 1 of 3

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203941087  
**Client Sample:** QC for batch 1727260  
**Client ID:** MB for batch 1727260  
**Batch ID:** 1727262  
**Run Date:** 12/19/2017 16:28  
**Prep Date:** 12/19/2017 09:30  
**Data File:** 121917.s\AL1914.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**

Page 2 of 3

SDG Number: 2018-1290

Lab Sample ID: 1203941087

Client Sample: QC for batch 1727260

Client ID: MB for batch 1727260

Batch ID: 1727262

Run Date: 12/19/2017 16:28

Prep Date: 12/19/2017 09:30

Data File: 121917.s\AL1914.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**

Page 3 of 3

SDG Number: 2018-1290

Lab Sample ID: 1203941087

Client Sample: QC for batch 1727260

Client ID: MB for batch 1727260

Batch ID: 1727262

Run Date: 12/19/2017 16:28

Prep Date: 12/19/2017 09:30

Data File: 121917.s\AL1914.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

Client: ARSL004  
Method: SW846 3510C/8270D  
Inst: MSDA.I  
Analyst: JMB3  
Aliquot: 1000 mL  
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
95-48-7	<i>m</i> -Nitroaniline o-Cresol	U	3.00	ug/L	3.00	10.0
88-74-4	2-Nitroaniline	U	3.00	ug/L	3.00	10.0
100-01-6	<i>o</i> -Nitroaniline 4-Nitroaniline <i>p</i> -Nitroaniline	U	3.00	ug/L	3.00	10.0

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	74.6	100	ug/L 75	(32%-124%)
2-Fluorobiphenyl	26.4	50.0	ug/L 53	(32%-112%)
2-Fluorophenol	38.1	100	ug/L 38	(15%-88%)
Nitrobenzene-d5	27.8	50.0	ug/L 56	(36%-115%)
Phenol-d5	24.9	100	ug/L 25	(15%-91%)
p-Terphenyl-d14	44.4	50.0	ug/L 89	(36%-121%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000646-31-1	Tetracosane	14.416	5.38	ug/L	90	NJ
000593-49-7	Heptacosane	14.969	7.3	ug/L	91	NJ
000630-02-4	Octacosane	15.598	9.34	ug/L	91	NJ
000629-94-7	Heneicosane	16.328	8.84	ug/L	90	NJ
000112-95-8	Eicosane	17.174	12.1	ug/L	91	NJ
000630-04-6	Hentriacontane	18.145	9.33	ug/L	91	NJ
000629-99-2	Pentacosane	19.257	7.36	ug/L	90	NJ
071005-15-7	Pentadecane, 8-heptyl-	20.527	4.49	ug/L	91	NJ

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

Page 1 of 3

SDG Number: 2018-1290

Lab Sample ID: 1203941088

Client Sample: QC for batch 1727260

Client ID: LCS for batch 1727260

Batch ID: 1727262

Run Date: 12/19/2017 16:55

Prep Date: 12/19/2017 09:30

Data File: 121917.s\AL1915.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
95-94-3	1,2,4,5-Tetrachlorobenzene		36.6	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		35.4	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		34.2	ug/L	3.00	10.0
122-66-7	Azobenzene		40.1	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		33.5	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		33.3	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		24.9	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		36.3	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		44.0	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		41.9	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		41.5	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		41.5	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		33.7	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		37.7	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		45.8	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		42.9	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		37.8	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		38.3	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		44.5	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		35.3	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		42.5	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		41.7	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		43.3	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		41.7	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		51.7	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		44.4	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		15.1	ug/L	3.00	10.0
83-32-9	Acenaphthene		42.5	ug/L	0.300	1.00
208-96-8	Acenaphthylene		39.7	ug/L	0.300	1.00
62-53-3	Aniline		40.0	ug/L	4.20	10.0
120-12-7	Anthracene		42.2	ug/L	0.300	1.00
1912-24-9	Atrazine		47.7	ug/L	3.00	10.0
92-87-5	Benzidine		66.1	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		43.4	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		44.0	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		44.6	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		40.2	ug/L	0.300	1.00

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

Page 2 of 3

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203941088  
**Client Sample:** QC for batch 1727260  
**Client ID:** LCS for batch 1727260  
**Batch ID:** 1727262  
**Run Date:** 12/19/2017 16:55  
**Prep Date:** 12/19/2017 09:30  
**Data File:** 121917.s\AL1915.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		45.5	ug/L	0.300	1.00
65-85-0	Benzoic acid		30.7	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		34.8	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		46.0	ug/L	3.00	10.0
218-01-9	Chrysene		44.6	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		45.8	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		44.3	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		43.3	ug/L	0.300	1.00
132-64-9	Dibenzofuran		41.7	ug/L	3.00	10.0
84-66-2	Diethylphthalate		45.2	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		44.5	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		42.6	ug/L	3.00	10.0
206-44-0	Fluoranthene		44.2	ug/L	0.300	1.00
86-73-7	Fluorene		41.6	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		42.8	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		34.9	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		23.2	ug/L	3.00	10.0
67-72-1	Hexachloroethane		32.7	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		42.8	ug/L	0.300	1.00
78-59-1	Isophorone		38.4	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		22.9	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		40.3	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		42.2	ug/L	3.00	10.0
91-20-3	Naphthalene		35.1	ug/L	0.300	1.00
98-95-3	Nitrobenzene		38.3	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		46.6	ug/L	3.00	10.0
85-01-8	Phenanthrene		42.2	ug/L	0.300	1.00
108-95-2	Phenol		15.1	ug/L	3.00	10.0
129-00-0	Pyrene		39.3	ug/L	0.300	1.00
110-86-1	Pyridine		25.9	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		37.0	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		39.7	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		39.6	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		43.4	ug/L	3.00	10.0

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

Page 3 of 3

<b>SDG Number:</b> 2018-1290	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 1203941088	
<b>Client Sample:</b> QC for batch 1727260	<b>Client:</b> ARSL004
<b>Client ID:</b> LCS for batch 1727260	<b>Method:</b> SW846 3510C/8270D
<b>Batch ID:</b> 1727262	<b>Inst:</b> MSDA.I
<b>Run Date:</b> 12/19/2017 16:55	<b>Analyst:</b> JMB3
<b>Prep Date:</b> 12/19/2017 09:30	<b>Aliquot:</b> 1000 mL
<b>Data File:</b> 121917.s\AL1915.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		35.1	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		52.1	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		33.4	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		42.6	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		46.3	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	93.9	100	ug/L	94	(32%-124%)
2-Fluorobiphenyl	39.2	50.0	ug/L	78	(32%-112%)
2-Fluorophenol	46.7	100	ug/L	47	(15%-88%)
Nitrobenzene-d5	39.6	50.0	ug/L	79	(36%-115%)
Phenol-d5	29.4	100	ug/L	29	(15%-91%)
p-Terphenyl-d14	45.5	50.0	ug/L	91	(36%-121%)

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

Page 1 of 3

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203941089  
**Client Sample:** QC for batch 1727260  
**Client ID:** CALA-18-150401MS  
**Batch ID:** 1727262  
**Run Date:** 12/19/2017 18:43  
**Prep Date:** 12/19/2017 09:30  
**Data File:** 121917.s\AL1919.D

**Date Collected:** 12/13/2017 11:12  
**Date Received:** 12/15/2017 09:05  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 mL  
**Column:** DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		70.9	ug/L	6.52	21.7
120-82-1	1,2,4-Trichlorobenzene		67.0	ug/L	6.52	21.7
95-50-1	1,2-Dichlorobenzene		63.8	ug/L	6.52	21.7
122-66-7	Azobenzene		81.3	ug/L	6.52	21.7
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		62.2	ug/L	6.52	21.7
106-46-7	1,4-Dichlorobenzene		62.2	ug/L	6.52	21.7
123-91-1	1,4-Dioxane		67.8	ug/L	6.52	21.7
90-12-0	1-Methylnaphthalene		71.9	ug/L	0.652	2.17
58-90-2	2,3,4,6-Tetrachlorophenol		92.8	ug/L	6.52	21.7
95-95-4	2,4,5-Trichlorophenol		83.8	ug/L	6.52	21.7
88-06-2	2,4,6-Trichlorophenol		85.5	ug/L	6.52	21.7
120-83-2	2,4-Dichlorophenol		82.6	ug/L	6.52	21.7
105-67-9	2,4-Dimethylphenol		66.1	ug/L	6.52	21.7
51-28-5	2,4-Dinitrophenol		82.8	ug/L	10.9	43.5
121-14-2	2,4-Dinitrotoluene		94.8	ug/L	6.52	21.7
606-20-2	2,6-Dinitrotoluene		88.0	ug/L	6.52	21.7
91-58-7	2-Chloronaphthalene		74.5	ug/L	0.891	2.17
95-57-8	2-Chlorophenol		71.3	ug/L	6.52	21.7
534-52-1	2-Methyl-4,6-dinitrophenol		95.8	ug/L	6.52	21.7
91-57-6	2-Methylnaphthalene		69.1	ug/L	0.652	2.17
88-75-5	2-Nitrophenol		88.2	ug/L	6.52	21.7
91-94-1	3,3'-Dichlorobenzidine		80.3	ug/L	6.52	21.7
101-55-3	4-Bromophenylphenylether		89.6	ug/L	6.52	21.7
59-50-7	Parachlorometa cresol		80.1	ug/L	6.52	21.7
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		83.4	ug/L	7.17	21.7
7005-72-3	4-Chlorophenylphenylether		91.7	ug/L	6.52	21.7
100-02-7	4-Nitrophenol		54.6	ug/L	6.52	21.7
83-32-9	Acenaphthene		85.9	ug/L	0.652	2.17
208-96-8	Acenaphthylene		80.5	ug/L	0.652	2.17
62-53-3	Aniline		42.0	ug/L	9.13	21.7
120-12-7	Anthracene		87.2	ug/L	0.652	2.17
1912-24-9	Atrazine		97.2	ug/L	6.52	21.7
92-87-5	Benzidine		101	ug/L	8.48	21.7
56-55-3	Benzo(a)anthracene		87.5	ug/L	0.652	2.17
50-32-8	Benzo(a)pyrene		88.4	ug/L	0.652	2.17
205-99-2	Benzo(b)fluoranthene		90.0	ug/L	0.652	2.17
191-24-2	Benzo(ghi)perylene		69.0	ug/L	0.652	2.17

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

Page 2 of 3

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203941089  
**Client Sample:** QC for batch 1727260  
**Client ID:** CALA-18-150401MS  
**Batch ID:** 1727262  
**Run Date:** 12/19/2017 18:43  
**Prep Date:** 12/19/2017 09:30  
**Data File:** 121917.s\AL1919.D

**Date Collected:** 12/13/2017 11:12  
**Date Received:** 12/15/2017 09:05  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 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		93.3	ug/L	0.652	2.17
65-85-0	Benzoic acid		122	ug/L	13.0	43.5
100-51-6	Benzyl alcohol		78.3	ug/L	6.52	21.7
85-68-7	Butylbenzylphthalate		91.0	ug/L	6.52	21.7
218-01-9	Chrysene		89.7	ug/L	0.652	2.17
84-74-2	Di-n-butylphthalate		92.8	ug/L	6.52	21.7
117-84-0	Di-n-octylphthalate		79.8	ug/L	6.52	21.7
53-70-3	Dibenzo(a,h)anthracene		75.9	ug/L	0.652	2.17
132-64-9	Dibenzofuran		84.1	ug/L	6.52	21.7
84-66-2	Diethylphthalate		93.3	ug/L	6.52	21.7
131-11-3	Dimethylphthalate		91.7	ug/L	6.52	21.7
88-85-7	Dinoseb	U	6.52	ug/L	6.52	21.7
122-39-4	Diphenylamine		80.8	ug/L	6.52	21.7
206-44-0	Fluoranthene		91.8	ug/L	0.652	2.17
86-73-7	Fluorene		85.5	ug/L	0.652	2.17
118-74-1	Hexachlorobenzene		88.0	ug/L	6.52	21.7
87-68-3	Hexachlorobutadiene		68.5	ug/L	6.52	21.7
77-47-4	Hexachlorocyclopentadiene		47.0	ug/L	6.52	21.7
67-72-1	Hexachloroethane		61.3	ug/L	6.52	21.7
193-39-5	Indeno(1,2,3-cd)pyrene		76.7	ug/L	0.652	2.17
78-59-1	Isophorone		77.7	ug/L	7.61	21.7
62-75-9	N-Methyl-N-nitrosomethylamine		57.8	ug/L	6.52	21.7
924-16-3	N-Nitrosodi-n-butylamine	U	6.52	ug/L	6.52	21.7
55-18-5	N-Nitrosodiethylamine	U	6.52	ug/L	6.52	21.7
621-64-7	N-Nitrosodi-n-propylamine		81.9	ug/L	6.52	21.7
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		88.1	ug/L	6.52	21.7
91-20-3	Naphthalene		68.3	ug/L	0.652	2.17
98-95-3	Nitrobenzene		77.4	ug/L	6.52	21.7
608-93-5	Pentachlorobenzene	U	6.52	ug/L	6.52	21.7
87-86-5	Pentachlorophenol		97.4	ug/L	6.52	21.7
85-01-8	Phenanthrene		87.0	ug/L	0.652	2.17
108-95-2	Phenol		48.5	ug/L	6.52	21.7
129-00-0	Pyrene		82.4	ug/L	0.652	2.17
110-86-1	Pyridine		66.7	ug/L	6.52	21.7
108-60-1	bis(2-Chloro-1-methylethyl)ether		74.8	ug/L	6.52	21.7
111-91-1	bis(2-Chloroethoxy)methane		80.8	ug/L	6.52	21.7
111-44-4	bis(2-Chloroethyl) ether		80.2	ug/L	6.52	21.7
117-81-7	bis(2-Ethylhexyl)phthalate		80.3	ug/L	6.52	21.7

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

Page 3 of 3

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203941089  
**Client Sample:** QC for batch 1727260  
**Client ID:** CALA-18-150401MS  
**Batch ID:** 1727262  
**Run Date:** 12/19/2017 18:43  
**Prep Date:** 12/19/2017 09:30  
**Data File:** 121917.s\AL1919.D

**Date Collected:** 12/13/2017 11:12  
**Date Received:** 12/15/2017 09:05  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 mL  
**Column:** DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		82.7	ug/L	8.04	21.7
99-09-2	3-Nitroaniline		107	ug/L	6.52	21.7
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol		69.8	ug/L	6.52	21.7
88-74-4	2-Nitroaniline		86.3	ug/L	6.52	21.7
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline		97.8	ug/L	6.52	21.7
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	189	217	ug/L	87	(32%-124%)
2-Fluorobiphenyl	78.6	109	ug/L	72	(32%-112%)
2-Fluorophenol	86.2	217	ug/L	40	(15%-88%)
Nitrobenzene-d5	80.5	109	ug/L	74	(36%-115%)
Phenol-d5	76.1	217	ug/L	35	(15%-91%)
p-Terphenyl-d14	91.4	109	ug/L	84	(36%-121%)

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

Page 1 of 3

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203941090  
**Client Sample:** QC for batch 1727260  
**Client ID:** CALA-18-150401MSD  
**Batch ID:** 1727262  
**Run Date:** 12/19/2017 19:10  
**Prep Date:** 12/19/2017 09:30  
**Data File:** 121917.s\AL1920.D

**Date Collected:** 12/13/2017 11:12  
**Date Received:** 12/15/2017 09:05  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 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		72.6	ug/L	6.52	21.7
120-82-1	1,2,4-Trichlorobenzene		67.6	ug/L	6.52	21.7
95-50-1	1,2-Dichlorobenzene		62.1	ug/L	6.52	21.7
122-66-7	Azobenzene		81.3	ug/L	6.52	21.7
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		60.5	ug/L	6.52	21.7
106-46-7	1,4-Dichlorobenzene		60.3	ug/L	6.52	21.7
123-91-1	1,4-Dioxane		64.6	ug/L	6.52	21.7
90-12-0	1-Methylnaphthalene		72.0	ug/L	0.652	2.17
58-90-2	2,3,4,6-Tetrachlorophenol		89.0	ug/L	6.52	21.7
95-95-4	2,4,5-Trichlorophenol		82.5	ug/L	6.52	21.7
88-06-2	2,4,6-Trichlorophenol		84.4	ug/L	6.52	21.7
120-83-2	2,4-Dichlorophenol		81.7	ug/L	6.52	21.7
105-67-9	2,4-Dimethylphenol		65.4	ug/L	6.52	21.7
51-28-5	2,4-Dinitrophenol		81.3	ug/L	10.9	43.5
121-14-2	2,4-Dinitrotoluene		92.0	ug/L	6.52	21.7
606-20-2	2,6-Dinitrotoluene		86.6	ug/L	6.52	21.7
91-58-7	2-Chloronaphthalene		75.7	ug/L	0.891	2.17
95-57-8	2-Chlorophenol		67.7	ug/L	6.52	21.7
534-52-1	2-Methyl-4,6-dinitrophenol		95.8	ug/L	6.52	21.7
91-57-6	2-Methylnaphthalene		69.8	ug/L	0.652	2.17
88-75-5	2-Nitrophenol		86.2	ug/L	6.52	21.7
91-94-1	3,3'-Dichlorobenzidine		80.7	ug/L	6.52	21.7
101-55-3	4-Bromophenylphenylether		88.7	ug/L	6.52	21.7
59-50-7	Parachlorometa cresol		78.6	ug/L	6.52	21.7
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		88.5	ug/L	7.17	21.7
7005-72-3	4-Chlorophenylphenylether		90.5	ug/L	6.52	21.7
100-02-7	4-Nitrophenol		56.0	ug/L	6.52	21.7
83-32-9	Acenaphthene		85.1	ug/L	0.652	2.17
208-96-8	Acenaphthylene		80.3	ug/L	0.652	2.17
62-53-3	Aniline		44.4	ug/L	9.13	21.7
120-12-7	Anthracene		86.6	ug/L	0.652	2.17
1912-24-9	Atrazine		95.6	ug/L	6.52	21.7
92-87-5	Benzidine		92.8	ug/L	8.48	21.7
56-55-3	Benzo(a)anthracene		88.1	ug/L	0.652	2.17
50-32-8	Benzo(a)pyrene		89.0	ug/L	0.652	2.17
205-99-2	Benzo(b)fluoranthene		91.4	ug/L	0.652	2.17
191-24-2	Benzo(ghi)perylene		67.8	ug/L	0.652	2.17



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

Page 2 of 3

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203941090  
**Client Sample:** QC for batch 1727260  
**Client ID:** CALA-18-150401MSD  
**Batch ID:** 1727262  
**Run Date:** 12/19/2017 19:10  
**Prep Date:** 12/19/2017 09:30  
**Data File:** 121917.s\AL1920.D

**Date Collected:** 12/13/2017 11:12  
**Date Received:** 12/15/2017 09:05  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 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		94.0	ug/L	0.652	2.17
65-85-0	Benzoic acid		125	ug/L	13.0	43.5
100-51-6	Benzyl alcohol		79.2	ug/L	6.52	21.7
85-68-7	Butylbenzylphthalate		92.6	ug/L	6.52	21.7
218-01-9	Chrysene		91.4	ug/L	0.652	2.17
84-74-2	Di-n-butylphthalate		92.5	ug/L	6.52	21.7
117-84-0	Di-n-octylphthalate		82.9	ug/L	6.52	21.7
53-70-3	Dibenzo(a,h)anthracene		74.5	ug/L	0.652	2.17
132-64-9	Dibenzofuran		84.2	ug/L	6.52	21.7
84-66-2	Diethylphthalate		91.2	ug/L	6.52	21.7
131-11-3	Dimethylphthalate		89.7	ug/L	6.52	21.7
88-85-7	Dinoseb	U	6.52	ug/L	6.52	21.7
122-39-4	Diphenylamine		79.3	ug/L	6.52	21.7
206-44-0	Fluoranthene		91.8	ug/L	0.652	2.17
86-73-7	Fluorene		85.3	ug/L	0.652	2.17
118-74-1	Hexachlorobenzene		87.7	ug/L	6.52	21.7
87-68-3	Hexachlorobutadiene		69.2	ug/L	6.52	21.7
77-47-4	Hexachlorocyclopentadiene		50.9	ug/L	6.52	21.7
67-72-1	Hexachloroethane		60.5	ug/L	6.52	21.7
193-39-5	Indeno(1,2,3-cd)pyrene		77.5	ug/L	0.652	2.17
78-59-1	Isophorone		76.2	ug/L	7.61	21.7
62-75-9	N-Methyl-N-nitrosomethylamine		63.8	ug/L	6.52	21.7
924-16-3	N-Nitrosodi-n-butylamine	U	6.52	ug/L	6.52	21.7
55-18-5	N-Nitrosodiethylamine	U	6.52	ug/L	6.52	21.7
621-64-7	N-Nitrosodi-n-propylamine		80.0	ug/L	6.52	21.7
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		87.8	ug/L	6.52	21.7
91-20-3	Naphthalene		67.7	ug/L	0.652	2.17
98-95-3	Nitrobenzene		76.5	ug/L	6.52	21.7
608-93-5	Pentachlorobenzene	U	6.52	ug/L	6.52	21.7
87-86-5	Pentachlorophenol		95.4	ug/L	6.52	21.7
85-01-8	Phenanthrene		86.7	ug/L	0.652	2.17
108-95-2	Phenol		47.5	ug/L	6.52	21.7
129-00-0	Pyrene		81.8	ug/L	0.652	2.17
110-86-1	Pyridine		65.7	ug/L	6.52	21.7
108-60-1	bis(2-Chloro-1-methylethyl)ether		72.4	ug/L	6.52	21.7
111-91-1	bis(2-Chloroethoxy)methane		79.1	ug/L	6.52	21.7
111-44-4	bis(2-Chloroethyl) ether		76.9	ug/L	6.52	21.7
117-81-7	bis(2-Ethylhexyl)phthalate		81.9	ug/L	6.52	21.7

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

Page 3 of 3

<b>SDG Number:</b> 2018-1290	<b>Date Collected:</b> 12/13/2017 11:12	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203941090	<b>Date Received:</b> 12/15/2017 09:05	
<b>Client Sample:</b> QC for batch 1727260	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CALA-18-150401MSD	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1727262	<b>Inst:</b> MSDA.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/19/2017 19:10	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 12/19/2017 09:30	<b>Aliquot:</b> 460 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> 121917.s\AL1920.D	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		80.7	ug/L	8.04	21.7
99-09-2	3-Nitroaniline		105	ug/L	6.52	21.7
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol		68.0	ug/L	6.52	21.7
88-74-4	2-Nitroaniline		85.3	ug/L	6.52	21.7
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline		97.0	ug/L	6.52	21.7
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	188	217	ug/L	87	(32%-124%)
2-Fluorobiphenyl	78.8	109	ug/L	72	(32%-112%)
2-Fluorophenol	83.1	217	ug/L	38	(15%-88%)
Nitrobenzene-d5	80.2	109	ug/L	74	(36%-115%)
Phenol-d5	76.0	217	ug/L	35	(15%-91%)
p-Terphenyl-d14	93.5	109	ug/L	86	(36%-121%)

# **Perchlorates by LCMSMS Analysis**

# Case Narrative

**Perchlorates by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1290  
Work Order #: 440209**

**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: 1727162

Prep Batch Number: 1727161

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
440209001	440209001 (CAMO-18-150344)
440209003	440209003 (CAMO-18-150363)
440209006	440209006 (CAMO-18-150383)
440209008	440209008 (CAMO-18-150345)
440209010	440209010 (CAMO-18-150347)
1203940856	Interference Check Sample (ICS)
1203940852	Method Blank (MB)
1203940853	Laboratory Control Sample (LCS)
1203940854	439940001(CALA-18-150103) Matrix Spike (MS)
1203940855	439940001(CALA-18-150103) 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 439940001 (CALA-18-150103) was chosen for matrix spike and matrix spike duplicate analysis.

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

The MS recoveries were within the established acceptance limits.

#### **MS/MSD Relative Percent Difference (RPD) Statement**

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

#### **Internal Standard Area Acceptance**

The internal standard areas were within the required acceptance criteria for all samples and QC.

#### **Retention Time**

During the analysis of Perchlorate by LC/MS/MS, retention time shifts are commonly observed. These retention time shifts, which are caused by fouling of the column by the sample matrices, are problematic when the retention time is used as one of the criterion for confirmation. To overcome this problem, a known amount of O(18) labeled Perchlorate was added to each sample as a retention time standard. The presence of Perchlorate was confirmed by the relative retention time (RRT) of the Perchlorate peak and the O(18) standard. A RRT window of 0.98 to 1.02, as required by DOD QSM 5.0, has been used. In addition to the isotopic ratio, the presence of Perchlorate in the samples associated with this data package have been confirmed using the relative retention criteria stated above, not the absolute retention time.

## **Technical Information**

### **Holding Time Specifications**

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

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

All procedures were performed as stated in the SOP.

### **Sample Dilutions**

The samples in this SDG did not require dilutions.

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

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

## **Miscellaneous Information**

### **Manual Integrations**

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

### **Method Comments**

The samples in this SDG were not originally analyzed using EPA Method 314.0.

### **Additional Comments**

The Perchlorate Isotope Ratio on the Form I may differ slightly from the ratio on the corresponding raw data due to rounding rules and/or significant figures or due to software limitations when there are manual integrations, dilutions or other factors. The ratio value of the Form I is the correct value. The retention time marker, Perchlorate-O (18), is added to all samples, instrument blanks, and standards prior to injection. It is used to verify the retention time of Perchlorate and Perchlorate-101 and to insure an accurate injection occurred. Due to various anions affecting the recovery of Perchlorate-O (18) and not Perchlorate and Perchlorate-101, the calibration curves of Perchlorate and Perchlorate-101 are internally corrected for using Perchlorate-O (18).

### **Perchlorate Isotope Ratio**

The Perchlorate isotope ratio met acceptance criteria for all samples and QC samples. Please see the isotope ratio criteria in the Miscellaneous Section.

## **System Configuration**

The laboratory utilizes a Waters LC 2795 liquid chromatography instrument for Perchlorate analysis. It is coupled with a Micromass Quattro Ultima Mass Spectrometer/Mass Spectrometer. It is designated as LCMSMS #2. It is fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis. The laboratory may also utilize an Agilent 1100 liquid chromatography instrument for Perchlorate analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/Mass Spectrometer, designated as LCMSMS #3 or LCMSMS #4. It is also fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis.

### **Electronic Packaging Comment**

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

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

electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Chromatographic Columns**

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

Chromatographic separation of Perchlorate is accomplished through analysis on the following anion column:

Dionex: IonPac AG-16 2 x 50 mm.

### **Certification Statement**

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



## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2018-1290 GEL Work Order: 440209

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

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

#### Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 22 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: 1727161Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-150344Date Received: 16-DEC-17GEL Job No (SDG): 2018-1290GEL Sample ID: 440209001Date Filtered: 18-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	0.613	ug/L		1	19-DEC-17 18:33	per1219031a
	Perchlorate Isotope Ratio			2.97			1	19-DEC-17 18:33	per1219031a
14797-73-0	Perchlorate-101	.05	.2	0.606	ug/L		1	19-DEC-17 18:33	per1219031a
	Perchlorate-O(18)			0.511	ug/L		1	19-DEC-17 18:33	per1219031a

^ 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: 1727161Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-150363Date Received: 16-DEC-17GEL Job No (SDG): 2018-1290GEL Sample ID: 440209003Date Filtered: 18-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	0.622	ug/L		1	19-DEC-17 18:42	per1219032a
	Perchlorate Isotope Ratio			3.15			1	19-DEC-17 18:42	per1219032a
14797-73-0	Perchlorate-101	.05	.2	0.580	ug/L		1	19-DEC-17 18:42	per1219032a
	Perchlorate-O(18)			0.514	ug/L		1	19-DEC-17 18:42	per1219032a

^ 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: 1727161Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-150383Date Received: 16-DEC-17GEL Job No (SDG): 2018-1290GEL Sample ID: 440209006Date Filtered: 18-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	19-DEC-17 18:51	per1219033a
	Perchlorate Isotope Ratio						1	19-DEC-17 18:51	per1219033a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	19-DEC-17 18:51	per1219033a
	Perchlorate-O(18)			0.467	ug/L		1	19-DEC-17 18:51	per1219033a

^ 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: 1727161Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-150345Date Received: 16-DEC-17GEL Job No (SDG): 2018-1290GEL Sample ID: 440209008Date Filtered: 18-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	0.335	ug/L		1	19-DEC-17 19:00	per1219034a
	Perchlorate Isotope Ratio			3.22			1	19-DEC-17 19:00	per1219034a
14797-73-0	Perchlorate-101	.05	.2	0.306	ug/L		1	19-DEC-17 19:00	per1219034a
	Perchlorate-O(18)			0.467	ug/L		1	19-DEC-17 19:00	per1219034a

^ 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: 1727161Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-150347Date Received: 16-DEC-17GEL Job No (SDG): 2018-1290GEL Sample ID: 440209010Date Filtered: 18-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	0.434	ug/L		1	19-DEC-17 19:09	per1219035a
	Perchlorate Isotope Ratio			2.86			1	19-DEC-17 19:09	per1219035a
14797-73-0	Perchlorate-101	.05	.2	0.445	ug/L		1	19-DEC-17 19:09	per1219035a
	Perchlorate-O(18)			0.466	ug/L		1	19-DEC-17 19:09	per1219035a

^ 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):** 2018-1290

**Extract Batch Code:** 1727161

**Date Filtered:** 18-DEC-17

**Matrix:** WATER

**Sample ID:** 1203940853

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.196	ug/L	98		85 - 115
Perchlorate Isotope Ratio		3.03				-
Perchlorate-101	0.200	.19	ug/L	95		85 - 115
Perchlorate-O(18)		.461	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):** 2018-1290

**Extract Batch Code:** 1727161

**Date Extracted:** 18-DEC-17

**GEL MS/PS ID:** 1203940854

**Client ID:** CALA-18-150103

**GEL MSD/PSD ID:** 1203940855

**QC Type:** MS

Compound^	Spike Added	Sample Conc	Units	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Recovery Limit
Perchlorate	0.200	0.445	ug/L	0.626	91	.64	97	2	30	75 - 125
Perchlorate Isotope Ratio	0	3.12		3.03		3.05		1		-
Perchlorate-101	0.200	0.419	ug/L	0.607	94	.617	99	2	30	75 - 125
Perchlorate-O(18)	0	0.476	ug/L	0.457		.465		2		-

^ 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: 1727161Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 18-DEC-17GEL Job No (SDG): 2018-1290GEL Sample ID: 1203940852Date Filtered: 18-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	19-DEC-17 15:52	per1219013a
	Perchlorate Isotope Ratio						1	19-DEC-17 15:52	per1219013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	19-DEC-17 15:52	per1219013a
	Perchlorate-O(18)			0.498	ug/L		1	19-DEC-17 15:52	per1219013a

^ 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: 1727161Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 18-DEC-17GEL Job No (SDG): 2018-1290GEL Sample ID: 1203940853Date Filtered: 18-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	0.196	ug/L	J	1	19-DEC-17 16:01	per1219014a
	Perchlorate Isotope Ratio			3.03			1	19-DEC-17 16:01	per1219014a
14797-73-0	Perchlorate-101	.05	.2	0.190	ug/L	J	1	19-DEC-17 16:01	per1219014a
	Perchlorate-O(18)			0.461	ug/L		1	19-DEC-17 16:01	per1219014a

^ 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: 1727161Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-1290GEL Sample ID: 1203940856Date Filtered: 18-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	0.228	ug/L		1	19-DEC-17 16:10	per1219015a
	Perchlorate Isotope Ratio			3.01			1	19-DEC-17 16:10	per1219015a
14797-73-0	Perchlorate-101	.05	.2	0.223	ug/L		1	19-DEC-17 16:10	per1219015a
	Perchlorate-O(18)			0.492	ug/L		1	19-DEC-17 16:10	per1219015a

^ 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: 1727161Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CALA-18-150103MSDate Received: 13-DEC-17GEL Job No (SDG): 2018-1290GEL Sample ID: 1203940854Date Filtered: 18-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	0.626	ug/L		1	19-DEC-17 16:54	per1219020a
	Perchlorate Isotope Ratio			3.03			1	19-DEC-17 16:54	per1219020a
14797-73-0	Perchlorate-101	.05	.2	0.607	ug/L		1	19-DEC-17 16:54	per1219020a
	Perchlorate-O(18)			0.457	ug/L		1	19-DEC-17 16:54	per1219020a

^ 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: 1727161Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CALA-18-150103MSDDate Received: 13-DEC-17GEL Job No (SDG): 2018-1290GEL Sample ID: 1203940855Date Filtered: 18-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	0.640	ug/L		1	19-DEC-17 17:03	per1219021a
	Perchlorate Isotope Ratio			3.05			1	19-DEC-17 17:03	per1219021a
14797-73-0	Perchlorate-101	.05	.2	0.617	ug/L		1	19-DEC-17 17:03	per1219021a
	Perchlorate-O(18)			0.465	ug/L		1	19-DEC-17 17:03	per1219021a

^ 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 =

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



# **Explosives by LCMSMS Analysis**

# Case Narrative

**Explosives by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1290  
Work Order #: 440209**

**Method/Analysis Information**

**Procedure:** The Processing, Extraction, and Analysis of Nitroaromatics, Nitroamines, and Nitrate Esters by SW-846 8330B

Analytical Method: SW846 3535A/8330B

Prep Method: SW846 3535A

Analytical Batch Number: 1727070

Prep Batch Number: 1727069

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 3535A/8330B:

<b>Sample ID</b>	<b>Client ID</b>
440209007	CAMO-18-150383
1203940616	Method Blank (MB)
1203940617	Laboratory Control Sample (LCS)
1203940618	440000004(CALA-18-148968) Matrix Spike (MS)
1203940619	440000004(CALA-18-148968) Matrix Spike Duplicate (MSD)

**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-068 REV# 7.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements for this analysis have been met for this SDG.

**Calibration Verification Standard Requirements**

All associated calibration verification standards (ICV and CCV) for this analysis met the acceptance criteria.

**Calibration Blank Requirements**

All initial and continuing calibration blanks (ICB and CCB) bracketing the analyses associated with this batch for this analysis were within acceptance criteria. Due to software limitations, the CCBs and/or the ICBs may have a concentration for target analytes in the Found column. These values should be zero.

**CRI Requirements**

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

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

The MB analyzed with this SDG for this analysis met the acceptance criteria.

**Surrogate Recoveries**

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

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries were within the established acceptance limits.

**QC Sample Designation**

Client sample 440000004 (CALA-18-148968) was chosen for matrix spike and matrix spike duplicate analysis.

**Matrix Spike (MS) Recovery Statement**

The MS spike recoveries were within the established acceptance limits for this analysis.

**MS/MSD Relative Percent Difference (RPD) Statement**

The RPDs between the MS and MSD met the acceptance limits for this analysis.

**Internal Standard (ISTD) Acceptance**

The internal standard responses were within the required acceptance criteria for all samples and QC in this SDG.

**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. 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**

In accordance with GEL SOP GL-OA-056, all sample and QC extracts are diluted 1:1 v/v with LC reagent grade Water. The samples in this SDG in this analytical batch for this analysis did not require any additional dilutions.

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

Re-extractions or re-analyses were not required in this SDG in this analytical batch for this analysis.

**Miscellaneous Information****Manual Integrations**

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

**Additional Comments**

Due to software limitations, all initial calibration blanks must be designated as XIB001 in order for the forms to be correct. Due to software limitations, file extensions such as DL, RE, etc. may not appear on the generated forms and/or raw data. Relative Retention Time (RRT) is used by the laboratory to establish peak identity. The

RRT of each target analyte is calculated using the retention time of the corresponding internal standard. The RRT of each analyte in a sample must be within 2.0 of the analyte's calculated RRT in the ICV.

### **System Configuration**

The laboratory utilizes an Agilent 1100 liquid chromatography instrument for either Primary or Secondary analyte analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/ Mass Spectrometer, designated as either LC/MS/MS #3 or LC/MS/MS #4. The laboratory also utilizes a Shimadzu Nexera XC liquid chromatography instrument for Primary and/or Secondary analyte analysis. It is coupled with an Applied Biosystems 5500 Mass Spectrometer/ Mass Spectrometer, designated as LC/MS/MS #5. All are fitted with an APCI (Atmospheric Pressure Chemical Ionization) probe that is operated in the negative ionization mode for both the Primary and Secondary analyte 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 Explosives analysis was performed on a ABSciex 5500 LCMSMS.

The detection of the Primary and Secondary Nitroaromatic and Nitramine analytes is accomplished through analysis on the following reversed phase column:

Phenomenex: Ultracarb 5u ODS (20), 250 x 4.60 mm ID.

### **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: 2018-1290 GEL Work Order: 440209

#### 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: 21 DEC 2017

Title: Group Leader

# Sample Data Summary

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAMO-18-150383

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Matrix: WATER

GEL Sample ID: 440209007

Sample Amount 900 mL

Date Received: 16-DEC-17

Moisture: .

Extraction Batch ID: 1727069

Extraction Type Sol Exchange

Date Extracted: 18-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1218025.wiff

Date Analyzed: 19-DEC-17 02:56

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0889	U	0.0889	0.278
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0889	U	0.0889	0.278
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.0889	U	0.0889	0.278
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0889	U	0.0889	0.278
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0889	U	0.0889	0.278
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0889	U	0.0889	0.278
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0889	U	0.0889	0.556
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	.0889	U	0.0889	0.278
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
98-95-3	Nitrobenzene	.0889	U	0.0889	0.278
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0889	U	0.0889	0.278
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.0889	U	0.0889	0.278
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.0889	U	0.0889	0.278
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.0911	U	0.0911	0.278
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				



1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAMO-18-150383

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Matrix: WATER

GEL Sample ID: 440209007

Sample Amount 900 mL

Date Received: 16-DEC-17

Moisture: .

Extraction Batch ID: 1727069

Extraction Type Sol Exchange

Date Extracted: 18-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	.111	U	0.111	0.556
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.167	U	0.167	0.556
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.333	U	0.333	1.11
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.333	U	0.333	1.11
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.333	U	0.333	1.11
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.556	U	0.556	2.78
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.556	U	0.556	2.78
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				

# **Quality Control Summary**

**High Explosives Surrogate Recovery Summary****Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2018-1290**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
440209007	CAMO-18-150383	77	55 - 115	
1203940616	MB for batch 1727069	80	55 - 115	
1203940617	LCS for batch 1727069	89	55 - 115	
1203940618	CALA-18-148968MS	81	55 - 115	
1203940619	CALA-18-148968MSD	89	55 - 115	

DNT = 3,4-Dinitrotoluene

**3B**  
**High Explosives LCS/LCS Duplicate Summary**

**Lab Name:** GEL Laboratories LLC

**Client ID:** LCS

**Lab Code:** GEL

**GEL Job No (SDG)** 2018-1290

**Extract Batch Code:** 1727069

**Date Extracted:** 18-DEC-17

**GEL LCS ID:** 1203940617

**GEL LCSDUP ID:**

**Analysis Date/Time:** 18-DEC-17 22:15

**DUP Analysis Date/Time:**

**Reporting Units:** ug/L

**QC Type:** LCS/LCSD

Compound	Spike Added	LCS Conc	LCS Rec #	LCSD Conc	LCSD Rec #	RPD #	RPD	Recovery Limits
p-Nitrotoluene	5	4.91	98					66 - 127
tris(o-cresyl) phosphate	5	3.14	63					43 - 104
1,3,5-Trinitrobenzene	5	4.96	99					70 - 110
2,4,6-Trinitrotoluene	5	4.69	94					69 - 113
2,4-Diamino-6-nitrotoluene	5	4.32	86					50 - 121
2,4-Dinitrotoluene	5	5.3	106					71 - 110
2,6-Diamino-4-nitrotoluene	5	3.98	80					53 - 127
2,6-Dinitrotoluene	5	4.46	89					72 - 105
2-Amino-4,6-dinitrotoluene	5	4.68	94					70 - 112
3,5-Dinitroaniline	5	4.42	88					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.73	95					74 - 116
HMX	5	4.52	90					58 - 113
Nitrobenzene	5	4.14	83					64 - 115
PETN	5	4.03	81					57 - 126
RDX	5	4.23	85					64 - 117
TATB	3	2.68	89					47 - 135
Tetryl	5	4.65	93					55 - 122
m-Dinitrobenzene	5	4.92	98					74 - 117
m-Nitrotoluene	5	4.05	81					66 - 114
o-Nitrotoluene	5	5.15	103					64 - 115

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

3  
High Explosives MS/MSD Summary

Lab Name: GEL Laboratories LLC

Client ID: CALA-18-148968

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Extract Batch Code: 1727069

Date Extracted: 18-DEC-17

GEL Spike ID: 1203940618

GEL SpikeDup ID: 1203940619

Analysis Date/Time: 18-DEC-17 23:26

MSD Analysis Date/Time: 19-DEC-17 00:01

Reporting Units: ug/L

QC Type: MS/MSD

Compound	Spike Added	Sample Conc	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Rec Limits
Tetryl	5.43478	0	4.9	90	4.98	90	2	30	50 - 126
m-Dinitrobenzene	5.43478	0	5.3	98	5.55	100	5	30	74 - 117
m-Nitrotoluene	5.43478	0	4.39	81	4.13	74	6	30	59 - 120
o-Nitrotoluene	5.43478	0	4.7	87	4.33	78	8	30	56 - 119
p-Nitrotoluene	5.43478	0	4.91	90	4.92	88	0	30	61 - 129
tris(o-cresyl) phosphate	5.43478	0	3.43	63	3.79	68	10	30	38 - 105
1,3,5-Trinitrobenzene	5.43478	0	5.72	105	5.67	102	1	30	67 - 111
2,4,6-Trinitrotoluene	5.43478	0	5.51	101	5.47	98	1	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.43478	0	4.28	79	3.78	68	12	30	50 - 121
2,4-Dinitrotoluene	5.43478	0	5.4	99	5.42	98	0	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.43478	0	5.19	96	5.29	95	2	30	53 - 127
2,6-Dinitrotoluene	5.43478	0	5	92	5.1	92	2	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.43478	0	4.87	90	5.33	96	9	30	67 - 115
3,5-Dinitroaniline	5.43478	0	5.06	93	5.14	92	1	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.43478	0	5.19	95	5.65	102	9	30	65 - 120
HMX	5.43478	0	4.46	82	4.61	83	3	30	44 - 128
Nitrobenzene	5.43478	0	4.93	91	4.94	89	0	30	62 - 116
PETN	5.43478	0	4.36	80	4.41	79	1	30	51 - 131
RDX	5.43478	0	4.78	88	4.91	88	3	30	57 - 125
TATB	3.26087	0	2.88	88	2.9	87	0	30	38 - 149

#Column to be used to flag recovery and RPD values with an asterisk

# Quality Control Data

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1727069

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Matrix: WATER

GEL Sample ID: 1203940616

Sample Amount 1000 mL

Date Received: 16-DEC-17

Moisture: .

Extraction Batch ID: 1727069

Extraction Type Sol Exchange

Date Extracted: 18-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1218016.wiff

Date Analyzed: 18-DEC-17 21:40

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.08	U	0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.08	U	0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.08	U	0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.08	U	0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.08	U	0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.08	U	0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.08	U	0.080	0.500
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	.08	U	0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
98-95-3	Nitrobenzene	.08	U	0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.08	U	0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.08	U	0.080	0.250
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.08	U	0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.082	U	0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1727069

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Matrix: WATER

GEL Sample ID: 1203940616

Sample Amount 1000 mL

Date Received: 16-DEC-17

Moisture: .

Extraction Batch ID: 1727069

Extraction Type Sol Exchange

Date Extracted: 18-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	.1	U	0.100	0.500
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.15	U	0.150	0.500
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.3	U	0.300	1.00
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.3	U	0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.3	U	0.300	1.00
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.5	U	0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.5	U	0.500	2.50
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				



1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1727069

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Matrix: WATER

GEL Sample ID: 1203940617

Sample Amount 1000 mL

Date Received: 16-DEC-17

Moisture: .

Extraction Batch ID: 1727069

Extraction Type Sol Exchange

Date Extracted: 18-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1218017.wiff

Date Analyzed: 18-DEC-17 22:15

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	2.68		0.300	1.00
<i>3058-38-6</i>	<i>TATB</i>				
78-30-8	tris(o-cresyl) phosphate	3.14		0.300	1.00
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	3.98		0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
78-11-5	PETN	4.03		0.100	0.500
<i>78-11-5</i>	<i>PETN</i>				
99-08-1	m-Nitrotoluene	4.05		0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
98-95-3	Nitrobenzene	4.14		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
121-82-4	RDX	4.23		0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	4.32		0.500	2.50
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
618-87-1	3,5-Dinitroaniline	4.42		0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
606-20-2	2,6-Dinitrotoluene	4.46		0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
2691-41-0	HMX	4.52		0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
479-45-8	Tetryl	4.65		0.080	0.500
<i>479-45-8</i>	<i>Tetryl</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.68		0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1727069

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Matrix: WATER

GEL Sample ID: 1203940617

Sample Amount 1000 mL

Date Received: 16-DEC-17

Moisture: .

Extraction Batch ID: 1727069

Extraction Type Sol Exchange

Date Extracted: 18-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	4.69		0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.73		0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-99-0	p-Nitrotoluene	4.91		0.150	0.500
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
99-65-0	m-Dinitrobenzene	4.92		0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
99-35-4	1,3,5-Trinitrobenzene	4.96		0.080	0.250
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
88-72-2	o-Nitrotoluene	5.15		0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	5.3		0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CALA-18-148968(440000004MS)MS

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Matrix: WATER

GEL Sample ID: 1203940618

Sample Amount 920 mL

Date Received: 16-DEC-17

Moisture: .

Extraction Batch ID: 1727069

Extraction Type Sol Exchange

Date Extracted: 18-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1218019.wiff

Date Analyzed: 18-DEC-17 23:26

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	2.88		0.326	1.09
3058-38-6	TATB				
78-30-8	tris(o-cresyl) phosphate	3.43		0.326	1.09
78-30-8	tris(o-cresyl) phosphate				
6629-29-4	2,4-Diamino-6-nitrotoluene	4.28		0.543	2.72
6629-29-4	2,4-Diamino-6-nitrotoluene				
78-11-5	PETN	4.36		0.109	0.543
78-11-5	PETN				
99-08-1	m-Nitrotoluene	4.39		0.087	0.272
99-08-1	m-Nitrotoluene				
2691-41-0	HMX	4.46		0.087	0.272
2691-41-0	HMX				
88-72-2	o-Nitrotoluene	4.7		0.0891	0.272
88-72-2	o-Nitrotoluene				
121-82-4	RDX	4.78		0.087	0.272
121-82-4	RDX				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.87		0.087	0.272
35572-78-2	2-Amino-4,6-dinitrotoluene				
479-45-8	Tetryl	4.9		0.087	0.543
479-45-8	Tetryl				
99-99-0	p-Nitrotoluene	4.91		0.163	0.543
99-99-0	p-Nitrotoluene				
98-95-3	Nitrobenzene	4.93		0.087	0.272
98-95-3	Nitrobenzene				
606-20-2	2,6-Dinitrotoluene	5		0.087	0.272
606-20-2	2,6-Dinitrotoluene				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CALA-18-148968(440000004MS)MS

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Matrix: WATER

GEL Sample ID: 1203940618

Sample Amount 920 mL

Date Received: 16-DEC-17

Moisture: .

Extraction Batch ID: 1727069

Extraction Type Sol Exchange

Date Extracted: 18-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
618-87-1	3,5-Dinitroaniline	5.06		0.326	1.09
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.19		0.087	0.272
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.19		0.543	2.72
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.3		0.087	0.272
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
121-14-2	2,4-Dinitrotoluene	5.4		0.087	0.272
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	5.51		0.087	0.272
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	5.72		0.087	0.272
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CALA-18-148968(440000004MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Matrix: WATER

GEL Sample ID: 1203940619

Sample Amount 900 mL

Date Received: 16-DEC-17

Moisture: .

Extraction Batch ID: 1727069

Extraction Type Sol Exchange

Date Extracted: 18-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1218020.wiff

Date Analyzed: 19-DEC-17 00:01

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	2.9		0.333	1.11
<i>3058-38-6</i>	<i>TATB</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	3.78		0.556	2.78
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
78-30-8	tris(o-cresyl) phosphate	3.79		0.333	1.11
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
99-08-1	m-Nitrotoluene	4.13		0.0889	0.278
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
88-72-2	o-Nitrotoluene	4.33		0.0911	0.278
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
78-11-5	PETN	4.41		0.111	0.556
<i>78-11-5</i>	<i>PETN</i>				
2691-41-0	HMX	4.61		0.0889	0.278
<i>2691-41-0</i>	<i>HMX</i>				
121-82-4	RDX	4.91		0.0889	0.278
<i>121-82-4</i>	<i>RDX</i>				
99-99-0	p-Nitrotoluene	4.92		0.167	0.556
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
98-95-3	Nitrobenzene	4.94		0.0889	0.278
<i>98-95-3</i>	<i>Nitrobenzene</i>				
479-45-8	Tetryl	4.98		0.0889	0.556
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	5.1		0.0889	0.278
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
618-87-1	3,5-Dinitroaniline	5.14		0.333	1.11
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CALA-18-148968(440000004MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2018-1290

Matrix: WATER

GEL Sample ID: 1203940619

Sample Amount 900 mL

Date Received: 16-DEC-17

Moisture: .

Extraction Batch ID: 1727069

Extraction Type Sol Exchange

Date Extracted: 18-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
59229-75-3	2,6-Diamino-4-nitrotoluene	5.29		0.556	2.78
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	5.33		0.0889	0.278
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	5.42		0.0889	0.278
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	5.47		0.0889	0.278
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.55		0.0889	0.278
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.65		0.0889	0.278
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	5.67		0.0889	0.278
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				

## Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2018-1290Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 18-DEC-17 12:53GEL Data File: EXP1218001.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0

## Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2018-1290Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 18-DEC-17 13:29GEL Data File: EXP1218002.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0



4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1290

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 18-DEC-17 18:10

GEL Data File: EXP1218010.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	3.3
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	3.7
4-Amino-2,6-dinitrotoluene	0	3.7
HMX	0	4
Nitrobenzene	0	0
PETN	0	0
RDX	0	6.1
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	2.9
p-Nitrotoluene	0	3.1

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1290

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 18-DEC-17 20:30

GEL Data File: EXP1218014.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1290

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 19-DEC-17 04:07

GEL Data File: EXP1218027.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0

# **FID Diesel Range Organics Analysis**

# Case Narrative

**Diesel Range Organics  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1290  
Work Order #: 440209**

**Method/Analysis Information**

**Procedure:** Analysis of Diesel Range Organics by Flame Ionization Detector

Analytical Method: SW846 3535A/8015B

Prep Method: SW846 3535A

Analytical Batch Number: 1727267

Prep Batch Number: 1727266

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 3535A/8015B:

<b>Sample ID</b>	<b>Client ID</b>
440209006	CAMO-18-150383
1203941099	Method Blank (MB)
1203941100	Laboratory Control Sample (LCS)
1203941101	440209006(CAMO-18-150383) Matrix Spike (MS)
1203941102	440209006(CAMO-18-150383) 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-003 REV# 29.

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

**Calibration Information**

**Initial Calibration**

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

**Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria. Analyte peaks eluted within the established retention time windows for this method.

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

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

The MB analyzed with this SDG met the acceptance criteria.

### **Surrogate Recoveries**

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

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

The LCS/LCSD spike recoveries met the acceptance limits.

### **QC Sample Designation**

Sample 440209006 (CAMO-18-150383) was selected for the MS and MSD analysis.

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

The MS/MSD recovery was within the established acceptance limits.

### **MS/MSD Relative Percent Difference (RPD) Statement**

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

## **Technical Information**

### **Holding Time Specifications**

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

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

All procedures were performed as stated in the SOP. Analyte peaks eluted within the established retention time windows for this method.

### **Sample Dilutions**

The samples in this SDG did not require dilutions.

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

Re-extractions or re-analyses were not required for the samples reported in this batch.

## **Miscellaneous Information**

### **Electronic Package Comment**

This 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. The data validator will always sign and date the case narrative.

### **Manual Integrations**

Samples 1203941100 (LCS), 1203941101 (CAMO-18-150383MS) and 1203941102 (CAMO-18-150383MSD) required manual integration to correctly position the baseline as set in the calibration standard injections.

### **Additional Comments**

The additional comments field is used to address special issues associated with each analysis, clarify

method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The additional comments were not required.

### **System Configuration**

The Diesel Range Organics 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>
FID5.I	Agilent Gas Chromatograph	Agilent 6890N GC/FID	J&W DB-5MS	30m x 0.25mm, 0.25um(J&W)
FID5.I	Agilent Gas Chromatograph	Agilent 6890N GC/FID	J&W DB-WAX	30m x 0.53 mm x 1um
FID5.I	Agilent Gas Chromatograph	Agilent 6890N GC/FID	J&W DB-624	30m x 0.53mm, 3.0um(J&W)

### **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: 2018-1290 GEL Work Order: 440209

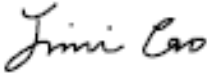
#### The Qualifiers in this report are defined as follows:

- \* 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: Jimin Cao

Date: 22 DEC 2017

Title: Data Validator

# **Sample Data Summary**

## FID Diesel Range Organics

Page 1 of 1

## Certificate of Analysis

## Sample Summary

SDG Number: 2018-1290

Lab Sample ID: 440209006

Date Collected: 12/14/2017 07:50

Date Received: 12/16/2017 09:30

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3535A/8015B

SOP Ref: GL-OA-E-003

Client ID: CAMO-18-150383

Batch ID: 1727267

Inst: FID5.I

Dilution: 1

Run Date: 12/20/2017 15:40

Analyst: LXA1

Inj. Vol: 1 uL

Prep Date: 12/19/2017 17:53

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: 122017\_DRO\F5I2007.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	U	0.050	mg/L	0.050	0.200

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	0.0151	0.020	mg/L 75	(48%-107%)

# **Quality Control Summary**

---

FID Diesel Range Organics  
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-1290

Matrix Type: LIQUID

---

Sample ID	Client ID	OTP %REC
1203941099	MB for batch 1727266	71
1203941100	LCS for batch 1727266	87
440209006	CAMO-18-150383	75
1203941101	CAMO-18-150383MS	60
1203941102	CAMO-18-150383MSD	59

**Surrogate****Acceptance Limits**

OTP = o-Terphenyl

(48%-107%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

---

**FID Diesel Range Organics**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 1 of 1

**SDG Number:** 2018-1290**Sample Type:** Laboratory Control Sample**Client ID:** LCS for batch 1727266**Matrix:** WATER**Lab Sample ID** 1203941100**Instrument:** FID5.I**Analysis Date:** 12/20/2017 15:00**Dilution:** 1**Analvst:** LXA1**Prep Batch ID:**1727266**Inj. Vol:** 1 uL**Batch ID:** 1727267

---

CAS No	Parmname	Amount Added mg/L	Sample Conc. mg/L	Spike Conc. mg/L	Recovery %	Acceptance Limits
68334-30-5	LCS Diesel Range Organics	1.00	0.0	0.694	69	59-111

---

---

**FID Diesel Range Organics**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 1 of 2

SDG Number: 2018-1290

Sample Type: Matrix Spike

Client ID: CAMO-18-150383MS

Matrix: W

Lab Sample ID 1203941101

Instrument: FID5.I

Analysis Date: 12/20/2017 16:20

Dilution: 1

Analyst: LXA1

Prep Batch ID:1727266

Inj. Vol: 1 uL

Batch ID: 1727267

---

CAS No	Parmname	Amount Added mg/L	Sample Conc. mg/L		Spike Conc. mg/L	Recovery %	Acceptance Limits
68334-30-5	MS Diesel Range Organics	1.04	0.00	U	0.524	50	50-111

---

---

**FID Diesel Range Organics**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 2 of 2

SDG Number: 2018-1290

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-150383MSD

Matrix: W

Lab Sample ID 1203941102

Instrument: FID5.I

Analysis Date: 12/20/2017 16:57

Dilution: 1

Analyst: LXA1

Prep Batch ID:1727266

Inj. Vol: 1 uL

Batch ID: 1727267

---

CAS No	Parmname	Amount Added mg/L	Sample Conc. mg/L		Spike Conc. mg/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
68334-30-5	MSD Diesel Range Organics	1.04	0.00	U	0.528	51	50-111	1	0-20

---



## Method Blank Summary

Page 1 of 1

SDG Number:	2018-1290	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1727266	Instrument ID:	FID5.I	Data File:	122017_DRO\f5I2005.D
Lab Sample ID:	1203941099	Prep Date:	12/19/2017 17:53	Analyzed:	12/20/17 14:20
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 1727266	1203941100	122017_DRO\f5I2006.D	12/20/17	1500
02 CAMO-18-150383	440209006	122017_DRO\f5I2007.D	12/20/17	1540
03 CAMO-18-150383MS	1203941101	122017_DRO\f5I2008.D	12/20/17	1620
04 CAMO-18-150383MSD	1203941102	122017_DRO\f5I2009.D	12/20/17	1657

# Quality Control Data

---

**FID Diesel Range Organics  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

SDG Number: 2018-1290

Lab Sample ID: 1203941099

Client Sample: QC for batch 1727266

Client ID: MB for batch 1727266

Batch ID: 1727267

Run Date: 12/20/2017 14:20

Prep Date: 12/19/2017 17:53

Data File: 122017\_DRO\F512005.D

Matrix: WATER

Client: ARSL004

Method: SW846 3535A/8015B

Inst: FID5.I

Analyst: LXA1

Aliquot: 1000 mL

Column: DB-5ms

Project: QC

SOP Ref: GL-OA-E-003

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	U	0.050	mg/L	0.050	0.200

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	0.0142	0.020	mg/L 71	(48%-107%)

---

**FID Diesel Range Organics  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

SDG Number: 2018-1290

Lab Sample ID: 1203941100

Client Sample: QC for batch 1727266

Client ID: LCS for batch 1727266

Batch ID: 1727267

Run Date: 12/20/2017 15:00

Prep Date: 12/19/2017 17:53

Data File: 122017\_DRO\F5I2006.D

Matrix: WATER

Client: ARSL004

Method: SW846 3535A/8015B

Inst: FID5.I

Analyst: LXA1

Aliquot: 1000 mL

Column: DB-5ms

Project: QC

SOP Ref: GL-OA-E-003

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics		0.694	mg/L	0.050	0.200

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	0.0173	0.020	mg/L 87	(48%-107%)

## FID Diesel Range Organics

Page 1 of 1

## Certificate of Analysis

## Sample Summary

SDG Number:	2018-1290	Date Collected:	12/14/2017 07:50	Matrix:	W
Lab Sample ID:	1203941101	Date Received:	12/16/2017 09:00		
Client Sample:	QC for batch 1727266	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-150383MS	Method:	SW846 3535A/8015B	SOP Ref:	GL-OA-E-003
Batch ID:	1727267	Inst:	FID5.I	Dilution:	1
Run Date:	12/20/2017 16:20	Analyst:	LXA1	Inj. Vol:	1 uL
Prep Date:	12/19/2017 17:53	Aliquot:	480 mL	Final Volume:	.5 mL
Data File:	122017_DRO\FI2008.D	Column:	DB-5ms		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics		0.524	mg/L	0.0521	0.208

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	0.0125	0.0208	mg/L 60	(48%-107%)

## FID Diesel Range Organics

Page 1 of 1

## Certificate of Analysis

## Sample Summary

SDG Number:	2018-1290	Date Collected:	12/14/2017 07:50	Matrix:	W
Lab Sample ID:	1203941102	Date Received:	12/16/2017 09:00		
Client Sample:	QC for batch 1727266	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-150383MSD	Method:	SW846 3535A/8015B	SOP Ref:	GL-OA-E-003
Batch ID:	1727267	Inst:	FID5.I	Dilution:	1
Run Date:	12/20/2017 16:57	Analyst:	LXA1	Inj. Vol:	1 uL
Prep Date:	12/19/2017 17:53	Aliquot:	480 mL	Final Volume:	.5 mL
Data File:	122017_DRO\F5I2009.D	Column:	DB-5ms		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics		0.528	mg/L	0.0521	0.208

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	0.0122	0.0208	mg/L 59	(48%-107%)

# PCB Analysis

# Case Narrative



**GC Semivolatile PCB  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1290  
Work Order #: 440209**

**Method/Analysis Information**

<b>Procedure:</b>	<b>Analysis of The Analysis of Polychlorinated Biphenyls by GC/ECD by ECD</b>
Analytical Method:	SW846 3535A/8082
Prep Method:	SW846 3535A
Analytical Batch Number:	1730491
Prep Batch Number:	1730488

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 3535A/8082:

<b>Sample ID</b>	<b>Client ID</b>
440209005	CAMO-18-150383
1203949423	Method Blank (MB)
1203949424	Laboratory Control Sample (LCS)
1203949425	440189003(CAWR-18-150421) Matrix Spike (MS)
1203949426	440189003(CAWR-18-150421) 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-040 REV# 24.

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

**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.

**Initial Calibration**

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

**Continuing Calibration Verification (CCV) Requirements**

The associated calibration verification standards (ICV or CCV) did not meet the acceptance criteria. One of the CCV standards, analyzed for this batch, failed to meet the acceptance criteria with positive bias. As there were no target analytes detected in the associated environmental samples, the sample results were not adversely affected.

All analytes were within the established retention time windows for this method.

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

The MB analyzed with this SDG met the acceptance criteria.

**Surrogate Recoveries**

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

**Laboratory Control Sample (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS/LCSD) Recovery**

The LCS/LCSD spike recoveries met the acceptance limits.

**QC Sample Designation**

Sample 440189003 (CAWR-18-150421) was selected for the matrix spike and matrix spike duplicate analysis.

**Matrix Spike (MS/MSD) Recovery Statement**

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

**MS/MSD Relative Percent Difference (RPD) Statement**

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

**Technical Information****Holding Time Specifications**

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

**Preparation/Analytical Method Verification**

All samples and QC in this batch were cleaned using alumina in order to remove oil and other high molecular weight interferences. All samples and QC in this batch were cleaned with activated copper in order to remove sulfur. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns.

**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 for the samples in this SDG and reported in this batch.

**Miscellaneous Information**

### **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. 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.

### **Manual integrations**

Manual integrations were not required for samples and QC samples associated with this SDG in this batch.

### **Additional Comments**

The column 1 has been chosen as the primary column. The data are reported from the column 1 for all samples in this batch.

### **System Configuration**

The Semi-Volatiles-PCB 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>
ECD8A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide I)
ECD8A.I_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP II	30m x 0.25mm, 0.20um (Rtx-CLPesticide II)

### **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: 2018-1290 GEL Work Order: 440209

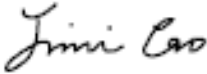
#### The Qualifiers in this report are defined as follows:

- \* 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: Jimin Cao

Date: 11 JAN 2018

Title: Data Validator

# **Sample Data Summary**

**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

**SDG Number:** 2018-1290  
**Lab Sample ID:** 440209005  
**Client Sample:** PCB  
**Client ID:** CAMO-18-150383  
**Batch ID:** 1730491  
**Run Date:** 01/11/2018 11:23  
**Prep Date:** 01/10/2018 18:26  
**Data File:** 011118.B\8a1132.D  
 011118.B\8a1132.D

**Date Collected:** 12/14/2017 07:50  
**Date Received:** 12/16/2017 09:30  
**Client:** ARSL004  
**Method:** SW846 3535A/8082  
**Inst:** ECD8A.I  
**Analyst:** JXM  
**Aliquot:** 940 mL  
**Column:** 1 RTX-CLPEST1  
 2 RTX-CLPEST2

**Matrix:** W  
**Project:** ESHL00114  
**SOP Ref:** GL-OA-E-040  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016	U	0.0354	ug/L	0.0354	0.106	1
11104-28-2	Aroclor-1221	U	0.0354	ug/L	0.0354	0.106	1
11141-16-5	Aroclor-1232	U	0.0354	ug/L	0.0354	0.106	1
53469-21-9	Aroclor-1242	U	0.0354	ug/L	0.0354	0.106	1
12672-29-6	Aroclor-1248	U	0.0354	ug/L	0.0354	0.106	1
11097-69-1	Aroclor-1254	U	0.0354	ug/L	0.0354	0.106	1
11096-82-5	Aroclor-1260	U	0.0354	ug/L	0.0354	0.106	1
37324-23-5	Aroclor-1262	U	0.0354	ug/L	0.0354	0.106	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.171	0.213	ug/L 81	(33%-122%)
Decachlorobiphenyl	0.171	0.213	ug/L 80	(35%-138%)

# **Quality Control Summary**

---

**PCB**  
**Surrogate Recovery Report**

Page 1 of 1

**SDG Number: 2018-1290****Matrix Type: LIQUID**

---

Sample ID	Client ID	4CMX 1 %REC #	4CMX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #
1203949423	MB for batch 1730488	70	76	88	99
1203949424	LCS for batch 1730488	73	78	84	99
1203949425	CAWR-18-150421MS	49	52	57	71
1203949426	CAWR-18-150421MSD	46	49	53	67
440209005	CAMO-18-150383	81	88	80	89

---

**Surrogate****Acceptance Limits**

4CMX    = 4cmx                   (33%-122%)

DCB       = Decachlorobiphenyl   (35%-138%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted



**PCB**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 1 of 1

SDG Number: 2018-1290

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1730488

Matrix: WATER

Lab Sample ID 1203949424

Instrument: ECD8A.I

Analysis Date: 01/11/2018 08:43

Dilution: 1

Analyst: JXM

Prep Batch ID: 1730488

Inj. Vol: 1 uL

Batch ID: 1730491

CAS No			Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
12674-11-2	LCS	Aroclor-1016		1.00	0.0	0.787	79	45-101
11096-82-5	LCS	Aroclor-1260		1.00	0.0	0.879	88	52-113

## PCB

Page 1 of 2

Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-1290

Sample Type: Matrix Spike

Client ID: CAWR-18-150421MS

Matrix: W

Lab Sample ID 1203949425

Instrument: ECD8A.I

Analysis Date: 01/11/2018 10:09

Dilution: 1

Analyst: JXM

Prep Batch ID: 1730488

Inj. Vol: 1 uL

Batch ID: 1730491

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
12674-11-2	MS Aroclor-1016	1.19	0.00 U	0.771	65	26-110
11096-82-5	MS Aroclor-1260	1.19	0.00 U	0.765	64	30-127

**PCB**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 2 of 2

SDG Number: 2018-1290

Sample Type: Matrix Spike Duplicate

Client ID: CAWR-18-150421MSD

Matrix: W

Lab Sample ID 1203949426

Instrument: ECD8A.I

Analysis Date: 01/11/2018 10:21

Dilution: 1

Analyst: JXM

Prep Batch ID: 1730488

Inj. Vol: 1 uL

Batch ID: 1730491

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
12674-11-2	MSD Aroclor-1016	1.19	0.00	U	0.766	64	26-110	1	0-27
11096-82-5	MSD Aroclor-1260	1.19	0.00	U	0.781	66	30-127	2	0-29

## Method Blank Summary

Page 1 of 1

SDG Number:	2018-1290	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1730488	Instrument ID:	ECD8A.I_1	Data File:	011118.B\8a1118.D
Lab Sample ID:	1203949423		ECD8A.I_2		011118.B\8a1118.D
Column:	RTX-CLPEST1	Prep Date:	01/10/2018 18:26	Analyzed:	01/11/18 08:30
	RTX-CLPEST2				

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 1730488	1203949424	011118.B\8a1119.D	01/11/18	0843
02 CAWR-18-150421MS	1203949425	011118.B\8a1126.D	01/11/18	1009
03 CAWR-18-150421MSD	1203949426	011118.B\8a1127.D	01/11/18	1021
04 CAMO-18-150383	440209005	011118.B\8a1132.D	01/11/18	1123

# Quality Control Data

**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203949423  
**Client Sample:** QC for batch 1730488  
**Client ID:** MB for batch 1730488  
**Batch ID:** 1730491  
**Run Date:** 01/11/2018 08:30  
**Prep Date:** 01/10/2018 18:26  
**Data File:** 011118.B\8a1118.D  
 011118.B\8a1118.D

**Client:** ARSL004  
**Method:** SW846 3535A/8082  
**Inst:** ECD8A.I  
**Analyst:** JXM  
**Aliquot:** 1000 mL  
**Column:** 1 RTX-CLPEST1  
 2 RTX-CLPEST2

**Matrix:** WATER  
**Project:** QC  
**SOP Ref:** GL-OA-E-040  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016	U	0.0333	ug/L	0.0333	0.100	1
11104-28-2	Aroclor-1221	U	0.0333	ug/L	0.0333	0.100	1
11141-16-5	Aroclor-1232	U	0.0333	ug/L	0.0333	0.100	1
53469-21-9	Aroclor-1242	U	0.0333	ug/L	0.0333	0.100	1
12672-29-6	Aroclor-1248	U	0.0333	ug/L	0.0333	0.100	1
11097-69-1	Aroclor-1254	U	0.0333	ug/L	0.0333	0.100	1
11096-82-5	Aroclor-1260	U	0.0333	ug/L	0.0333	0.100	1
37324-23-5	Aroclor-1262	U	0.0333	ug/L	0.0333	0.100	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.140	0.200	ug/L 70	(33%-122%)
Decachlorobiphenyl	0.176	0.200	ug/L 88	(35%-138%)

**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203949424  
**Client Sample:** QC for batch 1730488  
**Client ID:** LCS for batch 1730488  
**Batch ID:** 1730491  
**Run Date:** 01/11/2018 08:43  
**Prep Date:** 01/10/2018 18:26  
**Data File:** 011118.B\8a1119.D  
 011118.B\8a1119.D

**Client:** ARSL004  
**Method:** SW846 3535A/8082  
**Inst:** ECD8A.I  
**Analyst:** JXM  
**Aliquot:** 1000 mL  
**Column:** 1 RTX-CLPEST1  
 2 RTX-CLPEST2

**Matrix:** WATER  
**Project:** QC  
**SOP Ref:** GL-OA-E-040  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016		0.787	ug/L	0.0333	0.100	1
11104-28-2	Aroclor-1221	U	0.0333	ug/L	0.0333	0.100	1
11141-16-5	Aroclor-1232	U	0.0333	ug/L	0.0333	0.100	1
53469-21-9	Aroclor-1242	U	0.0333	ug/L	0.0333	0.100	1
12672-29-6	Aroclor-1248	U	0.0333	ug/L	0.0333	0.100	1
11097-69-1	Aroclor-1254	U	0.0333	ug/L	0.0333	0.100	1
11096-82-5	Aroclor-1260		0.879	ug/L	0.0333	0.100	1
37324-23-5	Aroclor-1262	U	0.0333	ug/L	0.0333	0.100	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.145	0.200	ug/L 73	(33%-122%)
Decachlorobiphenyl	0.169	0.200	ug/L 84	(35%-138%)

**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

**SDG Number:** 2018-1290  
**Lab Sample ID:** 1203949425  
**Client Sample:** QC for batch 1730488  
**Client ID:** CAWR-18-150421MS  
**Batch ID:** 1730491  
**Run Date:** 01/11/2018 10:09  
**Prep Date:** 01/10/2018 18:26  
**Data File:** 011118.B\8a1126.D  
 011118.B\8a1126.D

**Date Collected:** 12/13/2017 10:45  
**Date Received:** 12/15/2017 09:05  
**Client:** ARSL004  
**Method:** SW846 3535A/8082  
**Inst:** ECD8A.I  
**Analyst:** JXM  
**Aliquot:** 420 mL  
**Column:** 1 RTX-CLPEST1  
 2 RTX-CLPEST2

**Matrix:** W  
**Project:** QC  
**SOP Ref:** GL-OA-E-040  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** .5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016		0.771	ug/L	0.0396	0.119	1
11104-28-2	Aroclor-1221	U	0.0396	ug/L	0.0396	0.119	1
11141-16-5	Aroclor-1232	U	0.0396	ug/L	0.0396	0.119	1
53469-21-9	Aroclor-1242	U	0.0396	ug/L	0.0396	0.119	1
12672-29-6	Aroclor-1248	U	0.0396	ug/L	0.0396	0.119	1
11097-69-1	Aroclor-1254	U	0.0396	ug/L	0.0396	0.119	1
11096-82-5	Aroclor-1260		0.765	ug/L	0.0396	0.119	1
37324-23-5	Aroclor-1262	U	0.0396	ug/L	0.0396	0.119	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.116	0.238	ug/L 49	(33%-122%)
Decachlorobiphenyl	0.136	0.238	ug/L 57	(35%-138%)



**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

<b>SDG Number:</b> 2018-1290	<b>Date Collected:</b> 12/13/2017 10:45	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203949426	<b>Date Received:</b> 12/15/2017 09:05	
<b>Client Sample:</b> QC for batch 1730488	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAWR-18-150421MSD	<b>Method:</b> SW846 3535A/8082	<b>SOP Ref:</b> GL-OA-E-040
<b>Batch ID:</b> 1730491	<b>Inst:</b> ECD8A.I	<b>Dilution:</b> 1
<b>Run Date:</b> 01/11/2018 10:21	<b>Analyst:</b> JXM	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 01/10/2018 18:26	<b>Aliquot:</b> 420 mL	<b>Final Volume:</b> .5 mL
<b>Data File:</b> 011118.B\8a1127.D	<b>Column:</b> 1 RTX-CLPEST1	
011118.B\8a1127.D	2 RTX-CLPEST2	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016		0.766	ug/L	0.0396	0.119	1
11104-28-2	Aroclor-1221	U	0.0396	ug/L	0.0396	0.119	1
11141-16-5	Aroclor-1232	U	0.0396	ug/L	0.0396	0.119	1
53469-21-9	Aroclor-1242	U	0.0396	ug/L	0.0396	0.119	1
12672-29-6	Aroclor-1248	U	0.0396	ug/L	0.0396	0.119	1
11097-69-1	Aroclor-1254	U	0.0396	ug/L	0.0396	0.119	1
11096-82-5	Aroclor-1260		0.781	ug/L	0.0396	0.119	1
37324-23-5	Aroclor-1262	U	0.0396	ug/L	0.0396	0.119	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.111	0.238	ug/L 46	(33%-122%)
Decachlorobiphenyl	0.126	0.238	ug/L 53	(35%-138%)

# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2018-1290**  
**Work Order #: 440209**

<b>Sample ID</b>	<b>Client ID</b>
440209001	CAMO-18-150344
440209002	CAMO-18-150352
440209003	CAMO-18-150363
440209004	CAMO-18-150364
440209006	CAMO-18-150383
440209008	CAMO-18-150345
440209009	CAMO-18-150353
440209010	CAMO-18-150347
440209011	CAMO-18-150355
1203940450	Method Blank (MB) <b>ICP</b>
1203940451	Laboratory Control Sample (LCS)
1203940454	440209001(CAMO-18-150344L) Serial Dilution (SD)
1203940452	440209001(CAMO-18-150344D) Sample Duplicate (DUP)
1203940453	440209001(CAMO-18-150344S) Matrix Spike (MS)
1203940460	Method Blank (MB) <b>ICP-MS</b>
1203940461	Laboratory Control Sample (LCS)
1203940464	440209001(CAMO-18-150344L) Serial Dilution (SD)
1203940462	440209001(CAMO-18-150344D) Sample Duplicate (DUP)
1203940463	440209001(CAMO-18-150344S) Matrix Spike (MS)
1203948028	Method Blank (MB) <b>CVAA</b>
1203948029	Laboratory Control Sample (LCS)
1203948034	440000001(CALA-18-148967L) Serial Dilution (SD)
1203948030	440000001(CALA-18-148967D) Sample Duplicate (DUP)
1203948032	440000001(CALA-18-148967S) Matrix Spike (MS)

**Sample Analysis**

Samples 440209001,002,003,004,006,008,009,010 and 011 in this SDG were analyzed for metals and mercury on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1726995, 1727000, 1729947 and 1731623
<b>Prep Batch :</b>	1726994, 1726999 and 1729945
<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 350X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

## **Calibration Information**

### **Instrument Calibration**

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

### **CRDL/PQL Requirements**

The CRDL/PQL standard recoveries met the referenced advisory control limits.

### **ICSA/ICSAB Statement**

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria. 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: 440209001 (CAMO-18-150344)-ICP and ICP-MS and 440000001 (CALA-18-148967)-CVAA.

**Matrix Spike (MS/MSD) Recovery Statement**

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

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

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. The relative percent differences (RPD) between the sample and its duplicate (DUP) were within acceptable limits for all applicable analytes.

**Serial Dilution % Difference Statement**

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

**Technical Information****Holding Time Specifications**

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

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Preparation Information**

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

**Miscellaneous Information****Electronic Packaging Comment**

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

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

**Additional Comments**

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

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

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

**Certification Statement**

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

## **GEL LABORATORIES LLC**

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: 2018-1290 GEL Work Order: 440209

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

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

#### **Review/Validation**

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

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

**Signature:**



**Name: Nik-Cole Elmore**

**Date: 12 JAN 2018**

**Title: Data Validator**



# **Sample Data Summary**

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 440209001**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150344**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	01/09/18 12:12	010918W1-4	1729947

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

SDG No: 2018-1290

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 440209001

BASIS: As Received

DATE COLLECTED 14-DEC-17

CLIENT ID: CAMO-18-150344

LEVEL: Low

DATE RECEIVED 16-DEC-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	01/12/18 11:34	011218-1	1726995
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	01/11/18 00:29	180110-3	1727000
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	01/10/18 20:15	180110-2	1727000
7440-39-3	Barium	23.5	ug/L		1	5	5	1	P	HSC	01/12/18 11:34	011218-1	1726995
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:34	011218-1	1726995
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	01/12/18 11:34	011218-1	1726995
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	01/10/18 20:15	180110-2	1727000
7440-70-2	Calcium	17600	ug/L		50	200	200	1	P	HSC	01/12/18 11:34	011218-1	1726995
7440-47-3	Chromium	134	ug/L		3	10	10	1	MS	BAJ	01/10/18 20:15	180110-2	1727000
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:34	011218-1	1726995
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	01/12/18 11:34	011218-1	1726995
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	01/12/18 11:34	011218-1	1726995
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	01/10/18 20:15	180110-2	1727000
7439-95-4	Magnesium	5130	ug/L		110	300	300	1	P	HSC	01/12/18 11:34	011218-1	1726995
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	01/12/18 11:34	011218-1	1726995
7439-98-7	Molybdenum	0.793	ug/L		0.2	0.5	0.5	1	MS	BAJ	01/10/18 20:15	180110-2	1727000
7440-02-0	Nickel	3.34	ug/L		0.6	2	2	1	MS	BAJ	01/10/18 20:15	180110-2	1727000
7440-09-7	Potassium	1290	ug/L		50	150	150	1	P	HSC	01/12/18 11:34	011218-1	1726995
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	01/10/18 20:15	180110-2	1727000
7631-86-9	Silica	67000	ug/L		53	213	213	1	P	HSC	01/12/18 11:34	011218-1	1726995
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	01/10/18 20:15	180110-2	1727000
7440-23-5	Sodium	11500	ug/L		100	300	300	1	P	HSC	01/12/18 11:34	011218-1	1726995
7440-24-6	Strontium	73.5	ug/L		1	5	5	1	P	HSC	01/12/18 11:34	011218-1	1726995
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	01/10/18 20:15	180110-2	1727000
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	01/12/18 11:34	011218-1	1726995
7440-61-1	Uranium	0.491	ug/L		0.067	0.2	0.2	1	MS	BAJ	01/10/18 20:15	180110-2	1727000
7440-62-2	Vanadium	4.63	ug/L	J	1	5	5	1	P	HSC	01/12/18 11:34	011218-1	1726995
7440-66-6	Zinc	8.01	ug/L	J	3.3	10	10	1	P	HSC	01/12/18 11:34	011218-1	1726995

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 440209001**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150344**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	65.2	mg/L		0.453	1.24	1.24	1		JJ2	01/12/18 16:07		1731623

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1726995	1726994	SW846 3005A	50	mL	50	mL	12/18/17	SXW1
1727000	1726999	SW846 3005A	50	mL	50	mL	12/18/17	SXW1
1729947	1729945	EPA 245.1/245.2 Prep	20	mL	20	mL	01/08/18	AXS5

**\*Analytical Methods:**

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

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 440209002**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150352**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	01/09/18 12:14	010918W1-4	1729947

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1729947	1729945	EPA 245.1/245.2 Prep	20	mL	20	mL	01/08/18	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 440209003**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150363**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	01/09/18 12:19	010918W1-4	1729947

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

SDG No: 2018-1290

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 440209003

BASIS: As Received

DATE COLLECTED 14-DEC-17

CLIENT ID: CAMO-18-150363

LEVEL: Low

DATE RECEIVED 16-DEC-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	01/12/18 11:22	011218-1	1726995
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	01/11/18 00:49	180110-3	1727000
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	01/10/18 20:42	180110-2	1727000
7440-39-3	Barium	23.7	ug/L		1	5	5	1	P	HSC	01/12/18 11:22	011218-1	1726995
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:22	011218-1	1726995
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	01/12/18 11:22	011218-1	1726995
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	01/10/18 20:42	180110-2	1727000
7440-70-2	Calcium	17700	ug/L		50	200	200	1	P	HSC	01/12/18 11:22	011218-1	1726995
7440-47-3	Chromium	136	ug/L		3	10	10	1	MS	BAJ	01/10/18 20:42	180110-2	1727000
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:22	011218-1	1726995
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	01/12/18 11:22	011218-1	1726995
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	01/12/18 11:22	011218-1	1726995
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	01/10/18 20:42	180110-2	1727000
7439-95-4	Magnesium	5100	ug/L		110	300	300	1	P	HSC	01/12/18 11:22	011218-1	1726995
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	01/12/18 11:22	011218-1	1726995
7439-98-7	Molybdenum	0.732	ug/L		0.2	0.5	0.5	1	MS	BAJ	01/10/18 20:42	180110-2	1727000
7440-02-0	Nickel	3.33	ug/L		0.6	2	2	1	MS	BAJ	01/10/18 20:42	180110-2	1727000
7440-09-7	Potassium	1220	ug/L		50	150	150	1	P	HSC	01/12/18 11:22	011218-1	1726995
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	01/10/18 20:42	180110-2	1727000
7631-86-9	Silica	67200	ug/L		53	213	213	1	P	HSC	01/12/18 11:22	011218-1	1726995
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	01/10/18 20:42	180110-2	1727000
7440-23-5	Sodium	11300	ug/L		100	300	300	1	P	HSC	01/12/18 11:22	011218-1	1726995
7440-24-6	Strontium	73.1	ug/L		1	5	5	1	P	HSC	01/12/18 11:22	011218-1	1726995
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	01/10/18 20:42	180110-2	1727000
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	01/12/18 11:22	011218-1	1726995
7440-61-1	Uranium	0.457	ug/L		0.067	0.2	0.2	1	MS	BAJ	01/10/18 20:42	180110-2	1727000
7440-62-2	Vanadium	4.55	ug/L	J	1	5	5	1	P	HSC	01/12/18 11:22	011218-1	1726995
7440-66-6	Zinc	7.52	ug/L	J	3.3	10	10	1	P	HSC	01/12/18 11:22	011218-1	1726995

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 440209003**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150363**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	65.1	mg/L		0.453	1.24	1.24	1		JJ2	01/12/18 16:07		1731623

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1726995	1726994	SW846 3005A	50	mL	50	mL	12/18/17	SXW1
1727000	1726999	SW846 3005A	50	mL	50	mL	12/18/17	SXW1
1729947	1729945	EPA 245.1/245.2 Prep	20	mL	20	mL	01/08/18	AXS5

**\*Analytical Methods:**

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



---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 440209004**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150364**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	01/09/18 12:21	010918W1-4	1729947

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1729947	1729945	EPA 245.1/245.2 Prep	20	mL	20	mL	01/08/18	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 440209006**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150383**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	01/09/18 12:22	010918W1-4	1729947

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

SDG No: 2018-1290

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 440209006

BASIS: As Received

DATE COLLECTED 14-DEC-17

CLIENT ID: CAMO-18-150383

LEVEL: Low

DATE RECEIVED 16-DEC-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	01/12/18 11:25	011218-1	1726995
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	01/11/18 00:51	180110-3	1727000
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	01/10/18 20:45	180110-2	1727000
7440-39-3	Barium	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:25	011218-1	1726995
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:25	011218-1	1726995
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	01/12/18 11:25	011218-1	1726995
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	01/10/18 20:45	180110-2	1727000
7440-70-2	Calcium	50	ug/L	U	50	200	200	1	P	HSC	01/12/18 11:25	011218-1	1726995
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	01/10/18 20:45	180110-2	1727000
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:25	011218-1	1726995
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	01/12/18 11:25	011218-1	1726995
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	01/12/18 11:25	011218-1	1726995
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	01/10/18 20:45	180110-2	1727000
7439-95-4	Magnesium	110	ug/L	U	110	300	300	1	P	HSC	01/12/18 11:25	011218-1	1726995
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	01/12/18 11:25	011218-1	1726995
7439-98-7	Molybdenum	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	01/10/18 20:45	180110-2	1727000
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	01/10/18 20:45	180110-2	1727000
7440-09-7	Potassium	50	ug/L	U	50	150	150	1	P	HSC	01/12/18 11:25	011218-1	1726995
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	01/10/18 20:45	180110-2	1727000
7631-86-9	Silica	53	ug/L	U	53	213	213	1	P	HSC	01/12/18 11:25	011218-1	1726995
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	01/10/18 20:45	180110-2	1727000
7440-23-5	Sodium	100	ug/L	U	100	300	300	1	P	HSC	01/12/18 11:25	011218-1	1726995
7440-24-6	Strontium	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:25	011218-1	1726995
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	01/10/18 20:45	180110-2	1727000
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	01/12/18 11:25	011218-1	1726995
7440-61-1	Uranium	0.067	ug/L	U	0.067	0.2	0.2	1	MS	BAJ	01/10/18 20:45	180110-2	1727000
7440-62-2	Vanadium	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:25	011218-1	1726995
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	01/12/18 11:25	011218-1	1726995

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 440209006**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150383**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	0.453	mg/L	U	0.453	1.24	1.24	1		JJ2	01/12/18 16:07		1731623

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1726995	1726994	SW846 3005A	50	mL	50	mL	12/18/17	SXW1
1727000	1726999	SW846 3005A	50	mL	50	mL	12/18/17	SXW1
1729947	1729945	EPA 245.1/245.2 Prep	20	mL	20	mL	01/08/18	AXS5

**\*Analytical Methods:**

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

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 440209008**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150345**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	01/09/18 12:24	010918W1-4	1729947

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

SDG No: 2018-1290

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 440209008

BASIS: As Received

DATE COLLECTED 14-DEC-17

CLIENT ID: CAMO-18-150345

LEVEL: Low

DATE RECEIVED 16-DEC-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	01/12/18 11:28	011218-1	1726995
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	01/11/18 00:54	180110-3	1727000
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	01/10/18 20:48	180110-2	1727000
7440-39-3	Barium	24.1	ug/L		1	5	5	1	P	HSC	01/12/18 11:28	011218-1	1726995
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:28	011218-1	1726995
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	01/12/18 11:28	011218-1	1726995
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	01/10/18 20:48	180110-2	1727000
7440-70-2	Calcium	11600	ug/L		50	200	200	1	P	HSC	01/12/18 11:28	011218-1	1726995
7440-47-3	Chromium	4.62	ug/L	J	3	10	10	1	MS	BAJ	01/10/18 20:48	180110-2	1727000
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:28	011218-1	1726995
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	01/12/18 11:28	011218-1	1726995
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	01/12/18 11:28	011218-1	1726995
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	01/10/18 20:48	180110-2	1727000
7439-95-4	Magnesium	3900	ug/L		110	300	300	1	P	HSC	01/12/18 11:28	011218-1	1726995
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	01/12/18 11:28	011218-1	1726995
7439-98-7	Molybdenum	1.01	ug/L		0.2	0.5	0.5	1	MS	BAJ	01/10/18 20:48	180110-2	1727000
7440-02-0	Nickel	0.843	ug/L	J	0.6	2	2	1	MS	BAJ	01/10/18 20:48	180110-2	1727000
7440-09-7	Potassium	1240	ug/L		50	150	150	1	P	HSC	01/12/18 11:28	011218-1	1726995
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	01/10/18 20:48	180110-2	1727000
7631-86-9	Silica	73600	ug/L		53	213	213	1	P	HSC	01/12/18 11:28	011218-1	1726995
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	01/10/18 20:48	180110-2	1727000
7440-23-5	Sodium	10100	ug/L		100	300	300	1	P	HSC	01/12/18 11:28	011218-1	1726995
7440-24-6	Strontium	49.7	ug/L		1	5	5	1	P	HSC	01/12/18 11:28	011218-1	1726995
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	01/10/18 20:48	180110-2	1727000
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	01/12/18 11:28	011218-1	1726995
7440-61-1	Uranium	0.494	ug/L		0.067	0.2	0.2	1	MS	BAJ	01/10/18 20:48	180110-2	1727000
7440-62-2	Vanadium	7.1	ug/L		1	5	5	1	P	HSC	01/12/18 11:28	011218-1	1726995
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	01/12/18 11:28	011218-1	1726995

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 440209008**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150345**LEVEL:** Low**DATE RECEIVED** 16-DEC-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	44.9	mg/L		0.453	1.24	1.24	1		JJ2	01/12/18 16:07		1731623

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1726995	1726994	SW846 3005A	50	mL	50	mL	12/18/17	SXW1
1727000	1726999	SW846 3005A	50	mL	50	mL	12/18/17	SXW1
1729947	1729945	EPA 245.1/245.2 Prep	20	mL	20	mL	01/08/18	AXS5

**\*Analytical Methods:**

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

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 440209009**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150353**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	01/09/18 12:26	010918W1-4	1729947

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1729947	1729945	EPA 245.1/245.2 Prep	20	mL	20	mL	01/08/18	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974



---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 440209010**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150347**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	01/09/18 12:27	010918W1-4	1729947

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

SDG No: 2018-1290

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 440209010

BASIS: As Received

DATE COLLECTED 14-DEC-17

CLIENT ID: CAMO-18-150347

LEVEL: Low

DATE RECEIVED 16-DEC-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	01/12/18 11:31	011218-1	1726995
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	01/11/18 00:56	180110-3	1727000
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	01/10/18 20:52	180110-2	1727000
7440-39-3	Barium	23.5	ug/L		1	5	5	1	P	HSC	01/12/18 11:31	011218-1	1726995
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:31	011218-1	1726995
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	01/12/18 11:31	011218-1	1726995
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	01/10/18 20:52	180110-2	1727000
7440-70-2	Calcium	12500	ug/L		50	200	200	1	P	HSC	01/12/18 11:31	011218-1	1726995
7440-47-3	Chromium	5.36	ug/L	J	3	10	10	1	MS	BAJ	01/10/18 20:52	180110-2	1727000
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	01/12/18 11:31	011218-1	1726995
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	01/12/18 11:31	011218-1	1726995
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	01/12/18 11:31	011218-1	1726995
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	01/10/18 20:52	180110-2	1727000
7439-95-4	Magnesium	3120	ug/L		110	300	300	1	P	HSC	01/12/18 11:31	011218-1	1726995
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	01/12/18 11:31	011218-1	1726995
7439-98-7	Molybdenum	1.16	ug/L		0.2	0.5	0.5	1	MS	BAJ	01/10/18 20:52	180110-2	1727000
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	01/10/18 20:52	180110-2	1727000
7440-09-7	Potassium	1340	ug/L		50	150	150	1	P	HSC	01/12/18 11:31	011218-1	1726995
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	01/10/18 20:52	180110-2	1727000
7631-86-9	Silica	68500	ug/L		53	213	213	1	P	HSC	01/12/18 11:31	011218-1	1726995
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	01/10/18 20:52	180110-2	1727000
7440-23-5	Sodium	9670	ug/L		100	300	300	1	P	HSC	01/12/18 11:31	011218-1	1726995
7440-24-6	Strontium	51.6	ug/L		1	5	5	1	P	HSC	01/12/18 11:31	011218-1	1726995
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	01/10/18 20:52	180110-2	1727000
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	01/12/18 11:31	011218-1	1726995
7440-61-1	Uranium	0.422	ug/L		0.067	0.2	0.2	1	MS	BAJ	01/10/18 20:52	180110-2	1727000
7440-62-2	Vanadium	5.63	ug/L		1	5	5	1	P	HSC	01/12/18 11:31	011218-1	1726995
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	01/12/18 11:31	011218-1	1726995

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 440209010**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150347**LEVEL:** Low**DATE RECEIVED** 16-DEC-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	44	mg/L		0.453	1.24	1.24	1		JJ2	01/12/18 16:07		1731623

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1726995	1726994	SW846 3005A	50	mL	50	mL	12/18/17	SXW1
1727000	1726999	SW846 3005A	50	mL	50	mL	12/18/17	SXW1
1729947	1729945	EPA 245.1/245.2 Prep	20	mL	20	mL	01/08/18	AXS5

**\*Analytical Methods:**

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

---

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

**SDG No:** 2018-1290**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 440209011**BASIS:** As Received**DATE COLLECTED** 14-DEC-17**CLIENT ID:** CAMO-18-150355**LEVEL:** Low**DATE RECEIVED** 16-DEC-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	01/09/18 12:29	010918W1-4	1729947

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1729947	1729945	EPA 245.1/245.2 Prep	20	mL	20	mL	01/08/18	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974

# **Quality Control Summary**

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

SDG NO. 2018-1290

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>
1203940450	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203940460	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203948028	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. 2018-1290 Client ID CAMO-18-150344S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 440209001 Spike ID: 1203940453

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	5110		68	U	5000	102		P
Barium	ug/L	75-125	528		23.5		500	101		P
Beryllium	ug/L	75-125	501		1	U	500	100		P
Boron	ug/L	75-125	517		15	U	500	101		P
Calcium	ug/L	75-125	22600		17600		5000	99.8		P
Cobalt	ug/L	75-125	501		1	U	500	100		P
Copper	ug/L	75-125	571		3	U	500	114		P
Iron	ug/L	75-125	5090		30	U	5000	102		P
Magnesium	ug/L	75-125	10300		5130		5000	104		P
Manganese	ug/L	75-125	560		2	U	500	112		P
Potassium	ug/L	75-125	6200		1290		5000	98		P
Silica	ug/L		79400		67000		10700	115	N/A	P
Sodium	ug/L	75-125	16200		11500		5000	94.5		P
Strontium	ug/L	75-125	577		73.5		500	101		P
Tin	ug/L	75-125	561		2.5	U	500	112		P
Vanadium	ug/L	75-125	565		4.63	J	500	112		P
Zinc	ug/L	75-125	553		8.01	J	500	109		P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2018-1290 Client ID CAMO-18-150344S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 440209001 Spike ID: 1203940463

<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	54.6		1	U	50	109		MS
Arsenic	ug/L	75-125	56.8		2	U	50	111		MS
Cadmium	ug/L	75-125	53.4		0.3	U	50	107		MS
Chromium	ug/L	75-125	193		134		50	118		MS
Lead	ug/L	75-125	51.7		0.5	U	50	103		MS
Molybdenum	ug/L	75-125	54.8		0.793		50	108		MS
Nickel	ug/L	75-125	54.9		3.34		50	103		MS
Selenium	ug/L	75-125	56.3		2	U	50	110		MS
Silver	ug/L	75-125	53		0.3	U	50	106		MS
Thallium	ug/L	75-125	49.8		0.6	U	50	99.5		MS
Uranium	ug/L	75-125	51.8		0.491		50	103		MS

## \*Analytical Methods:

MS SW846 3005A/6020A



## METALS

-5a-

## Matrix Spike Summary

**SDG NO.** 2018-1290 **Client ID:** CALA-18-148967S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 440000001 **Spike ID:** 1203948032

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	1.98		0.067	U	2	99		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

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

SDG No.: 2018-1290

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-18-150344D

Matrix: WATER

Level: Low

Sample ID: 440209001

Duplicate ID: 1203940452

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	23.5		24.2		3.07		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	17600		18100		2.34		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%	5130		5220		1.71		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1290		1260		2.74		P
Silica	ug/L	+/-20%	67000		68900		2.79		P
Sodium	ug/L	+/-20%	11500		11700		2.13		P
Strontium	ug/L	+/-20%	73.5		75.3		2.44		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	4.63 J		4.75 J		2.6		P
Zinc	ug/L	+/-10	8.01 J		6.97 J		13.9		P

\*Analytical Methods:

P SW846 3005A/6010C

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

SDG No.: 2018-1290

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-18-150344D

Matrix: WATER

Level: Low

Sample ID: 440209001

Duplicate ID: 1203940462

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		2 U		2 U				MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-20%	134		134		.146		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.793		0.751		5.44		MS
Nickel	ug/L	+/-2	3.34		3.24		3.07		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	0.491		0.462		6.09		MS

\*Analytical Methods:

MS SW846 3005A/6020A

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

**SDG No.:** 2018–1290**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CALA–18–148967D**Matrix:** WATER**Level:** Low**Sample ID:** 440000001**Duplicate ID:** 1203948030**Percent Solids for Dup:** N/A

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

\*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-1290

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>
1203940451								
	Barium	ug/L	500	512		102	80-120	P
	Beryllium	ug/L	500	503		101	80-120	P
	Boron	ug/L	500	512		102	80-120	P
	Calcium	ug/L	5000	5320		106	80-120	P
	Cobalt	ug/L	500	515		103	80-120	P
	Copper	ug/L	500	575		115	80-120	P
	Iron	ug/L	5000	5230		105	80-120	P
	Magnesium	ug/L	5000	5350		107	80-120	P
	Manganese	ug/L	500	574		115	80-120	P
	Potassium	ug/L	5000	4930		98.5	80-120	P
	Silica	ug/L	10700	11700		110	80-120	P
	Sodium	ug/L	5000	4930		98.6	80-120	P
	Strontium	ug/L	500	522		104	80-120	P
	Tin	ug/L	500	576		115	80-120	P
	Vanadium	ug/L	500	570		114	80-120	P
	Zinc	ug/L	500	557		111	80-120	P
	Aluminum	ug/L	5000	5250		105	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-1290

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>
1203940461								
	Antimony	ug/L	50	52.6		105	80-120	MS
	Arsenic	ug/L	50	56.1		112	80-120	MS
	Cadmium	ug/L	50	55.6		111	80-120	MS
	Chromium	ug/L	50	55.1		110	80-120	MS
	Lead	ug/L	50	53		106	80-120	MS
	Molybdenum	ug/L	50	54.8		110	80-120	MS
	Nickel	ug/L	50	53.1		106	80-120	MS
	Selenium	ug/L	50	55.4		111	80-120	MS
	Silver	ug/L	50	54.2		108	80-120	MS
	Thallium	ug/L	50	49.4		98.9	80-120	MS
	Uranium	ug/L	50	51.9		104	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-1290

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>
1203948029	Mercury	ug/L	2	2.03		101	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-9-

## Serial Dilution Sample Summary

SDG NO. 2018-1290

Client ID: CAMO-18-150344L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 440209001

Serial Dilution ID: 1203940454

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	23.5		24	J	2.19			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	17600		18200		2.955		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	5130		5260		2.447			P
Manganese	2	U	10	U				P
Potassium	1290		1260		2.484			P
Silica	67000		68300		1.855		10	P
Sodium	11500		11600		.509		10	P
Strontium	73.5		74.3		1.039		10	P
Tin	2.5	U	12.5	U				P
Vanadium	4.63	J	5.81	J	25.54			P
Zinc	8.01	J	16.5	U	77.715			P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 2018-1290 **Client ID:** CAMO-18-150344L

**Contract:** ESHL00114

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

**Sample ID:** 440209001 **Serial Dilution ID:** 1203940464

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	134		144		7.894			MS
Lead	.5	U	2.5	U				MS
Molybdenum	.793		1	U	2.144			MS
Nickel	3.34		3.23	J	3.385			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.491		.5	J	1.833			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 2018-1290 **Client ID:** CALA-18-148967L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 440000001 **Serial Dilution ID:** 1203948034

<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 #: 2018-1290  
Work Order #: 440209**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1727146

**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>
440209002	CAMO-18-150352
440209004	CAMO-18-150364
440209006	CAMO-18-150383
440209009	CAMO-18-150353
440209011	CAMO-18-150355
1203940822	Method Blank (MB)
1203940823	Laboratory Control Sample (LCS)
1203940824	440189004(CAWR-18-150421) Sample Duplicate (DUP)
1203940826	440189004(CAWR-18-150421) 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 440189004 (CAWR-18-150421) 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>	1726578	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1726577	<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>
440209002	CAMO-18-150352
440209004	CAMO-18-150364
440209006	CAMO-18-150383
440209009	CAMO-18-150353
440209011	CAMO-18-150355
1203939471	Method Blank (MB)
1203939472	Laboratory Control Sample (LCS)
1203939474	440000002(CALA-18-148968) Sample Duplicate (DUP)
1203939476	440000002(CALA-18-148968) 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 440000002 (CALA-18-148968) 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:** 1729986

**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>
440209001	CAMO-18-150344
440209003	CAMO-18-150363
440209006	CAMO-18-150383
440209008	CAMO-18-150345
440209010	CAMO-18-150347
1203948150	Method Blank (MB)
1203948151	Laboratory Control Sample (LCS)
1203948152	440189001(CAWR-18-149018) Sample Duplicate (DUP)
1203948153	440189001(CAWR-18-149018) Post Spike (PS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 25.

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

### **Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 440189001 (CAWR-18-149018) 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
Fluoride	1203948153 (CAWR-18-149018PS)	140* (75%-125%)

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The following samples 1203948152 (CAWR-18-149018DUP) and 1203948153 (CAWR-18-149018PS) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

**Sample Re-analysis**

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

**Miscellaneous Information****Manual Integrations**

Samples 1203948152 (CAWR-18-149018DUP), 1203948153 (CAWR-18-149018PS), 440209001

(CAMO-18-150344), 440209003 (CAMO-18-150363), 440209006 (CAMO-18-150383), 440209008 (CAMO-18-150345) and 440209010 (CAMO-18-150347) were manually integrated to correctly position the baseline as set in the calibration standards.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

**Product:** Ammonia Nitrogen  
**Analytical Batch:** 1727026 **Method:** NH3  
**Prep Batch :** 1727025 **Method:** 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>
440209001	CAMO-18-150344
440209003	CAMO-18-150363
440209006	CAMO-18-150383
440209008	CAMO-18-150345
440209010	CAMO-18-150347
1203940538	Method Blank (MB)
1203940539	Laboratory Control Sample (LCS)
1203940540	440000001(CALA-18-148967) Sample Duplicate (DUP)
1203940541	440000001(CALA-18-148967) Matrix Spike (MS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-106 REV# 10.

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 440000001 (CALA-18-148967) 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 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
Nitrogen, Ammonia	1203940540 (CALA-18-148967DUP)	abs(.103 - .0413)* (+/- .05 mg/L)

**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>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1726143	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1726142	<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>
440209002	CAMO-18-150352
440209004	CAMO-18-150364
440209006	CAMO-18-150383
440209009	CAMO-18-150353
440209011	CAMO-18-150355
1203938297	Method Blank (MB)
1203938298	Laboratory Control Sample (LCS)
1203938299	439936004(CAWA-18-148943) Sample Duplicate (DUP)
1203938300	439936001(CAWA-18-148918) Sample Duplicate (DUP)
1203938301	439936004(CAWA-18-148943) Matrix Spike (MS)
1203938302	439936001(CAWA-18-148918) 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**

Samples 439936001 (CAWA-18-148918) and 439936004 (CAWA-18-148943) were selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203938301 (CAWA-18-148943MS)	114* (90%-110%)
	1203938302 (CAWA-18-148918MS)	129* (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**

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:** Nitrate Nitrite by Cadmium Reduction

**Analytical Batch:** 1727041

**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>
440209001	CAMO-18-150344
440209003	CAMO-18-150363
440209006	CAMO-18-150383
440209008	CAMO-18-150345
440209010	CAMO-18-150347
1203940580	Method Blank (MB)
1203940581	Laboratory Control Sample (LCS)
1203940582	440187001(CTU6B-18-147900) Sample Duplicate (DUP)
1203940583	440187001(CTU6B-18-147900) 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 440187001 (CTU6B-18-147900) 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 following samples 1203940582 (CTU6B-18-147900DUP), 1203940583 (CTU6B-18-147900PS), 440209001 (CAMO-18-150344) and 440209003 (CAMO-18-150363) 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	440209	
	001	003
Nitrogen, Nitrate/Nitrite	5X	5X

**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>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1727032	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1727029	<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>
440209001	CAMO-18-150344
440209003	CAMO-18-150363
440209006	CAMO-18-150383
440209008	CAMO-18-150345
440209010	CAMO-18-150347
1203940548	Method Blank (MB)
1203940549	Laboratory Control Sample (LCS)
1203940550	440000001(CALA-18-148967) Sample Duplicate (DUP)
1203940552	440000001(CALA-18-148967) 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 440000001 (CALA-18-148967) 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**

Sample1203940548 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

**Miscellaneous Information**

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an



effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

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

### **Method/Analysis Information**

**Product:** Solids and Total Dissolved

**Analytical Batch:** 1727218

**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>
440209001	CAMO-18-150344
440209003	CAMO-18-150363
440209006	CAMO-18-150383
440209008	CAMO-18-150345
440209010	CAMO-18-150347
1203940987	Method Blank (MB)
1203940988	Laboratory Control Sample (LCS)
1203940990	440189001(CAWR-18-149018) 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 440189001 (CAWR-18-149018) 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:** Specific Conductivity

**Analytical Batch:** 1727071

**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>
440209001	CAMO-18-150344
440209003	CAMO-18-150363
440209006	CAMO-18-150383
440209008	CAMO-18-150345
440209010	CAMO-18-150347
1203940620	Laboratory Control Sample (LCS)
1203940621	439940001(CALA-18-150103) Sample Duplicate (DUP)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

#### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

#### **Initial Standardization**

The titrant was properly standardized

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

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 439940001 (CALA-18-150103) 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:** 1727518 **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>
440209001	CAMO-18-150344
440209003	CAMO-18-150363
440209006	CAMO-18-150383
440209008	CAMO-18-150345
440209010	CAMO-18-150347
1203941751	Laboratory Control Sample (LCS)
1203941752	439936006(CAWA-18-150366) Sample Duplicate (DUP)
1203941753	439936009(CAWA-18-150418) 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# 23.

### **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 439936006 (CAWA-18-150366) and 439936009 (CAWA-18-150418) 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
1203941752 (CAWA-18-150366DUP)	pH	Received 13-DEC-17, out of holding 11-DEC-17
1203941753 (CAWA-18-150418DUP)	pH	Received 13-DEC-17, out of holding 11-DEC-17
440209001 (CAMO-18-150344)	pH	Received 16-DEC-17, out of holding 14-DEC-17
440209003 (CAMO-18-150363)	pH	Received 16-DEC-17, out of holding 14-DEC-17
440209006 (CAMO-18-150383)	pH	Received 16-DEC-17, out of holding 14-DEC-17
440209008 (CAMO-18-150345)	pH	Received 16-DEC-17, out of holding 14-DEC-17
440209010 (CAMO-18-150347)	pH	Received 16-DEC-17, out of holding 14-DEC-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:** 1727515      **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>
440209001	CAMO-18-150344
440209003	CAMO-18-150363
440209006	CAMO-18-150383
440209008	CAMO-18-150345
440209010	CAMO-18-150347
1203941744	Laboratory Control Sample (LCS)
1203941745	439936006(CAWA-18-150366) Sample Duplicate (DUP)
1203941746	439936009(CAWA-18-150418) Sample Duplicate (DUP)
1203941748	439936006(CAWA-18-150366) Matrix Spike (MS)
1203941749	439936009(CAWA-18-150418) 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**

Samples 439936006 (CAWA-18-150366) and 439936009 (CAWA-18-150418) were selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2018-1290 GEL Work Order: 440209


#### 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: 11 JAN 2018

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: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150344  
Sample ID: 440209001  
Matrix: W  
Collect Date: 14-DEC-17 13:40  
Receive Date: 16-DEC-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	0.0745	0.067	0.200	mg/L		1	JXH5	01/09/18	1320	1729986	1
Chloride		9.80	0.067	0.200	mg/L		1					
Fluoride		0.243	0.033	0.100	mg/L		1					
Sulfate		14.0	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0326	0.017	0.050	mg/L	1.00	1	KLP1	12/18/17	1425	1727026	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		2.10	0.085	0.250	mg/L		5	AXH3	12/18/17	0845	1727041	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0397	0.020	0.050	mg/L	1.00	1	KLP1	12/20/17	1305	1727032	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		153	3.40	14.3	mg/L			KLP1	12/20/17	1049	1727218	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		57.8	1.45	4.00	mg/L			RXB5	12/23/17	1122	1727515	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		211	1.00	1.00	umhos/cm		1	HXC1	12/19/17	1315	1727071	7
PH "As Received"												
pH at Temp 12.8C	H	7.90	0.010	0.100	SU		1	RXB5	12/23/17	1120	1727518	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	12/18/17	0820	1727025
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	12/20/17	0930	1727029

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150344  
Sample ID: 440209001

Project: ESHL00114  
Client ID: ARSL004

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

### Notes:

#### Column headers are defined as follows:

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

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150352  
Sample ID: 440209002  
Matrix: W  
Collect Date: 14-DEC-17 13:40  
Receive Date: 16-DEC-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	U	ND	0.330	1.00	mg/L		1	TSM	12/19/17	0256	1727146	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	12/19/17	0656	1726578	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	12/20/17	1621	1726143	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	12/18/17	1217	1726577
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	12/20/17	0930	1726142

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

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150363  
Sample ID: 440209003  
Matrix: W  
Collect Date: 14-DEC-17 13:40  
Receive Date: 16-DEC-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	0.0856	0.067	0.200	mg/L		1	JXH5	01/09/18	1349	1729986	1
Chloride		9.80	0.067	0.200	mg/L		1					
Fluoride		0.222	0.033	0.100	mg/L		1					
Sulfate		14.0	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0221	0.017	0.050	mg/L	1.00	1	KLP1	12/18/17	1426	1727026	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		2.05	0.085	0.250	mg/L		5	AXH3	12/18/17	0846	1727041	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0368	0.020	0.050	mg/L	1.00	1	KLP1	12/20/17	1306	1727032	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		181	3.40	14.3	mg/L			KLP1	12/20/17	1049	1727218	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		58.2	1.45	4.00	mg/L			RXB5	12/23/17	1124	1727515	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		206	1.00	1.00	umhos/cm		1	HXC1	12/19/17	1315	1727071	7
PH "As Received"												
pH at Temp 12.2C	H	7.92	0.010	0.100	SU		1	RXB5	12/23/17	1122	1727518	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	12/18/17	0820	1727025
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	12/20/17	0930	1727029



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150363  
Sample ID: 440209003

Project: ESHL00114  
Client ID: ARSL004

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

### Notes:

#### Column headers are defined as follows:

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

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150364  
Sample ID: 440209004  
Matrix: W  
Collect Date: 14-DEC-17 13:40  
Receive Date: 16-DEC-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	U	ND	0.330	1.00	mg/L		1	TSM	12/19/17	0335	1727146	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	12/19/17	0658	1726578	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	12/20/17	1622	1726143	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	12/18/17	1217	1726577
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	12/20/17	0930	1726142

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

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150383  
Sample ID: 440209006  
Matrix: W  
Collect Date: 14-DEC-17 07:50  
Receive Date: 16-DEC-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Carbon Analysis</b>												
<b>SW 9060 Total Organic Carbon "As Received"</b>												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	12/19/17	0414	1727146	1
<b>Flow Injection Analysis</b>												
<b>WSP-CN(T) "As Received"</b>												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	12/19/17	0659	1726578	2
<b>Ion Chromatography</b>												
<b>WSP-ANIONS "As Received"</b>												
Bromide	U	ND	0.067	0.200	mg/L		1	JXH5	01/09/18	1418	1729986	3
Chloride	J	0.117	0.067	0.200	mg/L		1					
Fluoride	U	ND	0.033	0.100	mg/L		1					
Sulfate	U	ND	0.133	0.400	mg/L		1					
<b>Nutrient Analysis</b>												
<b>NH3 "As Received"</b>												
Nitrogen, Ammonia	J	0.0193	0.017	0.050	mg/L	1.00	1	KLP1	12/18/17	1431	1727026	4
<b>NO3NO2 "As Received"</b>												
Nitrogen, Nitrate/Nitrite	J	0.0238	0.017	0.050	mg/L		1	AXH3	12/18/17	0847	1727041	5
<b>PO4 "As Received"</b>												
Phosphorus, Total as P	U	ND	0.020	0.050	mg/L	1.00	1	KLP1	12/20/17	1307	1727032	6
<b>TKN "As Received"</b>												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	12/20/17	1622	1726143	7
<b>Solids Analysis</b>												
<b>TDS "As Received"</b>												
Total Dissolved Solids	J	4.29	3.40	14.3	mg/L			KLP1	12/20/17	1049	1727218	8
<b>Titration and Ion Analysis</b>												
<b>EPA 310.1 Total Alkalinity "As Received"</b>												
Alkalinity, Total as CaCO3	U	ND	1.45	4.00	mg/L			RXB5	12/23/17	1126	1727515	9
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
<b>EPA120.1 Specific Conductivity "As Received"</b>												
Conductivity		3.54	1.00	1.00	umhos/cm		1	HXC1	12/19/17	1315	1727071	10
<b>PH "As Received"</b>												
pH at Temp 12.7C	H	5.95	0.010	0.100	SU		1	RXB5	12/23/17	1124	1727518	11

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
--------	-------------	---------	------	------	------------

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150383  
Sample ID: 440209006

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
EPA 335.4	EPA 335.4 Total Cyanide			AXH3	12/18/17		1217		1726577		
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep			AXH3	12/18/17		0820		1727025		
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep			AXH3	12/20/17		0930		1726142		
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR			AXH3	12/20/17		0930		1727029		

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:300.0	
4	EPA:350.1	
5	EPA:353.2	
6	EPA 365.4 1974	
7	EPA:351.2	
8	EPA:160.1	
9	EPA:310.1	
10	EPA:120.1	
11	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

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150345  
Sample ID: 440209008  
Matrix: W  
Collect Date: 14-DEC-17 12:12  
Receive Date: 16-DEC-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	JXH5	01/09/18	1447	1729986	1
Chloride		2.08	0.067	0.200	mg/L		1					
Fluoride		0.295	0.033	0.100	mg/L		1					
Sulfate		2.73	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0387	0.017	0.050	mg/L	1.00	1	KLP1	12/18/17	1432	1727026	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.505	0.017	0.050	mg/L		1	AXH3	12/18/17	0849	1727041	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0411	0.020	0.050	mg/L	1.00	1	KLP1	12/20/17	1312	1727032	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		139	3.40	14.3	mg/L			KLP1	12/20/17	1049	1727218	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		64.4	1.45	4.00	mg/L			RXB5	12/23/17	1128	1727515	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		145	1.00	1.00	umhos/cm		1	HXC1	12/19/17	1315	1727071	7
PH "As Received"												
pH at Temp 12.6C	H	8.05	0.010	0.100	SU		1	RXB5	12/23/17	1127	1727518	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	12/18/17	0820	1727025
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	12/20/17	0930	1727029

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150345  
Sample ID: 440209008

Project: ESHL00114  
Client ID: ARSL004

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

### Notes:

#### Column headers are defined as follows:

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

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150353  
Sample ID: 440209009  
Matrix: W  
Collect Date: 14-DEC-17 12:12  
Receive Date: 16-DEC-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	U	ND	0.330	1.00	mg/L		1	TSM	12/19/17	0512	1727146	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	12/19/17	0700	1726578	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	12/20/17	1623	1726143	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	12/18/17	1217	1726577
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	12/20/17	0930	1726142

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

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150347  
Sample ID: 440209010  
Matrix: W  
Collect Date: 14-DEC-17 10:51  
Receive Date: 16-DEC-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	JXH5	01/09/18	1614	1729986	1
Chloride		2.19	0.067	0.200	mg/L		1					
Fluoride		0.174	0.033	0.100	mg/L		1					
Sulfate		3.02	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0356	0.017	0.050	mg/L	1.00	1	KLP1	12/18/17	1433	1727026	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.712	0.017	0.050	mg/L		1	AXH3	12/18/17	0850	1727041	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0391	0.020	0.050	mg/L	1.00	1	KLP1	12/20/17	1313	1727032	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		153	3.40	14.3	mg/L			KLP1	12/20/17	1049	1727218	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		63.8	1.45	4.00	mg/L			RXB5	12/23/17	1130	1727515	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		143	1.00	1.00	umhos/cm		1	HXC1	12/19/17	1315	1727071	7
PH "As Received"												
pH at Temp 12.7C	H	7.98	0.010	0.100	SU		1	RXB5	12/23/17	1129	1727518	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	12/18/17	0820	1727025
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	12/20/17	0930	1727029



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150347  
Sample ID: 440209010

Project: ESHL00114  
Client ID: ARSL004

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

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 11, 2018

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: 2018-1290

Client Sample ID: CAMO-18-150355  
Sample ID: 440209011  
Matrix: W  
Collect Date: 14-DEC-17 10:51  
Receive Date: 16-DEC-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	U	ND	0.330	1.00	mg/L		1	TSM	12/19/17	0551	1727146	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	12/19/17	0701	1726578	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	J	0.0993	0.033	0.100	mg/L	1.00	1	KLP1	12/20/17	1624	1726143	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	12/18/17	1217	1726577
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	12/20/17	0930	1726142

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: January 11, 2018

Page 1 of 6

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

Contact: Ms. Nita Patel

Workorder: 440209

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1727146										
QC1203940824	440189004	DUP									
Total Organic Carbon Average		J	0.483	J	0.330	mg/L	37.6	^	(+/-1.00)	TSM	12/18/17 19:58
QC1203940823	LCS										
Total Organic Carbon Average	10.0				10.5	mg/L			105	(80%-120%)	12/18/17 18:45
QC1203940822	MB										
Total Organic Carbon Average			U		ND	mg/L					12/18/17 18:35
QC1203940826	440189004	PS									
Total Organic Carbon Average	10.0	J	0.483		12.1	mg/L			116	(75%-125%)	12/18/17 20:38
<b>Flow Injection Analysis</b>											
Batch	1726578										
QC1203939474	440000002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A			AXH3	12/19/17 06:30
QC1203939472	LCS										
Cyanide, Total	50.0				50.3	ug/L			101	(90%-110%)	12/19/17 06:27
QC1203939471	MB										
Cyanide, Total			U		ND	ug/L					12/19/17 06:26
QC1203939476	440000002	MS									
Cyanide, Total	100	U	ND		109	ug/L			109	(90%-110%)	12/19/17 06:31
<b>Ion Chromatography</b>											
Batch	1729986										
QC1203948152	440189001	DUP									
Bromide		J	0.0995	J	0.0969	mg/L	2.65	^	(+/-0.200)	JXH5	01/09/18 11:54

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 440209

Page 2 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1729986										
Chloride		12.0		12.0	mg/L	0.0549		(0%-20%)	JXH5	01/10/18	21:34
Fluoride		0.505		0.490	mg/L	3.16	^	(+/-0.100)		01/09/18	11:54
Sulfate		20.3		20.2	mg/L	0.744		(0%-20%)		01/10/18	21:34
QC1203948151 LCS											
Bromide	1.25			1.23	mg/L		98	(80%-120%)		01/09/18	10:56
Chloride	5.00			4.72	mg/L		94.4	(80%-120%)			
Fluoride	2.50			2.45	mg/L		97.8	(80%-120%)			
Sulfate	10.0			10.7	mg/L		107	(80%-120%)			
QC1203948150 MB											
Bromide			U	ND	mg/L					01/09/18	10:27
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			J	0.146	mg/L						
QC1203948153 440189001 PS											
Bromide	1.25	J	0.0995	1.66	mg/L		125	(75%-125%)		01/09/18	12:23
Chloride	5.00		6.01	11.5	mg/L		109	(75%-125%)		01/10/18	22:02
Fluoride	2.50		0.505	4.00	mg/L		140*	(75%-125%)		01/09/18	12:23
Sulfate	10.0		10.2	20.8	mg/L		106	(75%-125%)		01/10/18	22:02

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 440209

Page 3 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1726143										
QC1203938299	439936004	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	12/20/17	15:42
QC1203938300	439936001	DUP									
Nitrogen, Total Kjeldahl		J	0.0535	U	ND	mg/L	200 ^			12/20/17	15:39
QC1203938298	LCS										
Nitrogen, Total Kjeldahl	1.00				1.10	mg/L		110 (90%-110%)		12/20/17	15:38
QC1203938297	MB										
Nitrogen, Total Kjeldahl			U		ND	mg/L				12/20/17	15:37
QC1203938301	439936004	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND		1.14	mg/L		114* (90%-110%)		12/20/17	15:43
QC1203938302	439936001	MS									
Nitrogen, Total Kjeldahl	1.00	J	0.0535		1.34	mg/L		129* (90%-110%)		12/20/17	15:40
Batch	1727026										
QC1203940540	440000001	DUP									
Nitrogen, Ammonia		J	0.0413		0.103	mg/L	85.5* ^	(+/-0.050)	KLP1	12/18/17	14:21
QC1203940539	LCS										
Nitrogen, Ammonia	1.00				1.02	mg/L		102 (90%-110%)		12/18/17	14:20
QC1203940538	MB										
Nitrogen, Ammonia			U		ND	mg/L				12/18/17	14:19
QC1203940541	440000001	MS									
Nitrogen, Ammonia	1.00	J	0.0413		1.06	mg/L		102 (90%-110%)		12/18/17	14:22
Batch	1727032										
QC1203940550	440000001	DUP									
Phosphorus, Total as P			0.109		0.104	mg/L	4.69 ^	(+/-0.050)	KLP1	12/20/17	12:49

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 440209

Page 4 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1727032										
QC1203940549	LCS										
Phosphorus, Total as P	1.00			1.01	mg/L		101	(80%-124%)	KLP1	12/20/17	12:48
QC1203940548	MB										
Phosphorus, Total as P			U	ND	mg/L					12/20/17	13:00
QC1203940552	440000001	MS									
Phosphorus, Total as P	1.00	0.109		1.10	mg/L		99.1	(63%-139%)		12/20/17	12:50
<hr/>											
Batch	1727041										
QC1203940582	440187001	DUP									
Nitrogen, Nitrate/Nitrite		3.89		3.88	mg/L	0.257		(0%-20%)	AXH3	12/18/17	08:36
QC1203940581	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.07	mg/L		107	(90%-110%)		12/18/17	08:33
QC1203940580	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					12/18/17	08:32
QC1203940583	440187001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.389		1.44	mg/L		105	(90%-110%)		12/18/17	08:41
<hr/>											
<b>Solids Analysis</b>											
Batch	1727218										
QC1203940990	440189001	DUP									
Total Dissolved Solids		236		247	mg/L	4.73		(0%-5%)	KLP1	12/20/17	10:49
QC1203940988	LCS										
Total Dissolved Solids	300			299	mg/L		99.5	(95%-105%)		12/20/17	10:49
QC1203940987	MB										
Total Dissolved Solids			J	7.14	mg/L					12/20/17	10:49

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 440209

Page 5 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1727071										
QC1203940621	439940001	DUP									
Conductivity		277		278	umhos/cm	0.36		(0%-10%)	HXC1	12/19/17	13:14
QC1203940620	LCS										
Conductivity	1410			1410	umhos/cm		99.5	(95%-105%)		12/19/17	13:14
Batch	1727515										
QC1203941745	439936006	DUP									
Alkalinity, Total as CaCO3		54.4		52.1	mg/L	4.16		(0%-20%)	RXB5	12/23/17	10:35
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203941746	439936009	DUP									
Alkalinity, Total as CaCO3		56.4		52.3	mg/L	7.41		(0%-20%)		12/23/17	10:43
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203941744	LCS										
Alkalinity, Total as CaCO3	100			108	mg/L		108	(90%-110%)		12/23/17	10:27
QC1203941748	439936006	MS									
Alkalinity, Total as CaCO3	100	54.4		159	mg/L		105	(80%-120%)		12/23/17	10:36
QC1203941749	439936009	MS									
Alkalinity, Total as CaCO3	100	56.4		159	mg/L		102	(80%-120%)		12/23/17	10:44
Batch	1727518										
QC1203941752	439936006	DUP									
pH	H	7.65	H	7.66	SU	0.131		(0%-5%)	RXB5	12/23/17	10:34
QC1203941753	439936009	DUP									
pH	H	7.68	H	7.71	SU	0.39		(0%-5%)		12/23/17	10:41



# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 440209

Page 6 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1727518										
QC1203941751	LCS										
pH	7.00			6.99	SU		99.9	(99%-101%)	RXB5	12/23/17	10:25

### Notes:

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

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

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

\* Indicates that a Quality Control parameter was not within specifications.

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

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

# **Radiological Analysis**

# Case Narrative

**Radiochemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1290  
Work Order #: 440209**

**Method/Analysis Information**

**Product:** Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1727284

<b>Sample ID</b>	<b>Client ID</b>
440209006	CAMO-18-150383
1203941155	Method Blank (MB)
1203941157	Laboratory Control Sample (LCS)
1203941156	440209006(CAMO-18-150383) 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 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 1203941155 (MB) and 1203941157 (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: 440209006 (CAMO-18-150383). The QC was from ARSL work order 440209.

**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: 1727285

Sample ID	Client ID
440209006	CAMO-18-150383
1203941158	Method Blank (MB)
1203941160	Laboratory Control Sample (LCS)
1203941159	440209006(CAMO-18-150383) 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 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 1203941158 (MB) and 1203941160 (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
1203941158 (MB)	Plutonium-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
1203941158 (MB)	Plutonium-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: 440209006 (CAMO-18-150383). The QC was from ARSL work order 440209.

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

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

#### **RDL Met**

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

Sample	Analyte	Value
1203941159 (CAMO-18-150383DUP)	Plutonium-239/240	Result 0.00527 < MDA 0.0572 > RDL 0.05 pCi/L

#### **Technical Information:**

##### **Holding Time**

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

##### **Negative > 3 sigma TPU**

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:** 1727286

<b>Sample ID</b>	<b>Client ID</b>
440209006	CAMO-18-150383
1203941161	Method Blank (MB)
1203941163	Laboratory Control Sample (LCS)
1203941162	440209006(CAMO-18-150383) 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 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 1203941161 (MB) and 1203941163 (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
1203941161 (MB)	Uranium-233/234 and Uranium-235/236	Blank result > 1.65 CSU

#### **Blank Decision Level**

The blank result is less than the decision level.

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

All yields met the required acceptance limits.

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

The LCS spike recoveries met the acceptance limits.

#### **Designated QC**

The following sample was used for QC: 440209006 (CAMO-18-150383). The QC was from ARSL work order 440209.

#### **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:**                      **Gammasec**

Analytical Method:            EPA:901.1

Analytical Batch Number:    1727008

<b>Sample ID</b>	<b>Client ID</b>
440209006	CAMO-18-150383
1203940479	Method Blank (MB)
1203940481	Laboratory Control Sample (LCS)
1203940480	440189004(CAWR-18-150421) 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 and July 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: 440189004 (CAWR-18-150421). The QC was from ARSL work order

440189.

**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.

**Additional Identified Radionuclides**

No additional radionuclides were added.

**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**

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to no valid peak.	Potassium-40	440209006	CAMO-18-150383

**Method/Analysis Information**

<b>Product:</b>	<b>WSP-GrossA/B</b>
Analytical Method:	EPA 900.0/SW846 9310
Analytical Batch Number:	1727116

<b>Sample ID</b>	<b>Client ID</b>
440209006	CAMO-18-150383

1203940721	Method Blank (MB)
1203940725	Laboratory Control Sample (LCS)
1203940722	440189004(CAWR-18-150421) Sample Duplicate (DUP)
1203940723	440189004(CAWR-18-150421) Matrix Spike (MS)
1203940724	440189004(CAWR-18-150421) 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 1203940721 (MB) and 1203940725 (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: 440189004 (CAWR-18-150421). The QC was from ARSL work order 440189.

##### **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, 1203940723 (CAWR-18-150421MS) and 1203940724 (CAWR-18-150421MSD), 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: 1727972

Sample ID	Client ID
440209006	CAMO-18-150383
1203942900	Method Blank (MB)

1203942903	Laboratory Control Sample (LCS)
1203942901	440189004(CAWR-18-150421) Sample Duplicate (DUP)
1203942902	440189004(CAWR-18-150421) 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 1203942900 (MB) and 1203942903 (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: 440189004 (CAWR-18-150421). The QC was from ARSL work order 440189.

##### **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, 1203942902 (CAWR-18-150421MS), 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

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: 2018-1290 GEL Work Order: 440209

#### 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.
- UI Gamma Spectroscopy--Uncertain identification

#### Review/Validation

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

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

Signature:



Name: Heather McCarty

Date: 06 JAN 2018

Title: Analyst II



# Sample Data Summary

# GEL LABORATORIES LLC

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

## Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: January 6, 2018

Client Sample ID: CAMO-18-150383  
Sample ID: 440209006  
Matrix: W  
Collect Date: 14-DEC-17  
Receive Date: 16-DEC-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
-----------	-----------	--------	-------------	-----	----	-----	----	-------	----	----	---------	------	------	-------	------

### Rad Alpha Spec Analysis

*Alphaspec Am241 Liquid "As Received"*

Americium-241	U	0.00217	+/-0.00574	0.0354	0.0148	+/-0.00574	0.050	pCi/L			HAKB	12/21/17	1448	1727284	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	-0.00228	+/-0.00509	0.0459	0.0199	+/-0.00509	0.050	pCi/L			HAKB	12/21/17	1448	1727285	2
Plutonium-239/240	U	0.00683	+/-0.00821	0.0494	0.0216	+/-0.00821	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234	U	0.0799	+/-0.015	0.118	0.0557	+/-0.0154	1.00	pCi/L			HAKB	12/21/17	1448	1727286	3
Uranium-235/236	U	0.0282	+/-0.0113	0.0552	0.0238	+/-0.0114	1.00	pCi/L							
Uranium-238	U	0.0297	+/-0.00995	0.0583	0.026	+/-0.010	0.500	pCi/L							

### Rad Gamma Spec Analysis

*Gammasespec "As Received"*

Cesium-137	U	2.56	+/-2.15	3.13	1.39	+/-2.15	8.00	pCi/L			BSW1	12/18/17	0737	1727008	4
Cobalt-60	U	0.194	+/-0.813	3.27	1.38	+/-0.815	8.00	pCi/L							
Neptunium-237	U	-0.256	+/-1.68	6.15	2.85	+/-1.68		pCi/L							
Potassium-40	UI	25.1	+/-13.3	25.0	9.92	+/-13.4		pCi/L							
Sodium-22	U	0.0257	+/-0.840	3.29	1.40	+/-0.840		pCi/L							

### Rad Gas Flow Proportional Counting

*GFPC, Sr90, liquid "As Received"*

Strontium-90	U	-0.0817	+/-0.0855	0.359	0.154	+/-0.0855	0.500	pCi/L			KSD1	12/28/17	1234	1727972	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	0.204	+/-0.357	1.20	0.582	+/-0.358	3.00	pCi/L			AXH4	12/27/17	1453	1727116	6
Alpha	U	-0.479	+/-0.573	2.61	1.04	+/-0.573	3.00	pCi/L			AXH4	12/28/17	1621	1727116	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"	1727284	74.6	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1727285	73.5	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1727286	79.4	(50%-105%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-150383

Sample ID: 440209006

Project: ESHL00114

Client ID: ARSL004

Report Date: January 6, 2018

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"							1727972	103	(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

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

## QC Summary

Report Date: January 6, 2018

Page 1 of 6

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

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 440209

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1727284										
QC1203941156	440209006	DUP									
Americium-241	U	0.00217	U	0.00477	pCi/L	0.0692		(0-1)	HAKB	12/21/17	14:48
	Uncert:	+/-0.00574		+/-0.0131							
	TPU:	+/-0.00574		+/-0.0131							
**Americium-243 Tracer	2.62	1.96		1.78	pCi/L		68	(50%-105%)			
	Uncert:	+/-0.0751		+/-0.0794							
	TPU:	+/-0.138		+/-0.143							
QC1203941157	LCS										
Americium-241	1.97			1.71	pCi/L		87	(80%-120%)	HAKB	12/21/17	14:48
	Uncert:			+/-0.0616							
	TPU:			+/-0.101							
**Americium-243 Tracer	2.10			1.52	pCi/L		72.6	(50%-105%)			
	Uncert:			+/-0.0675							
	TPU:			+/-0.119							
QC1203941155	MB										
Americium-241			U	0.00383	pCi/L				HAKB	12/21/17	14:48
	Uncert:			+/-0.00469							
	TPU:			+/-0.0047							
**Americium-243 Tracer	2.10			1.43	pCi/L		68.3	(50%-105%)			
	Uncert:			+/-0.0632							
	TPU:			+/-0.114							
Batch	1727285										
QC1203941159	440209006	DUP									
Plutonium-238	U	-0.00228	U	0.00527	pCi/L	0.327		(0-1)	HAKB	12/21/17	14:48
	Uncert:	+/-0.00509		+/-0.00646							
	TPU:	+/-0.00509		+/-0.00646							
Plutonium-239/240	U	0.00683	U	0.00527	pCi/L	0.0497		(0-1)			
	Uncert:	+/-0.00821		+/-0.00746							
	TPU:	+/-0.00821		+/-0.00746							
**Plutonium-242 Tracer	2.47	1.81		1.81	pCi/L		73.4	(50%-105%)			
	Uncert:	+/-0.0753		+/-0.0807							
	TPU:	+/-0.127		+/-0.134							
QC1203941160	LCS										
Plutonium-238			U	0.0124	pCi/L			(80%-120%)	HAKB	12/21/17	14:48
	Uncert:			+/-0.00688							
	TPU:			+/-0.00689							
Plutonium-239/240	1.98			2.15	pCi/L		109	(80%-120%)			
	Uncert:			+/-0.0619							
	TPU:			+/-0.108							
**Plutonium-242 Tracer	1.97			1.46	pCi/L		73.8	(50%-105%)			
	Uncert:			+/-0.0594							
	TPU:			+/-0.101							

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 440209

Page 2 of 6

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1727285										
QC1203941158	MB										
Plutonium-238			U	0.0185	pCi/L				HAKB	12/21/17	14:48
				Uncert:							
				TPU:							
Plutonium-239/240			U	0.00555	pCi/L						
				Uncert:							
				TPU:							
**Plutonium-242 Tracer	1.97			1.59	pCi/L		80.5	(50%-105%)			
				Uncert:							
				TPU:							
Batch	1727286										
QC1203941162	440209006	DUP									
Uranium-234		U	0.0799	U	0.0708	pCi/L	0.149	(0-1)	HAKB	12/21/17	14:48
				Uncert:							
				TPU:							
Uranium-235/236		U	0.0282	U	0.0451	pCi/L	0.327	(0-1)			
				Uncert:							
				TPU:							
Uranium-238		U	0.0297	U	0.0386	pCi/L	0.216	(0-1)			
				Uncert:							
				TPU:							
**Uranium-232 Tracer	2.62		2.08		2.06	pCi/L	78.7	(50%-105%)			
				Uncert:							
				TPU:							
QC1203941163	LCS										
Uranium-234				2.70	pCi/L				HAKB	12/21/17	14:48
				Uncert:							
				TPU:							
Uranium-235/236				0.213	pCi/L						
				Uncert:							
				TPU:							
Uranium-238	2.70			2.81	pCi/L		104	(80%-120%)			
				Uncert:							
				TPU:							
**Uranium-232 Tracer	2.09			1.59	pCi/L		76.2	(50%-105%)			
				Uncert:							
				TPU:							
QC1203941161	MB										
Uranium-234			U	0.0362	pCi/L				HAKB	12/21/17	14:48
				Uncert:							
				TPU:							
Uranium-235/236			U	0.0141	pCi/L						
				Uncert:							
				TPU:							
Uranium-238			U	0.00381	pCi/L						
				Uncert:							
				TPU:							

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 440209

Page 3 of 6

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1727286										
*Uranium-232 Tracer	2.09			1.73	pCi/L		82.7	(50%-105%)			
	Uncert:			+/-0.064							
	TPU:			+/-0.119							
Rad Gamma Spec											
Batch	1727008										
QC1203940480	440189004	DUP									
Cesium-137	U	-1.84	U	-2.9	pCi/L	0.187		(0-1)	BSW1	12/18/17	10:58
	Uncert:	+/-1.53		+/-1.06							
	TPU:	+/-1.59		+/-1.26							
Cobalt-60	U	0.774	U	-1.53	pCi/L	0.477		(0-1)			
	Uncert:	+/-1.12		+/-1.23							
	TPU:	+/-1.14		+/-1.28							
Neptunium-237	U	-0.514	U	-0.779	pCi/L	0.026		(0-1)			
	Uncert:	+/-2.79		+/-2.30							
	TPU:	+/-2.79		+/-2.30							
Potassium-40	U	36.3	U	24.4	pCi/L	0.14		(0-1)			
	Uncert:	+/-21.8		+/-20.8							
	TPU:	+/-21.9		+/-20.8							
Sodium-22	U	-0.608	U	0.917	pCi/L	0.301		(0-1)			
	Uncert:	+/-1.25		+/-1.26							
	TPU:	+/-1.26		+/-1.27							
QC1203940481	LCS										
Americium-241	34300			35900	pCi/L		105	(80%-120%)	BSW1	12/18/17	11:01
	Uncert:			+/-471							
	TPU:			+/-1770							
Cesium-137	13000			13300	pCi/L		103	(80%-120%)			
	Uncert:			+/-169							
	TPU:			+/-580							
Cobalt-60	11100			11500	pCi/L		103	(80%-120%)			
	Uncert:			+/-174							
	TPU:			+/-557							
Neptunium-237			U	26.8	pCi/L						
	Uncert:			+/-54.0							
	TPU:			+/-54.4							
Potassium-40			U	-35.5	pCi/L						
	Uncert:			+/-110							
	TPU:			+/-110							
Sodium-22			U	2.67	pCi/L						
	Uncert:			+/-16.9							
	TPU:			+/-16.9							
QC1203940479	MB										
Cesium-137			U	-0.41	pCi/L				BSW1	12/18/17	07:38
	Uncert:			+/-0.962							
	TPU:			+/-0.967							
Cobalt-60			U	-0.762	pCi/L						
	Uncert:			+/-0.987							

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 440209

Page 4 of 6

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1727008										
Neptunium-237	TPU:			+/-1.00							
			U	-0.711	pCi/L						
	Uncert:			+/-1.74							
Potassium-40	TPU:			+/-1.75							
			U	10.4	pCi/L						
	Uncert:			+/-14.1							
Sodium-22	TPU:			+/-14.3							
			U	0.240	pCi/L						
	Uncert:			+/-0.783							
	TPU:			+/-0.785							
<b>Rad Gas Flow</b>											
Batch	1727116										
QC1203940722	440189004	DUP									
Alpha			5.19	8.77	pCi/L	0.621		(0-1)	AXH4	12/28/17	16:23
	Uncert:		+/-1.19	+/-1.44							
	TPU:		+/-1.27	+/-1.62							
Beta			3.62	4.65	pCi/L	0.448		(0-1)		12/27/17	14:53
	Uncert:		+/-0.392	+/-0.520							
	TPU:		+/-0.497	+/-0.650							
QC1203940725	LCS										
Alpha	12.1			11.4	pCi/L		94.6	(80%-120%)	AXH4	12/28/17	16:23
	Uncert:			+/-0.572							
	TPU:			+/-1.14							
Beta	47.3			51.7	pCi/L		109	(80%-120%)		12/27/17	14:52
	Uncert:			+/-0.916							
	TPU:			+/-4.40							
QC1203940721	MB										
Alpha			U	0.0408	pCi/L				AXH4	12/28/17	16:20
	Uncert:			+/-0.102							
	TPU:			+/-0.102							
Beta			U	0.066	pCi/L					12/27/17	14:53
	Uncert:			+/-0.0579							
	TPU:			+/-0.0582							
QC1203940723	440189004	MS									
Alpha	483	5.19		529	pCi/L		108	(75%-125%)	AXH4	12/28/17	16:20
	Uncert:	+/-1.19		+/-26.9							
	TPU:	+/-1.27		+/-54.1							
Beta	1890	3.62		1920	pCi/L		101	(75%-125%)		12/27/17	14:52
	Uncert:	+/-0.392		+/-35.6							
	TPU:	+/-0.497		+/-163							
QC1203940724	440189004	MSD									
Alpha	483	5.19		517	pCi/L	0.0543	106	(0-1)	AXH4	12/28/17	16:20
	Uncert:	+/-1.19		+/-26.7							
	TPU:	+/-1.27		+/-51.9							
Beta	1890	3.62		1960	pCi/L	0.0551	103	(0-1)		12/27/17	14:52
	Uncert:	+/-0.392		+/-35.6							



# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 440209

Page 5 of 6

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1727116										
Batch	1727972	TPU:	+/-0.497	+/-165							
QC1203942901	440189004	DUP									
Strontium-90		U	0.0206	U	0.175	pCi/L	0.319	(0-1)	KSD1	12/28/17	12:33
		Uncert:	+/-0.113	+/-0.129							
		TPU:	+/-0.113	+/-0.129							
**Strontium Carrier		7.85	8.00	8.00	mg		102	(50%-105%)			
QC1203942903	LCS										
Strontium-90		23.6		21.1	pCi/L		89.2	(80%-120%)	KSD1	12/28/17	12:34
		Uncert:		+/-0.468							
		TPU:		+/-1.82							
**Strontium Carrier		7.85		6.70	mg		85.4	(50%-105%)			
QC1203942900	MB										
Strontium-90			U	-0.0439	pCi/L				KSD1	12/28/17	12:33
		Uncert:		+/-0.0489							
		TPU:		+/-0.0489							
**Strontium Carrier		7.85		6.70	mg		85.4	(50%-105%)			
QC1203942902	440189004	MS									
Strontium-90		236	U	0.0206	243	pCi/L	103	(75%-125%)	KSD1	12/28/17	12:34
		Uncert:		+/-0.113	+/-5.02						
		TPU:		+/-0.113	+/-20.3						
**Strontium Carrier		7.85	8.00	8.00	mg		102	(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

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 440209

Page 6 of 6

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.