

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:

General Engineering Charleston SC		Chain of Custody/Analysis Request															COC/Lab Request #: 2018-854 <small>Page 1 of 1</small>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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		28 Days - <input checked="" type="checkbox"/>			<table border="1" style="width:100%; border-collapse: collapse; font-size: 0.8em;"> <tr> <td>Field Sample ID</td> <td>Sample Date</td> <td>Sample Time</td> <td>Sample Matrix</td> <td>MSGP-Hg</td><td>WSP-8082-PCB</td><td>WSP-8260B-VOA</td><td>WSP-8270C-SVOA</td><td>WSP-All Metals</td><td>WSP-CN(T)</td><td>WSP-GENINORG+PerChlorate</td><td>WSP-GrossA/B</td><td>WSP-H-3</td><td>WSP-NH3+NO3/NO2+PO4</td><td>WSP-RAD</td><td>WSP-TKN+TOC</td> </tr> <tr><td>CAMO-18-148055</td><td>Nov 9 2017</td><td>13:37</td><td>W</td><td> </td><td> </td><td> </td><td> </td><td>1</td><td> </td><td>1</td><td> </td><td> </td><td>1</td><td> </td><td> </td></tr> <tr><td>CAMO-18-148071</td><td>Nov 9 2017</td><td>13:37</td><td>W</td><td>1</td><td>3</td><td>2</td><td>2</td><td> </td><td>1</td><td> </td><td>1</td><td>1</td><td> </td><td>1</td><td>1</td></tr> <tr><td>CAMO-18-148094</td><td>Nov 9 2017</td><td>13:37</td><td>W</td><td> </td><td> </td><td colspan="2">ZIME</td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>CAMO-18-148056</td><td>Nov 9 2017</td><td>10:33</td><td>W</td><td> </td><td> </td><td> </td><td> </td><td>1</td><td> </td><td>1</td><td> </td><td> </td><td>1</td><td> </td><td> </td></tr> <tr><td>CAMO-18-148072</td><td>Nov 9 2017</td><td>10:33</td><td>W</td><td>1</td><td>3</td><td>2</td><td>2</td><td> </td><td>1</td><td> </td><td>1</td><td> </td><td> </td><td>1</td><td>1</td></tr> <tr><td>CAMO-18-148108</td><td>Nov 9 2017</td><td>10:33</td><td>W</td><td> </td><td> </td><td> </td><td> </td><td>1</td><td> </td><td>1</td><td> </td><td> </td><td>1</td><td> </td><td> </td></tr> <tr><td>CAMO-18-148110</td><td>Nov 9 2017</td><td>10:33</td><td>W</td><td>1</td><td>3</td><td>2</td><td>2</td><td> </td><td>1</td><td> </td><td>1</td><td> </td><td> </td><td>1</td><td>1</td></tr> <tr><td>CASA-18-147993</td><td>Nov 9 2017</td><td>12:46</td><td>W</td><td> </td><td> </td><td> </td><td> </td><td>1</td><td> </td><td>1</td><td> </td><td> </td><td>1</td><td> </td><td> </td></tr> <tr><td>CASA-18-148000</td><td>Nov 9 2017</td><td>12:46</td><td>W</td><td>1</td><td> </td><td>2</td><td>2</td><td> </td><td>1</td><td> </td><td>1</td><td> </td><td> </td><td>1</td><td>1</td></tr> <tr><td>CASA-18-148010</td><td>Nov 9 2017</td><td>12:46</td><td>W</td><td> </td><td> </td><td>2</td><td>2</td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>CASA-18-148015</td><td>Nov 9 2017</td><td>12:46</td><td>W</td><td> </td><td> </td><td colspan="2">ZIME</td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>CASA-18-147994</td><td>Nov 9 2017</td><td>14:24</td><td>W</td><td> </td><td> </td><td> </td><td> </td><td>1</td><td> </td><td>1</td><td> </td><td> </td><td>1</td><td> </td><td> </td></tr> <tr><td>CASA-18-148001</td><td>Nov 9 2017</td><td>14:24</td><td>W</td><td>1</td><td> </td><td>2</td><td>2</td><td> </td><td>1</td><td> </td><td>1</td><td> </td><td> </td><td>1</td><td>1</td></tr> <tr><td>CASA-18-148020</td><td>Nov 9 2017</td><td>14:24</td><td>W</td><td> </td><td> </td><td colspan="2">ZIME</td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>															Field Sample ID	Sample Date	Sample Time	Sample Matrix	MSGP-Hg	WSP-8082-PCB	WSP-8260B-VOA	WSP-8270C-SVOA	WSP-All Metals	WSP-CN(T)	WSP-GENINORG+PerChlorate	WSP-GrossA/B	WSP-H-3	WSP-NH3+NO3/NO2+PO4	WSP-RAD	WSP-TKN+TOC	CAMO-18-148055	Nov 9 2017	13:37	W					1		1			1			CAMO-18-148071	Nov 9 2017	13:37	W	1	3	2	2		1		1	1		1	1	CAMO-18-148094	Nov 9 2017	13:37	W			ZIME										CAMO-18-148056	Nov 9 2017	10:33	W					1		1			1			CAMO-18-148072	Nov 9 2017	10:33	W	1	3	2	2		1		1			1	1	CAMO-18-148108	Nov 9 2017	10:33	W					1		1			1			CAMO-18-148110	Nov 9 2017	10:33	W	1	3	2	2		1		1			1	1	CASA-18-147993	Nov 9 2017	12:46	W					1		1			1			CASA-18-148000	Nov 9 2017	12:46	W	1		2	2		1		1			1	1	CASA-18-148010	Nov 9 2017	12:46	W			2	2									CASA-18-148015	Nov 9 2017	12:46	W			ZIME										CASA-18-147994	Nov 9 2017	14:24	W					1		1			1			CASA-18-148001	Nov 9 2017	14:24	W	1		2	2		1		1			1	1	CASA-18-148020	Nov 9 2017	14:24	W			ZIME																																																																																																																																																																																																																																																														
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SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CASA-18-147993

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1246		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-43 S1		FIELD PREP:	F	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / <u>NA</u>

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

11/9/17

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CASA-18-147993

WORK ORDER:

COLLECTED BY (PRINT): D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) <i>Allison Stanfield</i> (Signature) <i>[Signature]</i>	Date/Time <i>11/9/17</i> <i>1520</i>	RECEIVED BY <i>MATT ENGELBERT</i> (Printed Name) (Signature) <i>M-Engel</i>	Date/Time <i>11-9-17</i> <i>1520</i>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CASA-18-147994

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1424		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-43 S2		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-CR52/53	1 LITER POLY	1	ICE	↓	↓
↓	WSP- GENINORG+PerChlorate	1 LITER POLY	1	ICE	↓	↓
↓	WSP-N15/O18- NO3	40 mL Glass	2	ICE	↓	↓
↓	WSP- NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS:

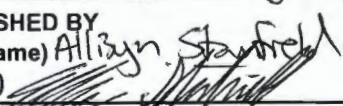
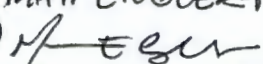
LOCATION COMMENTS:

FIELD PARAMETERS:

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

11/9/17

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CASA-18-147994**WORK ORDER:****COLLECTED BY (PRINT):** D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) Allison Stanford (Signature) 	Date/Time 11/9/17 1520	RECEIVED BY MATT ENGERT (Printed Name)  (Signature)	Date/Time 11-9-17 1520
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CASA-18-148000

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	<u>11/9/17</u>	<u>OK</u>	FIELD MATRIX:	<u>WG</u>	<u>OK</u>
TIME COLLECTED (HH:MM):	<u>1246</u>	<u> </u>	MEDIA:	<u>11/9/17 6:00</u>	<u> </u>
PRS ID:	<u>OK</u>	<u> </u>	SAMPLE TECH CODE:	<u>OK</u>	<u> </u>
LOCATION ID:	<u>R-43 S1</u>	<u> </u>	FIELD PREP:	<u>UF</u>	<u> </u>
LOCATION TYPE:	<u>OK</u>	<u> </u>	FIELD QC TYPE:	<u>REG</u>	<u> </u>
TOP DEPTH:	<u>↓</u>	<u>↓</u>	SAMPLE USAGE:	<u>INV</u>	<u>↓</u>
BOTTOM DEPTH:	<u>↓</u>	<u>↓</u>	EXCAVATED:		YES / NO / <u>(NA)</u>

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

SAMPLE COMMENTS: Sampled 40 ft. from running diesel generator, NMED split samplesLOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time	<u>1246</u>	HH:MM	Discharge Rate	<u>1.54</u>	Dissolved Oxygen	<u>6.95</u>
Groundwater Elevation	<u>5842.36</u>		Oxidation-Reduction Potential	<u>184.9</u>	Period Purge Volume	<u>7.70</u>
pH	<u>8.04</u>		Purge Volume	<u>218.68</u>	Specific Conductance	<u>195.7</u>
Temperature	<u>19.4</u>		Total Volume Pumped	<u>271.04</u>	Turbidity	<u>0.29</u>

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

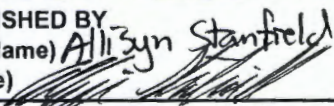
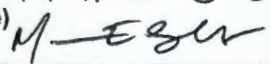
EVENT ID: 11552

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

SAMPLE ID: CASA-18-148000

WORK ORDER:

COLLECTED BY (PRINT): D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) Allizyn Stanfield (Signature) 	Date/Time 11/9/17 1520	RECEIVED BY MATT ENGLERT (Printed Name) (Signature) 	Date/Time 11-9-17 1520
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CASA-18-148001

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1424		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-43 S2		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-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
✓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	✓	✓

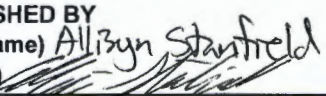
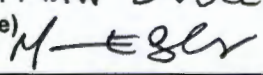
SAMPLE COMMENTS: Sampled 40ft. from running diesel generator; NMED split samples

LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time	1424	HH:MM	Discharge Rate	6.60	Dissolved Oxygen	3.34
Groundwater Elevation	5832.67		Oxidation-Reduction Potential	140.8	Period Purge Volume	8.00
pH	8.74		Purge Volume	76.80	Specific Conductance	194.9
Temperature	19.5		Total Volume Pumped	137.60	Turbidity	0.17

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CASA-18-148001**WORK ORDER:****COLLECTED BY (PRINT):** D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) Allbyn Stanfield (Signature) 	Date/Time 11/9/17 1520	RECEIVED BY MATT ENGLERT (Printed Name) (Signature) 	Date/Time 11-9-17 1520
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CASA-18-148010

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1246		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-43 S1		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FB	
TOP DEPTH:	↓		SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA
↓	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE	↓	

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):

D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) <i>Alizyn Stanfield</i> (Signature) <i>[Signature]</i>	Date/Time 11/9/17 1520	RECEIVED BY (Printed Name) <i>Ranee Ongst</i> (Signature) <i>[Signature]</i>	Date/Time 11/9/17 1520
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CASA-18-148015

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1246		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-43 S1		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	11/8/17	HCL	Y	NA

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): D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) Allison Stanfield (Signature)	Date/Time 11/9/17 1520	RECEIVED BY (Printed Name) Raneen Onstott (Signature)	Date/Time 11/9/17 1520
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CASA-18-148020

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1424		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DL	
LOCATION ID:	R-43 S2		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

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

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): D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) <u>Alison Stanfield</u> (Signature) <u>[Signature]</u>	Date/Time 11/9/17 1520	RECEIVED BY <u>MATT ENGELBERT</u> (Printed Name) <u>M-Engel</u> (Signature)	Date/Time 11-9-17 <u>+530</u> 1520
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148055

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/9/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1337		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	MCOI-6		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-CR52/53	1 LITER POLY	1	ICE		
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE		
	WSP-N15/O18- NO3	40 mL Glass	2	ICE		
	WSP- NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: None

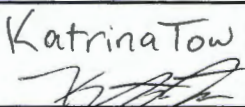
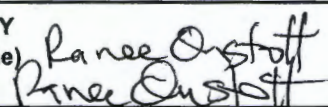
LOCATION COMMENTS: None

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 11/9/17
KT 11/9/17

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CAMO-18-148055**WORK ORDER:****COLLECTED BY (PRINT):** T. Vander Vis & T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow 	Date/Time 11/9/17 1435	RECEIVED BY (Printed Name) (Signature)	Ranee Oystoff 	Date/Time 11/9/17 1435
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148056

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/9/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1033		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-1		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

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

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

FIELD PARAMETERS:

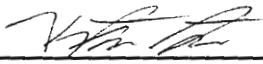
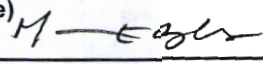
Sample Time _____ HH:MM _____ Discharge Rate _____
 Groundwater Elevation _____ Oxidation-Reduction Potential _____
 pH _____ Purge Volume _____
 Temperature _____ Total Volume Pumped _____

Dissolved Oxygen _____
 Period Purge Volume _____
 Specific Conductance _____
 Turbidity _____

KT 11/9/17

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CAMO-18-148056**WORK ORDER:****COLLECTED BY (PRINT):**

T. Bonham + T. Vander Vis

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow 	Date/Time 11/9/17 1435	RECEIVED BY (Printed Name) (Signature)	MAT ENGLERT 	Date/Time 11-9-17 1435
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148071

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/9/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1337		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	MCOI-6		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-8082-PCB	1 LITER AMBER GLASS	3	ICE		
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-H-3	250 ML AMBER GLASS	1	ICE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148071

WORK ORDER:

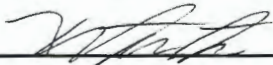
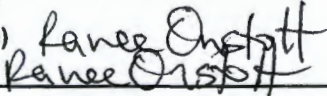
SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	<u>1337</u>	HH:MM	Discharge Rate	<u>1.26</u>	Dissolved Oxygen	<u>6.86</u>
Groundwater Elevation	<u>6130.22</u>		Oxidation-Reduction Potential	<u>285.2</u>	Period Purge Volume	<u>NA</u>
pH	<u>7.01</u>		Purge Volume	<u>119.70</u>	Specific Conductance	<u>556</u>
Temperature	<u>15.4</u>		Total Volume Pumped	<u>161.28</u>	Turbidity	<u>0.56</u>

COLLECTED BY (PRINT): T. Vander Vis & ^{KT 11/9/17} T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow 	Date/Time 11/9/17 1435	RECEIVED BY (Printed Name) (Signature)	Ranee Orsatt 	Date/Time 11/9/17 1435
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148072

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/9/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1033		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-1		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-8082-PCB	1 LITER AMBER GLASS	3	ICE	↓	↓
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL	↓	↓
	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE	↓	↓
	WSP-CN(T)	250 ML POLY	1	NAOH	↓	↓
	WSP-GrossA/B	1 LITER POLY	1	HNO3	↓	↓
	WSP-LL-H-3	1 LITER POLY	1	NONE	↓	↓
	WSP-RAD	1 GAL POLY	1	HNO3	↓	↓
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148072

WORK ORDER:


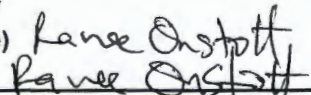
SAMPLE COMMENTS: Sampled 30 ft from running diesel generator

LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time	<u>1033</u>	HH:MM	Discharge Rate	<u>3.44</u>	Dissolved Oxygen	<u>6.12</u>
Groundwater Elevation	<u>5872.36</u>		Oxidation-Reduction Potential	<u>244.2</u>	Period Purge Volume	<u>NA</u>
pH	<u>7.95</u>		Purge Volume ^{11/9/17}	<u>187</u> 185.76	Specific Conductance	<u>138.0</u>
Temperature	<u>20.7</u>		Total Volume Pumped	<u>271.76</u>	Turbidity	<u>0.36</u>

COLLECTED BY (PRINT): T. Bonham & T. Vander Vis

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow 	Date/Time 11/9/17 1435	RECEIVED BY (Printed Name) (Signature)	Lance Onstott 	Date/Time 11/9/17 1435
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148094

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/9/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1337		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	MCOI-6		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FTB	
TOP DEPTH:	↓	↓	SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	11/8/17	HCL	Y	NA

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time	HH:MM	Discharge Rate		11/9/17	Dissolved Oxygen	
Groundwater Elevation		Oxidation-Reduction Potential			Period Purge Volume	
pH		Purge Volume			Specific Conductance	
Temperature		Total Volume Pumped			Turbidity	

COLLECTED BY (PRINT): T. Vander Vis & T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 11/9/17 1435	RECEIVED BY (Printed Name) (Signature)	Rance Onstott <i>[Signature]</i>	Date/Time 11/9/17 1435
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148095

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/9/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1033		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	KT 11/9/17 GSP DC	
LOCATION ID:	R-1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	1/2	HCL	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 11/9/17

COLLECTED BY (PRINT): T. Bonham & T. Vander Vis

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 11/9/17 1435	RECEIVED BY (Printed Name) (Signature)	Ranee Onstott <i>[Signature]</i>	Date/Time 11/9/17 1435
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148108

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	11/9/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1033		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-1		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-CR52/53	1 LITER POLY	1	ICE		
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE		
	WSP-N15/O18- NO3	40 mL Glass	2	ICE		
	WSP- NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4		

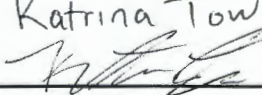
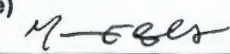
SAMPLE COMMENTS: None

LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time _____ HH:MM _____ Discharge Rate _____ *KT 11/9/17* Dissolved Oxygen _____
 Groundwater Elevation _____ Oxidation-Reduction Potential _____ Period Purge Volume _____
 pH _____ Purge Volume _____ Specific Conductance _____
 Temperature _____ Total Volume Pumped _____ Turbidity _____

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11552**EVENT NAME:** Mortandad/Sandia (Cr Inv and MDA C)
MY2018 Q1**SAMPLE ID:** CAMO-18-148108**WORK ORDER:****COLLECTED BY (PRINT):** T. Bonham & T. Vander Vis

RELINQUISHED BY (Printed Name) Katrina Tow (Signature) 	Date/Time 11/9/17 1435	RECEIVED BY MATT ENGLERT (Printed Name) (Signature) 	Date/Time 11-9-17 1435
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148110

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	11/9/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1033		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:		
LOCATION ID:	R-1		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-8082-PCB	1 LITER AMBER GLASS	3	ICE		
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11552

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

SAMPLE ID: CAMO-18-148110

WORK ORDER:

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 11/9/17

COLLECTED BY (PRINT):

KT 11/9/17
T. Bonham & T. Vander Vis

RELINQUISHED BY (Printed Name) Katrina Tow (Signature) <i>[Signature]</i>	Date/Time 11/9/17 1435	RECEIVED BY MAT ENGLERT (Printed Name) (Signature) <i>[Signature]</i>	Date/Time 11-9-17 1435
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

① Sampling Plan ID/Name: 11552COC: 2018-854

TEST – Explosives		YES	NO
② Samples collected from a WFO area?			<input checked="" type="checkbox"/>
Field Test for Explosives Results		YES	NO
③ HE SPOT test result positive. If YES - Do not transport.			<input checked="" type="checkbox"/>

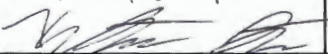
TEST – Chemical Preservation		YES	NO
④ Samples are chemically preserved?		<input checked="" type="checkbox"/>	
Field Team Member Statement		YES	NO
⑤ Chemical preservation exceeds limits given 40 CFR 136, Table II – Required Containers, Preservation Techniques and Holding Times (footnote 3). If YES - Do not ship.			<input checked="" type="checkbox"/>


TEST – Field Screen			YES	NO
⑥ The sample has field screening measurements of alpha activity and beta activity?				<input checked="" type="checkbox"/>
Sample Activity (dpm/100cm ²)	Shipment Activity (dpm*g/100cm ²)	Sampled Location	YES	NO
⑦ 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		
⑧ Alpha ≥ 125	AND Alpha ≥ 1,250,000	AT other locations		
⑨ Beta ≥ 1,500	AND Beta ≥ 15,000,000	AT any location		
⑩ The sample Alpha ≥ 16,000,000 dpm*g/100cm ² or Beta ≥ 160,000,000 dpm*g/100cm ² . If YES – Do not ship.				
⑪ On the external surface of the sample container, alpha activity ≥ 24 dpm/cm ² , beta activity ≥ 240 dpm/cm ² , or surface activity ≥ 0.5 mR/hr. If YES – Do not ship.				
⑫ The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package – Limited Quantity of Material – UN2910, based on field screening measurements of alpha and beta activity.				<input checked="" type="checkbox"/>

TEST - Location		YES	NO
⑬ Prior analytical measurements of radioactive isotopes are available?		<input checked="" type="checkbox"/>	
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO
• Am-241 ≥ 27 pCi/g	AND Am-241 ≥ 270,000 pCi Total		
• 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		<input checked="" type="checkbox"/>
• H-3 ≥ 27,000,000 pCi/g	AND H-3 ≥ 27,000,000,000 pCi Total		
⑮ Am-241, Pu-238, Pu-239/240, or Th-228 ≥ 27,000,000 pCi; or Cs-137 ≥ 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. If YES – Do not ship.			<input checked="" type="checkbox"/>
⑯ The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package – Limited Quantity of Material – UN2910, based on prior analytical measurements of radioactive isotopes.			<input checked="" type="checkbox"/>

TEST – AK		YES	NO
⑰ The shippers documented knowledge of the sample positively identifies appropriate labeling.			<input checked="" type="checkbox"/>
Documented Field Team Member Statement		YES	NO
⑱ The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package – Limited Quantity of Material – UN2910, and the sample is submitted to ARS or RP for hazard classification analysis.			<input checked="" type="checkbox"/>

⑲ These samples do not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200. The sample(s) contained in this shipment have been assigned a tentative proper DOT shipping name, hazard class, identification number, and packing group, based on the shipper's knowledge of the sample:

Hazard Assessment Completed By:	Date/Time
(Printed Name) Katrina Tow	11/9/17
(Signature) 	1455

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) MATT ENGLERT	11-9-17
(Signature) 	1455

DATA VALIDATION REPORT

Chain Of Custody No. 2018-854

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
437822	EPA:120.1	4	1			
437822	EPA:150.1	4	1			
437822	EPA:160.1	4	1			
437822	EPA:170.0	8	2	3	1	
437822	EPA:245.2	8	2			
437822	EPA:300.0	4	1			
437822	EPA:310.1	4	1			
437822	EPA:335.4	4	1			
437822	EPA:350.1	4	1			
437822	EPA:351.2	4	1			
437822	EPA:353.2	4	1			
437822	EPA:365.4	4	1			
437822	EPA:900	4	1			
437822	EPA:901.1	4	1			
437822	EPA:905.0	4	1			
437822	EPA:906.0	1				
437822	HASL-300:AM-241	4	1			
437822	HASL-300:ISOPU	4	1			
437822	HASL-300:ISOU	4	1			
437822	SM:A2340B	4	1			
437822	SW-846:6010C	4	1			
437822	SW-846:6020	4	1			
437822	SW-846:6850	4	1			
437822	SW-846:8082	2	1			
437822	SW-846:8260B	4	1	3	1	
437822	SW-846:8270D	4	1		1	
437822	SW-846:9060	4	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
437822	EPA:120.1	1719249	1719249	4	1									1			2				
437822	EPA:150.1	1720201	1720201	4	1									1			2				
437822	EPA:160.1	1718228	1718228	4	1				1					1			1				
437822	EPA:170.0	NA	NA	8	2	3	1														
437822	EPA:245.2	1722939	1722938	8	2				1	1				1			1				
437822	EPA:300.0	1719403	1719403	4	1				1					1			1				
437822	EPA:310.1	1720200	1720200	4	1					1				1			1				
437822	EPA:335.4	1718779	1718777	4	1				1	1				1			1				
437822	EPA:350.1	1718942	1718941	4	1				1	1				1			1				
437822	EPA:351.2	1718944	1718943	4	1				1	1				1			1				
437822	EPA:353.2	1718948	1718948	4	1				1					1			1				
437822	EPA:365.4	1718946	1718945	4	1				1	1				1			1				
437822	EPA:900	1720050	1720050	4	1				1	1	1			1			1				
437822	EPA:901.1	1718868	1718868	4	1				1					1			1				
437822	EPA:905.0	1720044	1720044	4	1				1	1				1			1				
437822	EPA:906.0	1719185	1719185	1					1	1				1			1				
437822	HASL-300:AM-241	1719849	1719849	4	1				1					1			1				
437822	HASL-300:ISOPU	1723433	1723433	4	1				1					1			1				
437822	HASL-300:ISOU	1719851	1719851	4	1				1					1			1				
437822	SM:A2340B	1725385	1725385	4	1																
437822	SW-846:6010C	1718859	1718858	4	1				1	1				1			1				
437822	SW-846:6020	1718865	1718864	4	1				1	1				1			1				
437822	SW-846:6850	1721630	1721628	4	1				1	1	1			1							
437822	SW-846:8082	1722631	1722630	2	1				1	1	1			1							
437822	SW-846:8260B	1721034	1721034	4	1	3	1		2					4							
437822	SW-846:8270D	1719087	1719086	4	1		1		1	1	1			1							
437822	SW-846:9060	1717990	1717990	4	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	CAMO-18-148055	437822001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-148056	437822005	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-148108	437822008	FD	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-18-147993	437822011	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-18-147994	437822015	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203920717	LCS	0	0	1	0
EPA:120.1	GENERAL CHEMISTRY	WST05-18-148658	1203920719	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	WST05-18-148663	1203920718	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-148055	1203923057	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-148055	437822001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-148056	437822005	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-148108	437822008	FD	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-18-147993	437822011	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-18-147994	437822015	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203923055	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	WST60-18-148791	1203923056	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-148055	437822001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-148056	437822005	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-148108	437822008	FD	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-18-147993	437822011	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-18-147994	437822015	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-18-147995	1203919676	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203918126	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203918125	MB	1	0	0	0
EPA:170.0	VOC	CAMO-18-148055	437822001	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148056	437822005	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148071	437822002	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148072	437822006	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-148094	437822004	FTB	1	0	0	0
EPA:170.0	VOC	CAMO-18-148108	437822008	FD	1	0	0	0
EPA:170.0	VOC	CAMO-18-148110	437822009	FD	1	0	0	0
EPA:170.0	VOC	CASA-18-147993	437822011	REG	1	0	0	0
EPA:170.0	VOC	CASA-18-147994	437822015	REG	1	0	0	0
EPA:170.0	VOC	CASA-18-148000	437822012	REG	1	0	0	0
EPA:170.0	VOC	CASA-18-148001	437822016	REG	1	0	0	0
EPA:170.0	VOC	CASA-18-148010	437822013	FB	1	0	0	0
EPA:170.0	VOC	CASA-18-148015	437822014	FTB	1	0	0	0
EPA:170.0	VOC	CASA-18-148020	437822017	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148055	1203929928	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148055	1203929930	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
EPA:245.2	INORGANIC	CAMO-18-148055	437822001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148056	437822005	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148071	437822002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148072	437822007	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148108	437822008	FD	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-148110	437822010	FD	1	0	0	0
EPA:245.2	INORGANIC	CASA-18-147993	437822011	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-18-147994	437822015	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-18-148000	437822012	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-18-148001	437822016	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203929927	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203929926	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-148054	1203921022	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-148055	437822001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-148056	437822005	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-148108	437822008	FD	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-18-147993	437822011	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CASA-18-147994	437822015	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203921021	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203921020	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148055	1203923050	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148055	1203923054	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148055	437822001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148056	437822005	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-148108	437822008	FD	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-18-147993	437822011	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-18-147994	437822015	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203923046	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAMO-18-148070	1203919601	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAMO-18-148070	1203919605	MS	0	0	1	0
EPA:335.4	INORGANIC	CAMO-18-148071	437822002	REG	1	0	0	0
EPA:335.4	INORGANIC	CAMO-18-148072	437822007	REG	1	0	0	0
EPA:335.4	INORGANIC	CAMO-18-148110	437822010	FD	1	0	0	0
EPA:335.4	INORGANIC	CASA-18-148000	437822012	REG	1	0	0	0
EPA:335.4	INORGANIC	CASA-18-148001	437822016	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203919599	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203919598	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-148055	437822001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-148056	437822005	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-148108	437822008	FD	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:350.1	GENERAL CHEMISTRY	CASA-18-147993	437822011	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-18-147994	437822015	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203919946	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203919945	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	WST35-18-148795	1203919947	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	WST35-18-148795	1203919948	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-148071	437822002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-148072	437822007	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-148110	437822010	FD	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-18-148000	437822012	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-18-148001	437822016	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203919952	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203919951	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	WST35-18-148795	1203919953	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	WST35-18-148795	1203919954	MS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-148055	437822001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-148056	437822005	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-148108	437822008	FD	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-18-147993	437822011	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-18-147994	437822015	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203919967	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203919966	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	WST35-18-148795	1203919968	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-148055	437822001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-148056	437822005	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-148108	437822008	FD	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-18-147993	437822011	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CASA-18-147994	437822015	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203919958	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203919957	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	WST35-18-148795	1203919961	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	WST35-18-148795	1203919962	MS	0	0	1	0
EPA:900	RAD	CAMO-18-148071	437822002	REG	2	0	0	0
EPA:900	RAD	CAMO-18-148072	437822007	REG	2	0	0	0
EPA:900	RAD	CAMO-18-148110	437822010	FD	2	0	0	0
EPA:900	RAD	CAMO-18-148117	1203922640	DUP	2	0	0	0
EPA:900	RAD	CAMO-18-148117	1203922641	MS	0	0	2	0
EPA:900	RAD	CAMO-18-148117	1203922642	MSD	0	0	2	0
EPA:900	RAD	CASA-18-148000	437822012	REG	2	0	0	0
EPA:900	RAD	CASA-18-148001	437822016	REG	2	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:900	RAD	LCS	1203922643	LCS	0	0	2	0
EPA:900	RAD	MB	1203922639	MB	2	0	0	0
EPA:901.1	RAD	CAMO-18-148070	1203919783	DUP	5	0	0	0
EPA:901.1	RAD	CAMO-18-148071	437822002	REG	5	0	0	0
EPA:901.1	RAD	CAMO-18-148072	437822007	REG	5	0	0	0
EPA:901.1	RAD	CAMO-18-148110	437822010	FD	5	0	0	0
EPA:901.1	RAD	CASA-18-148000	437822012	REG	5	0	0	0
EPA:901.1	RAD	CASA-18-148001	437822016	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203919784	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203919782	MB	5	0	0	0
EPA:905.0	RAD	CAMO-18-148071	437822002	REG	1	0	0	0
EPA:905.0	RAD	CAMO-18-148072	437822007	REG	1	0	0	0
EPA:905.0	RAD	CAMO-18-148073	1203922620	DUP	1	0	0	0
EPA:905.0	RAD	CAMO-18-148073	1203922621	MS	0	0	1	0
EPA:905.0	RAD	CAMO-18-148110	437822010	FD	1	0	0	0
EPA:905.0	RAD	CASA-18-148000	437822012	REG	1	0	0	0
EPA:905.0	RAD	CASA-18-148001	437822016	REG	1	0	0	0
EPA:905.0	RAD	LCS	1203922622	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203922619	MB	1	0	0	0
EPA:906.0	RAD	CAMO-18-148071	437822002	REG	1	0	0	0
EPA:906.0	RAD	LCS	1203920576	LCS	0	0	1	0
EPA:906.0	RAD	MB	1203920573	MB	1	0	0	0
EPA:906.0	RAD	WST03-18-148752	1203920574	DUP	1	0	0	0
EPA:906.0	RAD	WST03-18-148752	1203920575	MS	0	0	1	0
HASL-300:AM-241	RAD	CAMO-18-148070	1203922091	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-148071	437822002	REG	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-148072	437822007	REG	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-148110	437822010	FD	1	0	0	0
HASL-300:AM-241	RAD	CASA-18-148000	437822012	REG	1	0	0	0
HASL-300:AM-241	RAD	CASA-18-148001	437822016	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203922092	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203922090	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-148071	437822002	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-148072	437822007	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-148110	437822010	FD	2	0	0	0
HASL-300:ISOPU	RAD	CASA-18-148000	437822012	REG	2	0	0	0
HASL-300:ISOPU	RAD	CASA-18-148001	437822016	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203931267	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203931265	MB	2	0	0	0
HASL-300:ISOPU	RAD	WST05-18-148670	1203931266	DUP	2	0	0	0

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Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
HASL-300:ISOU	RAD	CAMO-18-148070	1203922097	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAMO-18-148071	437822002	REG	3	0	0	0
HASL-300:ISOU	RAD	CAMO-18-148072	437822007	REG	3	0	0	0
HASL-300:ISOU	RAD	CAMO-18-148110	437822010	FD	3	0	0	0
HASL-300:ISOU	RAD	CASA-18-148000	437822012	REG	3	0	0	0
HASL-300:ISOU	RAD	CASA-18-148001	437822016	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203922098	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203922096	MB	3	0	0	0
SM:A2340B	INORGANIC	CAMO-18-148055	437822001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-18-148056	437822005	REG	1	0	0	0
SM:A2340B	INORGANIC	CAMO-18-148108	437822008	FD	1	0	0	0
SM:A2340B	INORGANIC	CASA-18-147993	437822011	REG	1	0	0	0
SM:A2340B	INORGANIC	CASA-18-147994	437822015	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-148054	1203919763	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-148054	1203919764	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAMO-18-148055	437822001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-148056	437822005	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-148108	437822008	FD	17	0	0	0
SW-846:6010C	INORGANIC	CASA-18-147993	437822011	REG	17	0	0	0
SW-846:6010C	INORGANIC	CASA-18-147994	437822015	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203919762	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203919761	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-18-148054	1203919773	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-148054	1203919774	MS	0	0	11	0
SW-846:6020	INORGANIC	CAMO-18-148055	437822001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-148056	437822005	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-18-148108	437822008	FD	11	0	0	0
SW-846:6020	INORGANIC	CASA-18-147993	437822011	REG	11	0	0	0
SW-846:6020	INORGANIC	CASA-18-147994	437822015	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203919772	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203919771	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148055	1203926748	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148055	1203926749	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148055	437822001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148056	437822005	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-148108	437822008	FD	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-18-147993	437822011	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-18-147994	437822015	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203926680	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203926679	MB	1	0	0	0

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Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:8082	PESTPCB	CAMO-18-148071	437822003	REG	8	2	0	0
SW-846:8082	PESTPCB	CAMO-18-148072	437822006	REG	8	2	0	0
SW-846:8082	PESTPCB	CAMO-18-148110	437822009	FD	8	2	0	0
SW-846:8082	PESTPCB	CAMO-18-148117	1203929171	MS	0	2	2	0
SW-846:8082	PESTPCB	CAMO-18-148117	1203929172	MSD	0	2	2	0
SW-846:8082	PESTPCB	LCS	1203929170	LCS	0	2	2	0
SW-846:8082	PESTPCB	MB	1203929169	MB	8	2	0	0
SW-846:8260B	VOC	CAMO-18-148071	437822002	REG	80	3	0	0
SW-846:8260B	VOC	CAMO-18-148072	437822007	REG	80	3	0	0
SW-846:8260B	VOC	CAMO-18-148094	437822004	FTB	80	3	0	0
SW-846:8260B	VOC	CAMO-18-148110	437822010	FD	80	3	0	0
SW-846:8260B	VOC	CASA-18-148000	437822012	REG	80	3	0	0
SW-846:8260B	VOC	CASA-18-148001	437822016	REG	80	3	0	0
SW-846:8260B	VOC	CASA-18-148010	437822013	FB	80	3	0	0
SW-846:8260B	VOC	CASA-18-148015	437822014	FTB	80	3	0	0
SW-846:8260B	VOC	CASA-18-148020	437822017	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203925223	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203925224	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203925821	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203925822	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203925222	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203925820	MB	80	3	0	0
SW-846:8270D	SVOC	CAMO-18-148071	1203920338	MS	0	6	76	0
SW-846:8270D	SVOC	CAMO-18-148071	1203920339	MSD	0	6	76	0
SW-846:8270D	SVOC	CAMO-18-148071	437822002	REG	80	6	0	0
SW-846:8270D	SVOC	CAMO-18-148072	437822007	REG	80	6	0	0
SW-846:8270D	SVOC	CAMO-18-148110	437822010	FD	80	6	0	0
SW-846:8270D	SVOC	CASA-18-148000	437822012	REG	80	6	0	0
SW-846:8270D	SVOC	CASA-18-148001	437822016	REG	80	6	0	0
SW-846:8270D	SVOC	CASA-18-148010	437822013	FB	80	6	0	0
SW-846:8270D	SVOC	LCS	1203920337	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203920336	MB	80	6	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-148071	1203920738	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-148071	437822002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-148072	437822007	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-148110	437822010	FD	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-18-148000	437822012	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-18-148001	437822016	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203920735	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203920734	MB	1	0	0	0

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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	1203919761	METHOD BLANK	SW-846:6010C	W	Sodium	153	J	ug/L	300
MB	1203919951	METHOD BLANK	EPA:351.2	W	Total Kjeldahl Nitrogen	0.0803	J	mg/L	0.100
CAMO-18-148094	437822004	TRIP BLANK	EPA:170.0	W	Temperature	2		Deg C	
CASA-18-148010	437822013	FIELD BLANK	EPA:170.0	W	Temperature	2		Deg C	
CASA-18-148015	437822014	TRIP BLANK	EPA:170.0	W	Temperature	2		Deg C	
CASA-18-148020	437822017	TRIP BLANK	EPA:170.0	W	Temperature	2		Deg C	

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAMO-18-148110	1203919951	METHOD BLANK	EPA:351.2	Total Kjeldahl Nitrogen	0.0803	mg/L	0.0723	J	0.100	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

Field Sample ID	Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Spike Recovery	Upper Limit	Lower Limit	Rejection Limit
MB	1203920336	SW-846:8270D	Phenol-d5	1719087	11-20-2017	11	91	15	

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAMO-18-148055	1203926748	1203926749	SW-846:6850	Perchlorate	1721628	11-28-2017	W	0	0	125	75	10	2	30

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
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DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Paramter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
MCOI-6	2018-854	CAMO-18-148055	REG	INIT	LCMS/MS PERCHLORAT	SW-846:6850	Perchlorate		U	PE12d	Y	87.5	ug/L	87.5	ug/L			W	11/09/2017		1721630	VAL	Y
MCOI-6	2018-854	CAMO-18-148071	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	-0.00756	pCi/L	-0.00756	pCi/L	0.0448	0.00667	W	11/09/2017		1719849	VAL	Y
MCOI-6	2018-854	CAMO-18-148071	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-1.06	pCi/L	-1.06	pCi/L	2.84	0.856	W	11/09/2017		1718868	VAL	Y
MCOI-6	2018-854	CAMO-18-148071	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.952	pCi/L	-0.952	pCi/L	3.88	1.10	W	11/09/2017		1718868	VAL	Y
MCOI-6	2018-854	CAMO-18-148071	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.113	pCi/L	0.113	pCi/L	2.91	0.745	W	11/09/2017		1720050	VAL	Y
MCOI-6	2018-854	CAMO-18-148071	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-0.374	pCi/L	-0.374	pCi/L	5.33	1.62	W	11/09/2017		1718868	VAL	Y
MCOI-6	2018-854	CAMO-18-148071	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.0299	pCi/L	-0.0299	pCi/L	0.0733	0.0263	W	11/09/2017		1723433	VAL	Y
MCOI-6	2018-854	CAMO-18-148071	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.00995	pCi/L	0.00995	pCi/L	0.105	0.0211	W	11/09/2017		1723433	VAL	Y
MCOI-6	2018-854	CAMO-18-148071	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-3.6	pCi/L	-3.6	pCi/L	50.0	13.4	W	11/09/2017		1718868	VAL	Y
MCOI-6	2018-854	CAMO-18-148071	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	0.184	pCi/L	0.184	pCi/L	3.04	0.749	W	11/09/2017		1718868	VAL	Y
MCOI-6	2018-854	CAMO-18-148071	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.115	pCi/L	-0.115	pCi/L	0.446	0.110	W	11/09/2017		1720044	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0	pCi/L	0	pCi/L	0.0343	0.00544	W	11/09/2017		1719849	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.919	pCi/L	0.919	pCi/L	3.54	0.901	W	11/09/2017		1718868	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.695	pCi/L	-0.695	pCi/L	3.44	0.933	W	11/09/2017		1718868	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	-0.359	pCi/L	-0.359	pCi/L	1.92	0.463	W	11/09/2017		1720050	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	2.25	pCi/L	2.25	pCi/L	2.88	0.922	W	11/09/2017		1720050	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	0.206	pCi/L	0.206	pCi/L	6.38	1.73	W	11/09/2017		1718868	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.00461	pCi/L	-0.00461	pCi/L	0.068	0.0103	W	11/09/2017		1723433	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0138	pCi/L	-0.0138	pCi/L	0.0971	0.0138	W	11/09/2017		1723433	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	17.2	pCi/L	17.2	pCi/L	35.5	19.6	W	11/09/2017		1718868	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.583	pCi/L	-0.583	pCi/L	3.25	0.868	W	11/09/2017		1718868	VAL	Y
R-1	2018-854	CAMO-18-148072	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.021	pCi/L	0.021	pCi/L	0.452	0.122	W	11/09/2017		1720044	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.0201	pCi/L	0.0201	pCi/L	0.0325	0.00837	W	11/09/2017		1719849	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	3.78	pCi/L	3.78	pCi/L	3.85	1.28	W	11/09/2017		1718868	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.151	pCi/L	-0.151	pCi/L	4.09	1.07	W	11/09/2017		1718868	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.573	pCi/L	0.573	pCi/L	1.87	0.532	W	11/09/2017		1720050	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	1.16	pCi/L	1.16	pCi/L	2.05	0.637	W	11/09/2017		1720050	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-0.854	pCi/L	-0.854	pCi/L	6.67	1.84	W	11/09/2017		1718868	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.0102	pCi/L	0.0102	pCi/L	0.0749	0.0102	W	11/09/2017		1723433	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.00508	pCi/L	0.00508	pCi/L	0.107	0.0114	W	11/09/2017		1723433	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-34.6	pCi/L	-34.6	pCi/L	46.2	16.3	W	11/09/2017		1718868	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.0407	pCi/L	-0.0407	pCi/L	4.20	1.09	W	11/09/2017		1718868	VAL	Y

DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-1	2018-854	CAMO-18-148110	FD	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.113	pCi/L	-0.113	pCi/L	0.425	0.102	W	11/09/2017		1720044	VAL	Y
R-1	2018-854	CAMO-18-148110	FD	INIT	GENERAL CHEMISTRY	EPA:351.2	Total Kjeldahl Nitrogen	U	U	I4	N	0.0723	mg/L	0.0723	mg/L			W	11/09/2017		1718944	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT		HASL-300:AM-241	Americium-241	U	U	R5	N	-0.00461	pCi/L	-0.00461	pCi/L	0.0411	0.00565	W	11/09/2017		1719849	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	1.54	pCi/L	1.54	pCi/L	5.90	1.48	W	11/09/2017		1718868	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	1.38	pCi/L	1.38	pCi/L	5.70	1.21	W	11/09/2017		1718868	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	-1.22	pCi/L	-1.22	pCi/L	2.93	0.662	W	11/09/2017		1720050	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	-0.709	pCi/L	-0.709	pCi/L	2.15	0.502	W	11/09/2017		1720050	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	0.83	pCi/L	0.83	pCi/L	9.80	2.62	W	11/09/2017		1718868	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.0173	pCi/L	0.0173	pCi/L	0.0639	0.0106	W	11/09/2017		1723433	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.00867	pCi/L	-0.00867	pCi/L	0.0914	0.00867	W	11/09/2017		1723433	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-4.91	pCi/L	-4.91	pCi/L	75.7	19.6	W	11/09/2017		1718868	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	3.07	pCi/L	3.07	pCi/L	5.21	1.46	W	11/09/2017		1718868	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.13	pCi/L	-0.13	pCi/L	0.494	0.129	W	11/09/2017		1720044	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0386	pCi/L	0.0386	pCi/L	0.0517	0.0122	W	11/09/2017		1719851	VAL	Y
R-43 S1	2018-854	CASA-18-148000	REG	INIT	RAD	HASL-300:ISOU	Uranium-238	U	U	R5	N	0.0528	pCi/L	0.0528	pCi/L	0.0699	0.014	W	11/09/2017		1719851	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.0034	pCi/L	0.0034	pCi/L	0.0303	0.0068	W	11/09/2017		1719849	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-0.605	pCi/L	-0.605	pCi/L	4.25	1.17	W	11/09/2017		1718868	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.397	pCi/L	-0.397	pCi/L	4.11	1.02	W	11/09/2017		1718868	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	-0.401	pCi/L	-0.401	pCi/L	1.54	0.357	W	11/09/2017		1720050	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	0.247	pCi/L	0.247	pCi/L	2.15	0.586	W	11/09/2017		1720050	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-0.769	pCi/L	-0.769	pCi/L	8.43	2.27	W	11/09/2017		1718868	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0	pCi/L	0	pCi/L	0.0894	0.0149	W	11/09/2017		1723433	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.0242	pCi/L	0.0242	pCi/L	0.128	0.0171	W	11/09/2017		1723433	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	1.23	pCi/L	1.23	pCi/L	68.7	17.3	W	11/09/2017		1718868	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	0.0562	pCi/L	0.0562	pCi/L	3.70	0.820	W	11/09/2017		1718868	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.371	pCi/L	0.371	pCi/L	0.438	0.144	W	11/09/2017		1720044	VAL	Y
R-43 S2	2018-854	CASA-18-148001	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.052	pCi/L	0.052	pCi/L	0.0566	0.0145	W	11/09/2017		1719851	VAL	Y

Reason Code

Description

I4

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

DATA VALIDATION REPORT

Reason Code

Description

J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualify. The analyte is detected in the sample.
PE12d	The MS/MSD percent recovery was <10%
R5	Analyte is not detected because the amount reported is less than the MDC.
U_LAB	The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-148055	MCOI-6	REG	EPA:120.1	0	1
CAMO-18-148055	MCOI-6	REG	EPA:150.1	0	1
CAMO-18-148055	MCOI-6	REG	EPA:160.1	0	1
CAMO-18-148055	MCOI-6	REG	EPA:170.0	0	1
CAMO-18-148055	MCOI-6	REG	EPA:245.2	0	1
CAMO-18-148055	MCOI-6	REG	EPA:300.0	0	4
CAMO-18-148055	MCOI-6	REG	EPA:310.1	0	2
CAMO-18-148055	MCOI-6	REG	EPA:350.1	0	1
CAMO-18-148055	MCOI-6	REG	EPA:353.2	0	1
CAMO-18-148055	MCOI-6	REG	EPA:365.4	0	1
CAMO-18-148055	MCOI-6	REG	SM:A2340B	0	1
CAMO-18-148055	MCOI-6	REG	SW-846:6010C	0	17
CAMO-18-148055	MCOI-6	REG	SW-846:6020	0	11
CAMO-18-148055	MCOI-6	REG	SW-846:6850	0	1
CAMO-18-148056	R-1	REG	EPA:120.1	0	1
CAMO-18-148056	R-1	REG	EPA:150.1	0	1
CAMO-18-148056	R-1	REG	EPA:160.1	0	1
CAMO-18-148056	R-1	REG	EPA:170.0	0	1
CAMO-18-148056	R-1	REG	EPA:245.2	0	1
CAMO-18-148056	R-1	REG	EPA:300.0	0	4
CAMO-18-148056	R-1	REG	EPA:310.1	0	2
CAMO-18-148056	R-1	REG	EPA:350.1	0	1
CAMO-18-148056	R-1	REG	EPA:353.2	0	1
CAMO-18-148056	R-1	REG	EPA:365.4	0	1
CAMO-18-148056	R-1	REG	SM:A2340B	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-148056	R-1	REG	SW-846:6010C	0	17
CAMO-18-148056	R-1	REG	SW-846:6020	0	11
CAMO-18-148056	R-1	REG	SW-846:6850	0	1
CAMO-18-148071	MCOI-6	REG	EPA:170.0	0	1
CAMO-18-148071	MCOI-6	REG	EPA:245.2	0	1
CAMO-18-148071	MCOI-6	REG	EPA:335.4	0	1
CAMO-18-148071	MCOI-6	REG	EPA:351.2	0	1
CAMO-18-148071	MCOI-6	REG	EPA:900	0	2
CAMO-18-148071	MCOI-6	REG	EPA:901.1	0	5
CAMO-18-148071	MCOI-6	REG	EPA:905.0	0	1
CAMO-18-148071	MCOI-6	REG	EPA:906.0	0	1
CAMO-18-148071	MCOI-6	REG	HASL-300:AM-241	0	1
CAMO-18-148071	MCOI-6	REG	HASL-300:ISOPU	0	2
CAMO-18-148071	MCOI-6	REG	HASL-300:ISOU	0	3
CAMO-18-148071	MCOI-6	REG	SW-846:8082	0	8
CAMO-18-148071	MCOI-6	REG	SW-846:8260B	0	80
CAMO-18-148071	MCOI-6	REG	SW-846:8270D	0	80
CAMO-18-148071	MCOI-6	REG	SW-846:9060	0	1
CAMO-18-148072	R-1	REG	EPA:170.0	0	1
CAMO-18-148072	R-1	REG	EPA:245.2	0	1
CAMO-18-148072	R-1	REG	EPA:335.4	0	1
CAMO-18-148072	R-1	REG	EPA:351.2	0	1
CAMO-18-148072	R-1	REG	EPA:900	0	2
CAMO-18-148072	R-1	REG	EPA:901.1	0	5
CAMO-18-148072	R-1	REG	EPA:905.0	0	1
CAMO-18-148072	R-1	REG	HASL-300:AM-241	0	1
CAMO-18-148072	R-1	REG	HASL-300:ISOPU	0	2
CAMO-18-148072	R-1	REG	HASL-300:ISOU	0	3
CAMO-18-148072	R-1	REG	SW-846:8082	0	8
CAMO-18-148072	R-1	REG	SW-846:8260B	0	80
CAMO-18-148072	R-1	REG	SW-846:8270D	0	80
CAMO-18-148072	R-1	REG	SW-846:9060	0	1
CAMO-18-148094	MCOI-6	FTB	EPA:170.0	0	1
CAMO-18-148094	MCOI-6	FTB	SW-846:8260B	0	80
CAMO-18-148108	R-1	FD	EPA:120.1	0	1
CAMO-18-148108	R-1	FD	EPA:150.1	0	1
CAMO-18-148108	R-1	FD	EPA:160.1	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-148108	R-1	FD	EPA:170.0	0	1
CAMO-18-148108	R-1	FD	EPA:245.2	0	1
CAMO-18-148108	R-1	FD	EPA:300.0	0	4
CAMO-18-148108	R-1	FD	EPA:310.1	0	2
CAMO-18-148108	R-1	FD	EPA:350.1	0	1
CAMO-18-148108	R-1	FD	EPA:353.2	0	1
CAMO-18-148108	R-1	FD	EPA:365.4	0	1
CAMO-18-148108	R-1	FD	SM:A2340B	0	1
CAMO-18-148108	R-1	FD	SW-846:6010C	0	17
CAMO-18-148108	R-1	FD	SW-846:6020	0	11
CAMO-18-148108	R-1	FD	SW-846:6850	0	1
CAMO-18-148110	R-1	FD	EPA:170.0	0	1
CAMO-18-148110	R-1	FD	EPA:245.2	0	1
CAMO-18-148110	R-1	FD	EPA:335.4	0	1
CAMO-18-148110	R-1	FD	EPA:351.2	0	1
CAMO-18-148110	R-1	FD	EPA:900	0	2
CAMO-18-148110	R-1	FD	EPA:901.1	0	5
CAMO-18-148110	R-1	FD	EPA:905.0	0	1
CAMO-18-148110	R-1	FD	HASL-300:AM-241	0	1
CAMO-18-148110	R-1	FD	HASL-300:ISOPU	0	2
CAMO-18-148110	R-1	FD	HASL-300:ISOU	0	3
CAMO-18-148110	R-1	FD	SW-846:8082	0	8
CAMO-18-148110	R-1	FD	SW-846:8260B	0	80
CAMO-18-148110	R-1	FD	SW-846:8270D	0	80
CAMO-18-148110	R-1	FD	SW-846:9060	0	1
CASA-18-147993	R-43 S1	REG	EPA:120.1	0	1
CASA-18-147993	R-43 S1	REG	EPA:150.1	0	1
CASA-18-147993	R-43 S1	REG	EPA:160.1	0	1
CASA-18-147993	R-43 S1	REG	EPA:170.0	0	1
CASA-18-147993	R-43 S1	REG	EPA:245.2	0	1
CASA-18-147993	R-43 S1	REG	EPA:300.0	0	4
CASA-18-147993	R-43 S1	REG	EPA:310.1	0	2
CASA-18-147993	R-43 S1	REG	EPA:350.1	0	1
CASA-18-147993	R-43 S1	REG	EPA:353.2	0	1
CASA-18-147993	R-43 S1	REG	EPA:365.4	0	1
CASA-18-147993	R-43 S1	REG	SM:A2340B	0	1
CASA-18-147993	R-43 S1	REG	SW-846:6010C	0	17

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CASA-18-147993	R-43 S1	REG	SW-846:6020	0	11
CASA-18-147993	R-43 S1	REG	SW-846:6850	0	1
CASA-18-147994	R-43 S2	REG	EPA:120.1	0	1
CASA-18-147994	R-43 S2	REG	EPA:150.1	0	1
CASA-18-147994	R-43 S2	REG	EPA:160.1	0	1
CASA-18-147994	R-43 S2	REG	EPA:170.0	0	1
CASA-18-147994	R-43 S2	REG	EPA:245.2	0	1
CASA-18-147994	R-43 S2	REG	EPA:300.0	0	4
CASA-18-147994	R-43 S2	REG	EPA:310.1	0	2
CASA-18-147994	R-43 S2	REG	EPA:350.1	0	1
CASA-18-147994	R-43 S2	REG	EPA:353.2	0	1
CASA-18-147994	R-43 S2	REG	EPA:365.4	0	1
CASA-18-147994	R-43 S2	REG	SM:A2340B	0	1
CASA-18-147994	R-43 S2	REG	SW-846:6010C	0	17
CASA-18-147994	R-43 S2	REG	SW-846:6020	0	11
CASA-18-147994	R-43 S2	REG	SW-846:6850	0	1
CASA-18-148000	R-43 S1	REG	EPA:170.0	0	1
CASA-18-148000	R-43 S1	REG	EPA:245.2	0	1
CASA-18-148000	R-43 S1	REG	EPA:335.4	0	1
CASA-18-148000	R-43 S1	REG	EPA:351.2	0	1
CASA-18-148000	R-43 S1	REG	EPA:900	0	2
CASA-18-148000	R-43 S1	REG	EPA:901.1	0	5
CASA-18-148000	R-43 S1	REG	EPA:905.0	0	1
CASA-18-148000	R-43 S1	REG	HASL-300:AM-241	0	1
CASA-18-148000	R-43 S1	REG	HASL-300:ISOPU	0	2
CASA-18-148000	R-43 S1	REG	HASL-300:ISOU	0	3
CASA-18-148000	R-43 S1	REG	SW-846:8260B	0	80
CASA-18-148000	R-43 S1	REG	SW-846:8270D	0	80
CASA-18-148000	R-43 S1	REG	SW-846:9060	0	1
CASA-18-148001	R-43 S2	REG	EPA:170.0	0	1
CASA-18-148001	R-43 S2	REG	EPA:245.2	0	1
CASA-18-148001	R-43 S2	REG	EPA:335.4	0	1
CASA-18-148001	R-43 S2	REG	EPA:351.2	0	1
CASA-18-148001	R-43 S2	REG	EPA:900	0	2
CASA-18-148001	R-43 S2	REG	EPA:901.1	0	5
CASA-18-148001	R-43 S2	REG	EPA:905.0	0	1
CASA-18-148001	R-43 S2	REG	HASL-300:AM-241	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CASA-18-148001	R-43 S2	REG	HASL-300:ISOPU	0	2
CASA-18-148001	R-43 S2	REG	HASL-300:ISOU	0	3
CASA-18-148001	R-43 S2	REG	SW-846:8260B	0	80
CASA-18-148001	R-43 S2	REG	SW-846:8270D	0	80
CASA-18-148001	R-43 S2	REG	SW-846:9060	0	1
CASA-18-148010	R-43 S1	FB	EPA:170.0	0	1
CASA-18-148010	R-43 S1	FB	SW-846:8260B	0	80
CASA-18-148010	R-43 S1	FB	SW-846:8270D	0	80
CASA-18-148015	R-43 S1	FTB	EPA:170.0	0	1
CASA-18-148015	R-43 S1	FTB	SW-846:8260B	0	80
CASA-18-148020	R-43 S2	FTB	EPA:170.0	0	1
CASA-18-148020	R-43 S2	FTB	SW-846:8260B	0	80

December 08, 2017

gel.com

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

Re: LANL- WQH Water Samples
Work Order: 437822
SDG: 2018-854

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on November 14, 2017, and analyzed for 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,

B. Luthman
Brielle Luthman for
Valerie Davis
Project Manager

Chain of Custody: 2018-854
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 437822
SDG: 2018-854

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 437822
SDG # : 2018-854**

December 08, 2017

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on November 14, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperatures were checked, documented, and within specifications. Shipping container temperature was within specification (0 - 6C). There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
437822001	CAMO-18-148055
437822002	CAMO-18-148071
437822003	CAMO-18-148071
437822004	CAMO-18-148094
437822005	CAMO-18-148056
437822006	CAMO-18-148072
437822007	CAMO-18-148072
437822008	CAMO-18-148108
437822009	CAMO-18-148110
437822010	CAMO-18-148110
437822011	CAMO-18-148993
437822012	CAMO-18-148000
437822013	CAMO-18-148010
437822014	CAMO-18-148015
437822015	CAMO-18-147994
437822016	CAMO-18-148001
437822017	CAMO-18-148020

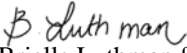
Case Narrative

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

Data Package

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: GC 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 08 December 2017

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

Chain of Custody and Supporting Documentation

SAMPLE RECEIPT & REVIEW FORM

Client: ESHL		SDG/AR/COC/Work Order: 437822	
Received By: ZKW		Date Received: 11/14/17	
Carrier and Tracking Number		Circle Applicable: FedEx Express <input checked="" type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <input type="checkbox"/> 5908 1783 1857-3C 5908 1783 1890-3C 5908 1783 1905-3C 5908 1783 1824-4C (rchem) 5908 1783 1835-18C (rchem) 5908 1783 1880-2C 5908 1783 1868-2C 5908 1783 1879-4C 5908 1783 1846-3C	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hazard Class Shipped: UN#:	
COC/Samples marked or classified as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM/mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken <input type="checkbox"/> Damaged container <input type="checkbox"/> Leaking container <input type="checkbox"/> Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Packs <input type="checkbox"/> Dry Ice <input checked="" type="checkbox"/> Other: see TEMP: 4/20/17 *all temperatures are recorded in Celsius
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: IR3-16 Secondary Temperature Device Serial #: (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken <input type="checkbox"/> Damaged container <input type="checkbox"/> Leaking container <input type="checkbox"/> Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> (If unknown, select No) VOA vials free of headspace? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Sample ID's and containers affected: -093 rec'd w/ headspace
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: see Below
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

* We rec'd Camo-18-148095 collected 11/9/17 @ 10:33 for 8260 not on any COC's

* We rec'd the missing soils for WSTN A-17-148755 & -148753

PM (or PMA) review: Initials

Date **11/15/2017** Page **1** of **1**

GL-CHL-SR-001 Rev 5

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

SHIP DATE: 13NOV17
ACTWGT: 65.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWE0

FedEx
Express



2 of 2

MPS# 5908 1783 1880

Mstr# 5908 1783 1879

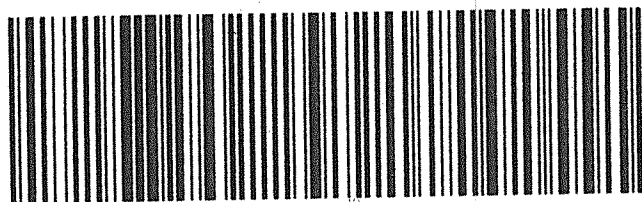
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X7 RBWA

29407

SC-US CHS

TUE - 14 NOV 10:30/
PRIORITY OVERNIGHT



UNITED STATES US

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 8V030AXFM101030100

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2 of 2

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29407

SC-US CHS

TUE - 14 NOV 10:30/
PRIORITY OVERNIGHT



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

SHIP DATE: 13NOV17
ACTWGT: 49.0 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

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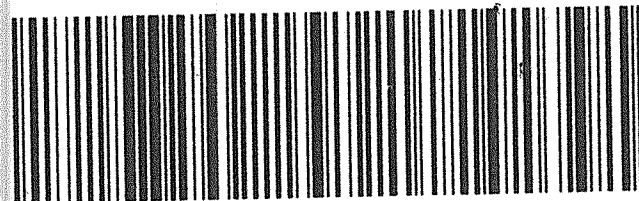
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UNITED STATES US

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CHARLESTON SC 29407

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REF: 8V030AXFM101030100

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Express



1 of 2

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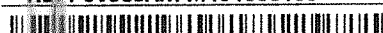
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SC-US CH

TUE - 14 NOV 10:30/
PRIORITY OVERNIGHT



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

SHIP DATE: 13NOV17
ACTWGT: 55.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

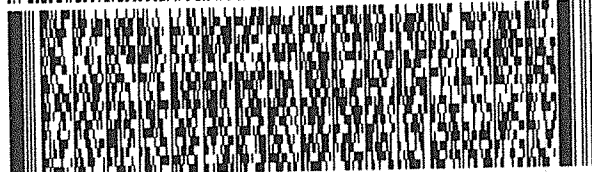
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GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

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PRIORITY OVERNIGHT

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SC-US CHS



UNITED STATES US

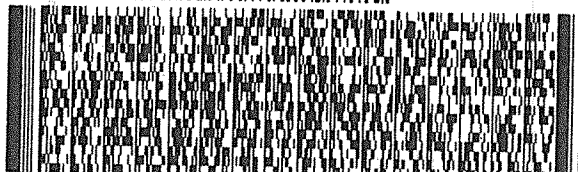
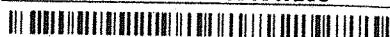
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GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

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1 of 2

TRK# 5908 1783 1824
0201

MASTER

X7 RBWA

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PRIORITY OVERNIGHT

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SC-US CHS

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

SHIP DATE: 13NOV17
ACTWGT: 55.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

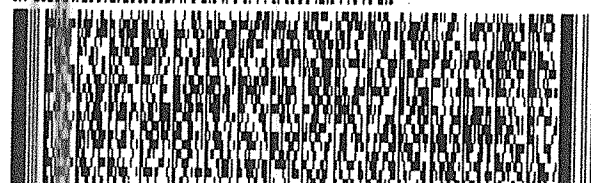
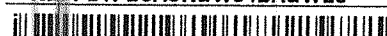
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TO **VALERIE DAVIS**
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BAGWE0



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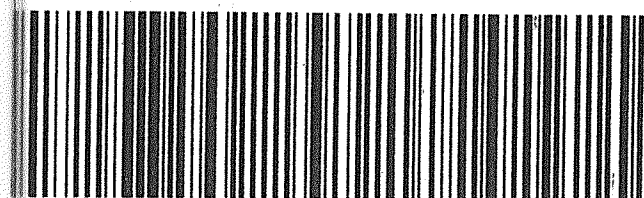
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Master # 5908 1783 1846

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PRIORITY OVERNIGHT

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SC-US CHS

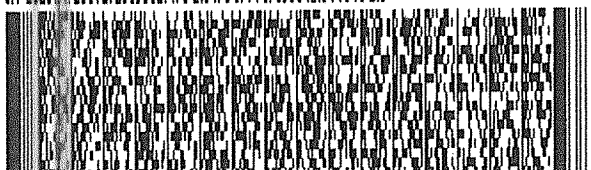


TO **VALERIE DAVIS**
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

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1 of 2

TRK# 5908 1783 1879
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MASTER

X7 RBWA

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PRIORITY OVERNIGHT

29407
SC-US CHS

SHIP DATE: 13NOV17
ACTWGT: 57.0 LB TAN
CAD: 0014126/CAFE2916

ORIGIN ID: SAFA (505) 665-9866
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03

BILL SENDER

LOS ALAMOS, NM 87545
UNITED STATES US

TO VALERIE DAVIS

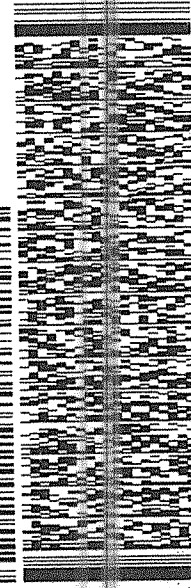
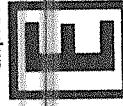
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0AWE991316W200

FedEx
Express



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PRIORITY OVERNIGHT

2 of 2

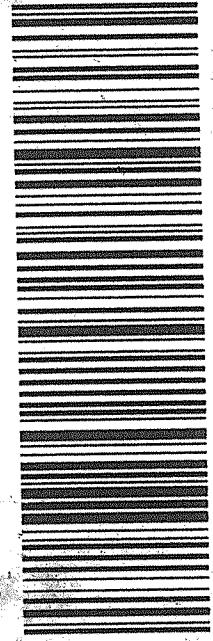
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29407
SC-US CHS



Part # 156148V-434 R17206/15 88

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 #: 2018-854
Work Order #: 437822**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch
Number: 1721034

Sample Analysis

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

Sample ID	Client ID
437822002	CAMO-18-148071
437822004	CAMO-18-148094
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CASA-18-148000
437822013	CASA-18-148010
437822014	CASA-18-148015
437822016	CASA-18-148001
437822017	CASA-18-148020
1203925222	Method Blank (MB)
1203925223	Laboratory Control Sample (LCS)
1203925224	Laboratory Control Sample (LCS)
1203925225	437822002(CAMO-18-148071) Post Spike (PS)
1203925226	437822002(CAMO-18-148071) Post Spike (PS)
1203925227	437822002(CAMO-18-148071) Post Spike Duplicate (PSD)
1203925228	437822002(CAMO-18-148071) Post Spike Duplicate (PSD)
1203925820	Method Blank (MB)
1203925821	Laboratory Control Sample (LCS)
1203925822	Laboratory Control Sample (LCS)

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

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

SOP Reference

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

Calibration Information

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

Initial Calibration

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

Continuing Calibration Verification Requirements

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

Quality Control (QC) Information

Blank (MB) Statement

The blanks analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 437822002 (CAMO-18-148071) was designated for spike analysis.

Matrix Spike/Matrix Spike Duplicate Recovery Statement

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

Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information

Holding Time Specifications

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

Sample Preservation and Integrity

All samples met the sample preservation and integrity requirements.

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Manual Integrations

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

TIC Comment

Tentatively identified compounds (TIC) may be requested for samples 437822002 (CAMO-18-148071), 437822004 (CAMO-18-148094), 437822007 (CAMO-18-148072), 437822010 (CAMO-18-148110), 437822012 (CASA-18-148000), 437822013 (CASA-18-148010), 437822014 (CASA-18-148015), 437822016 (CASA-18-148001) and 437822017 (CASA-18-148020) in this delivery group/work order. Please note that non-requested calibrated analytes detected in a client sample may be reported on the Form 1/Certificate of Analysis as TICs. TIC data, if requested, were included on the Sample Data Summary (Form 1) and included with the sample raw data.

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

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

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the reviewer name associated with the generation of the data and package. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOA1.I	Hewlett Packard 5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	RTX-624	Restek, 60m x 0.25mm x 1.4um	Trap 10

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-854 GEL Work Order: 437822

The Qualifiers in this report are defined as follows:

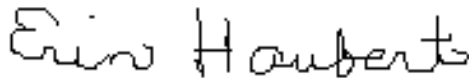
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- 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 DEC 2017

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822002

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148071
Batch ID: 1721034
Run Date: 11/21/2017 13:05
Prep Date: 11/21/2017 13:05
Data File: 112117V1\1J210.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: 2018-854
Lab Sample ID: 437822002

Client ID: CAMO-18-148071
Batch ID: 1721034
Run Date: 11/21/2017 13:05
Prep Date: 11/21/2017 13:05
Data File: 112117V1\1J210.D

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05
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**

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SDG Number: 2018-854
Lab Sample ID: 437822002

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148071
Batch ID: 1721034
Run Date: 11/21/2017 13:05
Prep Date: 11/21/2017 13:05
Data File: 112117V1\1J210.D

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

Column: DB-624

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	45.6	50.0	ug/L 91	(71%-134%)
Bromofluorobenzene	58.8	50.0	ug/L 118	(70%-131%)
Toluene-d8	44.7	50.0	ug/L 89	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822004

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148094
Batch ID: 1721034
Run Date: 11/21/2017 13:34
Prep Date: 11/21/2017 13:34
Data File: 112117V1\1J211.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

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SDG Number: 2018-854
Lab Sample ID: 437822004

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148094
Batch ID: 1721034
Run Date: 11/21/2017 13:34
Prep Date: 11/21/2017 13:34
Data File: 112117V1\1J211.D

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

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

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-854
Lab Sample ID: 437822004

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148094
Batch ID: 1721034
Run Date: 11/21/2017 13:34
Prep Date: 11/21/2017 13:34
Data File: 112117V1\1J211.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	45.6	50.0	ug/L 91	(71%-134%)
Bromofluorobenzene	60.2	50.0	ug/L 120	(70%-131%)
Toluene-d8	44.2	50.0	ug/L 88	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822007

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148072
Batch ID: 1721034
Run Date: 11/21/2017 16:27
Prep Date: 11/21/2017 16:27
Data File: 112117V1\1J217.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: 2018-854
Lab Sample ID: 437822007

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148072
Batch ID: 1721034
Run Date: 11/21/2017 16:27
Prep Date: 11/21/2017 16:27
Data File: 112117V1\1J217.D

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

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

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-854
Lab Sample ID: 437822007

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148072

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/21/2017 16:27

Inst: VOA1.I

Dilution: 1

Prep Date: 11/21/2017 16:27

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J217.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	46.2	50.0	ug/L 92	(71%-134%)
Bromofluorobenzene	60.3	50.0	ug/L 121	(70%-131%)
Toluene-d8	43.9	50.0	ug/L 88	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822010

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148110
Batch ID: 1721034
Run Date: 11/21/2017 23:34
Prep Date: 11/21/2017 23:34
Data File: 112117V1\1J232.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: 2018-854
Lab Sample ID: 437822010

Client ID: CAMO-18-148110
Batch ID: 1721034
Run Date: 11/21/2017 23:34
Prep Date: 11/21/2017 23:34
Data File: 112117V1\1J232.D

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05
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**

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SDG Number: 2018-854
Lab Sample ID: 437822010

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148110
Batch ID: 1721034
Run Date: 11/21/2017 23:34
Prep Date: 11/21/2017 23:34
Data File: 112117V1\1J232.D

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

Column: DB-624

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	43.2	50.0	ug/L 86	(71%-134%)
Bromofluorobenzene	59.7	50.0	ug/L 119	(70%-131%)
Toluene-d8	45.1	50.0	ug/L 90	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822012

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148000

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/22/2017 00:03

Inst: VOA1.I

Dilution: 1

Prep Date: 11/22/2017 00:03

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J233.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-854
Lab Sample ID: 437822012

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148000

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/22/2017 00:03

Inst: VOA1.I

Dilution: 1

Prep Date: 11/22/2017 00:03

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J233.D

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-854
Lab Sample ID: 437822012

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148000

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/22/2017 00:03

Inst: VOA1.I

Dilution: 1

Prep Date: 11/22/2017 00:03

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J233.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	43.7	50.0	ug/L 87	(71%-134%)
Bromofluorobenzene	59.9	50.0	ug/L 120	(70%-131%)
Toluene-d8	45.3	50.0	ug/L 91	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822013

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148010

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/22/2017 00:32

Inst: VOA1.I

Dilution: 1

Prep Date: 11/22/2017 00:32

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J234.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-854
Lab Sample ID: 437822013

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148010

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/22/2017 00:32

Inst: VOA1.I

Dilution: 1

Prep Date: 11/22/2017 00:32

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J234.D

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-854
Lab Sample ID: 437822013

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148010

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/22/2017 00:32

Inst: VOA1.I

Dilution: 1

Prep Date: 11/22/2017 00:32

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J234.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	44.6	50.0	ug/L 89	(71%-134%)
Bromofluorobenzene	58.9	50.0	ug/L 118	(70%-131%)
Toluene-d8	44.7	50.0	ug/L 89	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822014

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148015

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/21/2017 14:03

Inst: VOA1.I

Dilution: 1

Prep Date: 11/21/2017 14:03

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J212.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-854
Lab Sample ID: 437822014

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148015

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/21/2017 14:03

Inst: VOA1.I

Dilution: 1

Prep Date: 11/21/2017 14:03

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J212.D

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

Page 3 of 3

SDG Number: 2018-854
Lab Sample ID: 437822014

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148015

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/21/2017 14:03

Inst: VOA1.I

Dilution: 1

Prep Date: 11/21/2017 14:03

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J212.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	46.4	50.0	ug/L 93	(71%-134%)
Bromofluorobenzene	60.7	50.0	ug/L 121	(70%-131%)
Toluene-d8	45.0	50.0	ug/L 90	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822016

Date Collected: 11/09/2017 14:24
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148001

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/22/2017 01:01

Inst: VOA1.I

Dilution: 1

Prep Date: 11/22/2017 01:01

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J235.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-854
Lab Sample ID: 437822016

Date Collected: 11/09/2017 14:24
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148001

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/22/2017 01:01

Inst: VOA1.I

Dilution: 1

Prep Date: 11/22/2017 01:01

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J235.D

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-854
Lab Sample ID: 437822016

Date Collected: 11/09/2017 14:24
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148001

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/22/2017 01:01

Inst: VOA1.I

Dilution: 1

Prep Date: 11/22/2017 01:01

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J235.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	45.1	50.0	ug/L 90	(71%-134%)
Bromofluorobenzene	61.4	50.0	ug/L 123	(70%-131%)
Toluene-d8	45.0	50.0	ug/L 90	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822017

Date Collected: 11/09/2017 14:24
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148020

Client: ARSL004

Project: ESHL00114

Batch ID: 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/21/2017 14:32

Inst: VOA1.I

Dilution: 1

Prep Date: 11/21/2017 14:32

Analyst: PXY1

Purge Vol: 5 mL

Data File: 112117V1\1J213.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-854
Lab Sample ID: 437822017

Date Collected: 11/09/2017 14:24
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CASA-18-148020
Batch ID: 1721034
Run Date: 11/21/2017 14:32
Prep Date: 11/21/2017 14:32
Data File: 112117V1\1J213.D

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

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

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-854
Lab Sample ID: 437822017

Date Collected: 11/09/2017 14:24

Matrix: W

Date Received: 11/14/2017 09:05

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1721034

Inst: VOA1.I

Dilution: 1

Run Date: 11/21/2017 14:32

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 11/21/2017 14:32

Data File: 112117V1\1J213.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	46.3	50.0	ug/L 93	(71%-134%)
Bromofluorobenzene	60.2	50.0	ug/L 120	(70%-131%)
Toluene-d8	44.7	50.0	ug/L 89	(74%-124%)

Tentatively Identified Compound Summary

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

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-854**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203925223	LCS for batch 1721034	88	90	108
1203925224	LCS for batch 1721034	87	89	113
1203925222	MB for batch 1721034	89	91	119
437822002	CAMO-18-148071	91	89	118
437822004	CAMO-18-148094	91	88	120
437822014	CASA-18-148015	93	90	121
437822017	CASA-18-148020	93	89	120
437822007	CAMO-18-148072	92	88	121
1203925225	CAMO-18-148071PS	85	90	108
1203925227	CAMO-18-148071PSD	85	89	109
1203925226	CAMO-18-148071PS	84	88	110
1203925228	CAMO-18-148071PSD	85	88	110
1203925821	LCS for batch 1721034	84	89	108
1203925822	LCS for batch 1721034	85	90	112
1203925820	MB for batch 1721034	85	89	119
437822010	CAMO-18-148110	86	90	119
437822012	CASA-18-148000	87	91	120
437822013	CASA-18-148010	89	89	118
437822016	CASA-18-148001	90	90	123

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: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721034

Matrix: WATER

Lab Sample ID 1203925223

Instrument: VOA1.I

Analysis Date: 11/21/2017 09:43

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	102	102	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1230	98	61-125
67-64-1	LCS Acetone	250	0.0	296	119	48-157
74-88-4	LCS Iodomethane	250	0.0	263	105	72-128
75-15-0	LCS Carbon disulfide	250	0.0	270	108	69-138
108-05-4	LCS Vinyl acetate	250	0.0	251	100	67-125
78-93-3	LCS 2-Butanone	250	0.0	296	118	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	251	100	66-124
591-78-6	LCS 2-Hexanone	250	0.0	286	114	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	54.0	108	40-160
74-87-3	LCS Chloromethane	50.0	0.0	52.8	106	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	56.7	113	65-137
74-83-9	LCS Bromomethane	50.0	0.0	53.9	108	63-137
75-00-3	LCS Chloroethane	50.0	0.0	49.7	99	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	57.1	114	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	51.2	102	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	59.9	120	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	53.7	107	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	54.8	110	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	58.2	116	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	56.3	113	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	55.8	112	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721034

Matrix: WATER

Lab Sample ID 1203925223

Instrument: VOA1.I

Analysis Date: 11/21/2017 09:43

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	61.4	123	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	53.3	107	76-125
67-66-3	LCS Chloroform	50.0	0.0	55.6	111	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	59.1	118	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	58.0	116	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	61.5	123	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	56.8	114	74-122
71-43-2	LCS Benzene	50.0	0.0	52.9	106	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	59.1	118	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	53.0	106	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	55.7	111	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	57.1	114	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	56.6	113	78-131
108-88-3	LCS Toluene	50.0	0.0	50.0	100	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	54.9	110	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	49.9	100	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	49.7	99	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	52.1	104	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	53.7	107	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	52.3	105	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	50.2	100	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	52.3	105	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721034

Matrix: WATER

Lab Sample ID 1203925223

Instrument: VOA1.I

Analysis Date: 11/21/2017 09:43

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	52.6	105	74-126
100-42-5	LCS Styrene	50.0	0.0	52.2	104	72-130
75-25-2	LCS Bromoform	50.0	0.0	52.1	104	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	50.5	101	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	46.6	93	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	48.4	97	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	48.1	96	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	49.6	99	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	50.4	101	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	49.1	98	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	48.9	98	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	53.0	106	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	50.5	101	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	51.5	103	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	52.6	105	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	46.5	93	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	47.3	95	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	53.3	107	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	44.9	90	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	54.5	109	72-136
91-20-3	LCS Naphthalene	50.0	0.0	50.5	101	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	51.6	103	70-130

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721034

Matrix: WATER

Lab Sample ID 1203925223

Instrument: VOA1.I

Analysis Date: 11/21/2017 09:43

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	56.6	113	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	54.7	109	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	48.0	96	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5300	106	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721034

Matrix: WATER

Lab Sample ID 1203925224

Instrument: VOA1.I

Analysis Date: 11/21/2017 10:40

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	280	112	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	227	91	61-148
107-05-1	LCS	Allyl chloride	250	0.0	225	90	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	222	89	65-122
107-12-0	LCS	Propionitrile	250	0.0	217	87	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	220	88	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	226	91	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	205	82	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2360	94	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	46.0	92	66-147

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-854

Sample Type: Post Spike

Client ID: CAMO-18-148071PS

Matrix: W

Lab Sample ID 1203925225

Instrument: VOA1.I

Analysis Date: 11/21/2017 18:50

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	PS m,p-Xylenes	100	0.00 U	96.4	96	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1140	92	56-131
67-64-1	PS Acetone	250	0.00 U	107	43	25-155
74-88-4	PS Iodomethane	250	0.00 U	246	98	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	246	99	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	222	89	48-133
78-93-3	PS 2-Butanone	250	0.00 U	148	59	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	220	88	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	172	69	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	46.4	93	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	46.5	93	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	49.0	98	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	50.9	102	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	44.3	89	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	49.4	99	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	47.6	95	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	53.6	107	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	51.2	102	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	52.6	105	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	53.3	107	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	52.3	105	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

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SDG Number: 2018-854

Sample Type: Post Spike

Client ID: CAMO-18-148071PS

Matrix: W

Lab Sample ID 1203925225

Instrument: VOA1.I

Analysis Date: 11/21/2017 18:50

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	53.3	107	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	51.2	102	71-130
67-66-3	PS Chloroform	50.0	0.00 U	52.4	105	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	52.7	105	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	52.4	105	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	55.4	111	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	54.3	109	69-130
71-43-2	PS Benzene	50.0	0.00 U	49.3	99	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	53.1	106	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	50.4	101	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	52.8	106	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	54.1	108	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	51.8	104	70-134
108-88-3	PS Toluene	50.0	0.00 U	46.7	93	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	52.5	105	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	48.4	97	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	48.0	96	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	48.3	97	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	52.8	106	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	50.9	102	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	47.5	95	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	49.0	98	61-130

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-854

Sample Type: Post Spike

Client ID: CAMO-18-148071PS

Matrix: W

Lab Sample ID 1203925225

Instrument: VOA1.I

Analysis Date: 11/21/2017 18:50

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	PS o-Xylene	50.0	0.00 U	49.9	100	62-131
100-42-5	PS Styrene	50.0	0.00 U	49.3	99	59-135
75-25-2	PS Bromoform	50.0	0.00 U	50.5	101	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	47.0	94	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	45.1	90	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	47.2	94	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	45.9	92	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	46.4	93	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	47.4	95	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	46.2	92	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	45.4	91	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	49.5	99	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	47.2	94	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	47.9	96	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	49.4	99	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	43.6	87	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	44.3	89	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	48.7	97	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	43.2	86	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	50.0	100	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	45.9	92	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	46.6	93	52-135

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-854

Sample Type: Post Spike

Client ID: CAMO-18-148071PS

Matrix: W

Lab Sample ID 1203925225

Instrument: VOA1.I

Analysis Date: 11/21/2017 18:50

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	50.5	101	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	52.0	104	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	45.3	91	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	4970	99	60-140

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-854

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148071PSD

Matrix: W

Lab Sample ID 1203925227

Instrument: VOA1.I

Analysis Date: 11/21/2017 19:19

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	93.1	93	59-132	3	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1160	93	56-131	1	0-20
67-64-1	PSD Acetone	250	0.00 U	108	43	25-155	1	0-20
74-88-4	PSD Iodomethane	250	0.00 U	240	96	66-133	2	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	239	95	61-141	3	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	222	89	48-133	0	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	150	60	25-143	1	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	221	88	61-127	0	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	174	70	33-138	2	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	43.5	87	33-164	6	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	45.3	91	53-139	3	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	48.6	97	58-140	1	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	49.2	98	59-146	3	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	44.2	88	65-129	0	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	47.8	96	65-141	3	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	48.0	96	69-127	1	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	51.9	104	59-130	3	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	50.9	102	62-123	1	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	52.4	105	69-132	0	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	51.7	103	65-127	3	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	51.2	102	67-127	2	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	51.8	104	69-127	3	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-854

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148071PSD

Matrix: W

Lab Sample ID 1203925227

Instrument: VOA1.I

Analysis Date: 11/21/2017 19:19

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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 51.3	103	66-137	4	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 50.9	102	71-130	1	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 51.2	102	71-129	2	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 51.2	102	69-139	3	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 50.3	101	67-130	4	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 52.7	105	66-143	5	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 53.2	106	69-130	2	0-20
71-43-2	PSD Benzene	50.0	0.00	U 48.5	97	66-125	2	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 52.0	104	65-131	2	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 49.6	99	67-127	2	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 52.8	106	72-129	0	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 53.2	106	70-138	2	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 51.8	104	70-134	0	0-20
108-88-3	PSD Toluene	50.0	0.00	U 45.3	91	60-126	3	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 51.6	103	69-135	2	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 47.8	96	66-125	1	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 47.4	95	67-124	1	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 46.4	93	60-130	4	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 51.4	103	68-143	3	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 50.3	101	71-127	1	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 46.2	92	64-124	3	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 47.0	94	61-130	4	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-854

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148071PSD

Matrix: W

Lab Sample ID 1203925227

Instrument: VOA1.I

Analysis Date: 11/21/2017 19:19

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
95-47-6	PSD o-Xylene	50.0	0.00	U 48.3	97	62-131	3	0-20
100-42-5	PSD Styrene	50.0	0.00	U 48.3	97	59-135	2	0-20
75-25-2	PSD Bromoform	50.0	0.00	U 50.4	101	64-138	0	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00	U 46.2	92	55-133	2	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00	U 46.0	92	62-129	2	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00	U 48.5	97	70-124	3	0-20
108-86-1	PSD Bromobenzene	50.0	0.00	U 45.4	91	62-124	1	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00	U 44.8	90	50-133	4	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00	U 45.9	92	53-135	3	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00	U 45.6	91	56-128	1	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00	U 44.0	88	53-130	3	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00	U 47.6	95	55-135	4	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00	U 45.4	91	53-132	4	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00	U 46.3	93	50-138	3	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00	U 46.9	94	49-138	5	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00	U 42.4	85	56-126	3	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00	U 42.9	86	55-125	3	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00	U 45.6	91	43-142	7	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00	U 45.1	90	62-141	4	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00	U 46.5	93	40-147	7	0-20
91-20-3	PSD Naphthalene	50.0	0.00	U 48.5	97	62-134	5	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00	U 46.4	93	52-135	0	0-20

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-854

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148071PSD

Matrix: W

Lab Sample ID 1203925227

Instrument: VOA1.I

Analysis Date: 11/21/2017 19:19

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
120-82-1	PSD 1,2,4-Trichlorobenzene	50.0	0.00	U 49.1	98	50-133	3	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00	U 50.8	102	71-133	2	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00	U 44.4	89	60-125	2	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00	U 5210	104	60-140	5	0-20

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-854

Sample Type: Post Spike

Client ID: CAMO-18-148071PS

Matrix: W

Lab Sample ID 1203925226

Instrument: VOA1.I

Analysis Date: 11/21/2017 19:47

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	PS	Acrolein	250	0.00	U	199	79	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00	U	218	87	57-149
107-05-1	PS	Allyl chloride	250	0.00	U	221	89	54-128
107-13-1	PS	Acrylonitrile	250	0.00	U	225	90	59-129
107-12-0	PS	Propionitrile	250	0.00	U	217	87	58-131
126-98-7	PS	Methacrylonitrile	250	0.00	U	224	89	59-134
80-62-6	PS	Methyl methacrylate	250	0.00	U	230	92	62-135
97-63-2	PS	Ethyl methacrylate	250	0.00	U	204	82	60-136
78-83-1	PS	Isobutyl alcohol	2500	0.00	U	2370	95	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00	U	44.5	89	63-146

Volatile

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Quality Control Summary Spike Recovery Report

SDG Number: 2018-854

Sample Type: Post Spike Duplicate

Client ID: CAMO-18-148071PSD

Matrix: W

Lab Sample ID 1203925228

Instrument: VOA1.I

Analysis Date: 11/21/2017 20:16

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	207	83	49-141	4	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00	U	220	88	57-149	1	0-20
107-05-1	PSD Allyl chloride	250	0.00	U	220	88	54-128	1	0-20
107-13-1	PSD Acrylonitrile	250	0.00	U	229	92	59-129	2	0-20
107-12-0	PSD Propionitrile	250	0.00	U	228	91	58-131	5	0-20
126-98-7	PSD Methacrylonitrile	250	0.00	U	227	91	59-134	1	0-20
80-62-6	PSD Methyl methacrylate	250	0.00	U	233	93	62-135	1	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00	U	208	83	60-136	2	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00	U	2480	99	60-143	4	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00	U	43.7	87	63-146	2	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721034

Matrix: WATER

Lab Sample ID 1203925821

Instrument: VOA1.I

Analysis Date: 11/21/2017 21:38

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	91.2	91	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1130	91	61-125
67-64-1	LCS Acetone	250	0.0	206	83	48-157
74-88-4	LCS Iodomethane	250	0.0	239	96	72-128
75-15-0	LCS Carbon disulfide	250	0.0	230	92	69-138
108-05-4	LCS Vinyl acetate	250	0.0	221	89	67-125
78-93-3	LCS 2-Butanone	250	0.0	215	86	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	216	87	66-124
591-78-6	LCS 2-Hexanone	250	0.0	202	81	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	42.1	84	40-160
74-87-3	LCS Chloromethane	50.0	0.0	44.5	89	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	45.9	92	65-137
74-83-9	LCS Bromomethane	50.0	0.0	47.4	95	63-137
75-00-3	LCS Chloroethane	50.0	0.0	42.6	85	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	43.6	87	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	48.5	97	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	49.7	99	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	51.8	104	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	54.3	109	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	50.6	101	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	50.7	101	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	51.6	103	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721034

Matrix: WATER

Lab Sample ID 1203925821

Instrument: VOA1.I

Analysis Date: 11/21/2017 21:38

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	48.3	97	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	51.4	103	76-125
67-66-3	LCS Chloroform	50.0	0.0	50.3	101	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	48.2	96	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	48.5	97	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	49.7	99	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	52.4	105	74-122
71-43-2	LCS Benzene	50.0	0.0	48.3	97	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	50.6	101	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	50.1	100	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	52.4	105	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	53.2	106	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	52.9	106	78-131
108-88-3	LCS Toluene	50.0	0.0	45.7	91	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	52.2	104	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	48.7	97	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	47.9	96	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	44.6	89	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	51.6	103	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	50.6	101	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	46.5	93	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	45.8	92	73-125

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721034

Matrix: WATER

Lab Sample ID 1203925821

Instrument: VOA1.I

Analysis Date: 11/21/2017 21:38

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	47.9	96	74-126
100-42-5	LCS Styrene	50.0	0.0	48.1	96	72-130
75-25-2	LCS Bromoform	50.0	0.0	50.6	101	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	45.1	90	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	45.2	90	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	47.3	95	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	46.2	92	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	44.3	89	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	46.0	92	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	45.5	91	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	45.1	90	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	47.0	94	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	45.7	91	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	45.7	91	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	47.3	95	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	43.2	86	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	44.1	88	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	46.9	94	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	44.2	88	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	50.1	100	72-136
91-20-3	LCS Naphthalene	50.0	0.0	49.7	99	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	49.1	98	70-130

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721034

Matrix: WATER

Lab Sample ID 1203925821

Instrument: VOA1.I

Analysis Date: 11/21/2017 21:38

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	52.3	105	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	50.3	101	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	45.5	91	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5040	101	63-138

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1721034

Matrix: WATER

Lab Sample ID 1203925822

Instrument: VOA1.I

Analysis Date: 11/21/2017 22:36

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1721034

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	259	104	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	201	80	61-148
107-05-1	LCS Allyl chloride	250	0.0	213	85	59-125
107-13-1	LCS Acrylonitrile	250	0.0	223	89	65-122
107-12-0	LCS Propionitrile	250	0.0	218	87	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	222	89	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	229	92	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	208	83	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2370	95	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	41.2	82	66-147

Method Blank Summary

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SDG Number:	2018-854	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1721034	Instrument ID:	VOA1.I	Data File:	112117V1\1J206AR.D
Lab Sample ID:	1203925222	Prep Date:	11/21/2017 11:09	Analyzed:	11/21/17 11:09
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 1721034	1203925223	112117V1\1J203AR.D	11/21/17	0943
02 LCS for batch 1721034	1203925224	112117V1\1J205AR.D	11/21/17	1040
03 CAMO-18-148071	437822002	112117V1\1J210.D	11/21/17	1305
04 CAMO-18-148094	437822004	112117V1\1J211.D	11/21/17	1334
05 CASA-18-148015	437822014	112117V1\1J212.D	11/21/17	1403
06 CASA-18-148020	437822017	112117V1\1J213.D	11/21/17	1432
07 CAMO-18-148072	437822007	112117V1\1J217.D	11/21/17	1627
08 CAMO-18-148071PS	1203925225	112117V1\1J222.D	11/21/17	1850
09 CAMO-18-148071PSD	1203925227	112117V1\1J223.D	11/21/17	1919
10 CAMO-18-148071PS	1203925226	112117V1\1J224.D	11/21/17	1947
11 CAMO-18-148071PSD	1203925228	112117V1\1J225.D	11/21/17	2016

Method Blank Summary

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SDG Number:	2018-854	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1721034	Instrument ID:	VOA1.I	Data File:	112117V1\1J231A.D
Lab Sample ID:	1203925820	Prep Date:	11/21/2017 23:05	Analyzed:	11/21/17 23:05
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
13 LCS for batch 1721034	1203925821	112117V1\1J228A.D	11/21/17	2138
14 LCS for batch 1721034	1203925822	112117V1\1J230A.D	11/21/17	2236
15 CAMO-18-148110	437822010	112117V1\1J232.D	11/21/17	2334
16 CASA-18-148000	437822012	112117V1\1J233.D	11/22/17	0003
17 CASA-18-148010	437822013	112117V1\1J234.D	11/22/17	0032
18 CASA-18-148001	437822016	112117V1\1J235.D	11/22/17	0101

Quality Control Data

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Certificate of Analysis
Sample Summary

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SDG Number: 2018-854

Lab Sample ID: 1203925222

Client Sample: QC for batch 1721034

Client ID: MB for batch 1721034

Batch ID: 1721034

Run Date: 11/21/2017 11:09

Prep Date: 11/21/2017 11:09

Data File: 112117V1\1J206AR.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Volatile
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Sample Summary

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SDG Number: 2018-854

Lab Sample ID: 1203925222

Client Sample: QC for batch 1721034

Client ID: MB for batch 1721034

Batch ID: 1721034

Run Date: 11/21/2017 11:09

Prep Date: 11/21/2017 11:09

Data File: 112117V1\1J206AR.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA1.I

Analyst: PXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

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Sample Summary

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SDG Number: 2018-854

Lab Sample ID: 1203925222

Client Sample: QC for batch 1721034

Client ID: MB for batch 1721034

Batch ID: 1721034

Run Date: 11/21/2017 11:09

Prep Date: 11/21/2017 11:09

Data File: 112117V1\1J206AR.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	44.6	50.0	ug/L 89	(71%-134%)
Bromofluorobenzene	59.6	50.0	ug/L 119	(70%-131%)
Toluene-d8	45.5	50.0	ug/L 91	(74%-124%)

Tentatively Identified Compound Summary

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

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Sample Summary

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SDG Number: 2018-854
Lab Sample ID: 1203925223
Client Sample: QC for batch 1721034
Client ID: LCS for batch 1721034
Batch ID: 1721034
Run Date: 11/21/2017 09:43
Prep Date: 11/21/2017 09:43
Data File: 112117V1\1J203AR.D

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

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		54.7	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		59.1	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		46.6	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		49.9	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		56.3	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		59.9	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		58.0	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		51.6	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		48.4	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		56.6	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		50.5	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		52.3	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		48.0	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		56.8	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		53.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		50.4	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		46.5	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		49.7	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		47.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		61.4	ug/L	0.300	1.00
78-93-3	2-Butanone		296	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		49.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		286	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		48.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		52.6	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		251	ug/L	1.50	5.00
67-64-1	Acetone		296	ug/L	1.50	10.0
75-05-8	Acetonitrile		1230	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		52.9	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		53.3	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		57.1	ug/L	0.300	1.00
75-25-2	Bromoform		52.1	ug/L	0.300	1.00

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Sample Summary

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SDG Number: 2018-854
Lab Sample ID: 1203925223
Client Sample: QC for batch 1721034
Client ID: LCS for batch 1721034
Batch ID: 1721034
Run Date: 11/21/2017 09:43
Prep Date: 11/21/2017 09:43
Data File: 112117V1\1J203AR.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		53.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		270	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		61.5	ug/L	0.300	1.00
108-90-7	Chlorobenzene		50.2	ug/L	0.300	1.00
75-00-3	Chloroethane		49.7	ug/L	0.300	1.00
67-66-3	Chloroform		55.6	ug/L	0.300	1.00
74-87-3	Chloromethane		52.8	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		53.7	ug/L	0.300	1.00
74-95-3	Dibromomethane		55.7	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		54.0	ug/L	0.300	1.00
60-29-7	Ethyl ether		51.2	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		52.3	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		54.5	ug/L	0.300	1.00
74-88-4	Iodomethane		263	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		50.5	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		53.7	ug/L	1.00	10.0
91-20-3	Naphthalene		50.5	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		52.2	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		52.1	ug/L	0.300	1.00
108-88-3	Toluene		50.0	ug/L	0.300	1.00
79-01-6	Trichloroethylene		59.1	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		57.1	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		251	ug/L	1.50	5.00
75-01-4	Vinyl chloride		56.7	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		55.8	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		56.6	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		102	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5300	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		53.3	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		49.6	ug/L	0.300	1.00
95-47-6	o-Xylene		52.6	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		51.5	ug/L	0.300	1.00

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Sample Summary**

SDG Number: 2018-854
Lab Sample ID: 1203925223
Client Sample: QC for batch 1721034
Client ID: LCS for batch 1721034
Batch ID: 1721034
Run Date: 11/21/2017 09:43
Prep Date: 11/21/2017 09:43
Data File: 112117V1\1J203AR.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
1634-04-4	tert-Butyl methyl ether		54.8	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		53.0	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		58.2	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		54.9	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	54.0	50.0	ug/L	108	(70%-131%)
Toluene-d8	44.8	50.0	ug/L	90	(74%-124%)

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Sample Summary

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SDG Number: 2018-854
Lab Sample ID: 1203925224
Client Sample: QC for batch 1721034
Client ID: LCS for batch 1721034
Batch ID: 1721034
Run Date: 11/21/2017 10:40
Prep Date: 11/21/2017 10:40
Data File: 112117V1\1J205AR.D

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

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		46.0	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		280	ug/L	1.50	5.00
107-13-1	Acrylonitrile		222	ug/L	1.50	5.00
107-05-1	Allyl chloride		225	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

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Sample Summary**

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SDG Number: 2018-854
Lab Sample ID: 1203925224
Client Sample: QC for batch 1721034
Client ID: LCS for batch 1721034
Batch ID: 1721034
Run Date: 11/21/2017 10:40
Prep Date: 11/21/2017 10:40
Data File: 112117V1\1J205AR.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		205	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		220	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		226	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		217	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		227	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile
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Sample Summary

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SDG Number:	2018-854	Matrix:	WATER
Lab Sample ID:	1203925224		
Client Sample:	QC for batch 1721034	Client:	ARSL004
Client ID:	LCS for batch 1721034	Method:	SW-846:8260B
Batch ID:	1721034	Inst:	VOA1.I
Run Date:	11/21/2017 10:40	Analyst:	PXY1
Prep Date:	11/21/2017 10:40		
Data File:	112117V1\1J205AR.D	Column:	DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	43.4	50.0	ug/L 87	(71%-134%)
Bromofluorobenzene	56.3	50.0	ug/L 113	(70%-131%)
Toluene-d8	44.3	50.0	ug/L 89	(74%-124%)

Volatile
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Sample Summary

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SDG Number: 2018-854
Lab Sample ID: 1203925225
Client Sample: QC for batch 1721034
Client ID: CAMO-18-148071PS
Batch ID: 1721034
Run Date: 11/21/2017 18:50
Prep Date: 11/21/2017 18:50
Data File: 112117V1\1J222.D

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05
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		52.0	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		52.7	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		45.1	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		48.4	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		52.3	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		53.6	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		52.4	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		46.6	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		50.5	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		47.2	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		43.2	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		50.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		45.3	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		54.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		50.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		47.4	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		48.0	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		44.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		53.3	ug/L	0.300	1.00
78-93-3	2-Butanone		148	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		46.2	ug/L	0.300	1.00
591-78-6	2-Hexanone		172	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		45.4	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		49.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		220	ug/L	1.50	5.00
67-64-1	Acetone		107	ug/L	1.50	10.0
75-05-8	Acetonitrile		1140	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		49.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		45.9	ug/L	0.300	1.00
74-97-5	Bromochloromethane		51.2	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		54.1	ug/L	0.300	1.00
75-25-2	Bromoform		50.5	ug/L	0.300	1.00

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Sample Summary

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SDG Number: 2018-854
Lab Sample ID: 1203925225
Client Sample: QC for batch 1721034
Client ID: CAMO-18-148071PS
Batch ID: 1721034
Run Date: 11/21/2017 18:50
Prep Date: 11/21/2017 18:50
Data File: 112117V1\1J222.D

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05
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		50.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		246	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		55.4	ug/L	0.300	1.00
108-90-7	Chlorobenzene		47.5	ug/L	0.300	1.00
75-00-3	Chloroethane		44.3	ug/L	0.300	1.00
67-66-3	Chloroform		52.4	ug/L	0.300	1.00
74-87-3	Chloromethane		46.5	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		52.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		52.8	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		46.4	ug/L	0.300	1.00
60-29-7	Ethyl ether		47.6	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		49.0	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		50.0	ug/L	0.300	1.00
74-88-4	Iodomethane		246	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		47.0	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		51.2	ug/L	1.00	10.0
91-20-3	Naphthalene		45.9	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		49.3	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		48.3	ug/L	0.300	1.00
108-88-3	Toluene		46.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		53.1	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		49.4	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		222	ug/L	1.50	5.00
75-01-4	Vinyl chloride		49.0	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		51.8	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		96.4	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4970	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		48.7	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		46.4	ug/L	0.300	1.00
95-47-6	o-Xylene		49.9	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		47.9	ug/L	0.300	1.00

Volatile
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Sample Summary

SDG Number:	2018-854	Date Collected:	11/09/2017 13:37	Matrix:	W
Lab Sample ID:	1203925225	Date Received:	11/14/2017 09:05		
Client Sample:	QC for batch 1721034	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-148071PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1721034	Inst:	VOA1.I	Dilution:	1
Run Date:	11/21/2017 18:50	Analyst:	PXY1	Purge Vol:	5 mL
Prep Date:	11/21/2017 18:50				
Data File:	112117V1\1J222.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		52.6	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		49.5	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		53.3	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		52.5	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	53.9	50.0	ug/L	108	(70%-131%)
Toluene-d8	44.9	50.0	ug/L	90	(74%-124%)

Volatile
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Sample Summary

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SDG Number: 2018-854
Lab Sample ID: 1203925226
Client Sample: QC for batch 1721034
Client ID: CAMO-18-148071PS
Batch ID: 1721034
Run Date: 11/21/2017 19:47
Prep Date: 11/21/2017 19:47
Data File: 112117V1\1J224.D

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05
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		44.5	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		199	ug/L	1.50	5.00
107-13-1	Acrylonitrile		225	ug/L	1.50	5.00
107-05-1	Allyl chloride		221	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: 2018-854
Lab Sample ID: 1203925226
Client Sample: QC for batch 1721034
Client ID: CAMO-18-148071PS
Batch ID: 1721034
Run Date: 11/21/2017 19:47
Prep Date: 11/21/2017 19:47
Data File: 112117V1\1J224.D

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05
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		204	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2370	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		224	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		230	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		217	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		218	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:	2018-854	Date Collected:	11/09/2017 13:37	Matrix:	W
Lab Sample ID:	1203925226	Date Received:	11/14/2017 09:05		
Client Sample:	QC for batch 1721034	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-148071PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1721034	Inst:	VOA1.I	Dilution:	1
Run Date:	11/21/2017 19:47	Analyst:	PXY1	Purge Vol:	5 mL
Prep Date:	11/21/2017 19:47				
Data File:	112117V1\1J224.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	42.0	50.0	ug/L	84	(71%-134%)
Bromofluorobenzene	54.9	50.0	ug/L	110	(70%-131%)
Toluene-d8	44.0	50.0	ug/L	88	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-854	Date Collected: 11/09/2017 13:37	Matrix: W
Lab Sample ID: 1203925227	Date Received: 11/14/2017 09:05	
Client Sample: QC for batch 1721034	Client: ARSL004	Project: QC
Client ID: CAMO-18-148071PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1721034	Inst: VOA1.I	Dilution: 1
Run Date: 11/21/2017 19:19	Analyst: PXY1	Purge Vol: 5 mL
Prep Date: 11/21/2017 19:19		
Data File: 112117V1\1J223.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		50.8	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		51.2	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		46.0	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.8	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		51.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		51.9	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		50.3	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		46.4	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		48.5	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		49.1	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		45.4	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		45.1	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		50.3	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		44.4	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		53.2	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		49.6	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		45.9	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		42.4	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		47.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		42.9	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		51.3	ug/L	0.300	1.00
78-93-3	2-Butanone		150	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		45.6	ug/L	0.300	1.00
591-78-6	2-Hexanone		174	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		44.0	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		46.9	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		221	ug/L	1.50	5.00
67-64-1	Acetone		108	ug/L	1.50	10.0
75-05-8	Acetonitrile		1160	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		48.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		45.4	ug/L	0.300	1.00
74-97-5	Bromochloromethane		50.9	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		53.2	ug/L	0.300	1.00
75-25-2	Bromoform		50.4	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-854	Date Collected: 11/09/2017 13:37	Matrix: W
Lab Sample ID: 1203925227	Date Received: 11/14/2017 09:05	
Client Sample: QC for batch 1721034	Client: ARSL004	Project: QC
Client ID: CAMO-18-148071PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1721034	Inst: VOA1.I	Dilution: 1
Run Date: 11/21/2017 19:19	Analyst: PXY1	Purge Vol: 5 mL
Prep Date: 11/21/2017 19:19		
Data File: 112117V1\1J223.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		49.2	ug/L	0.300	1.00
75-15-0	Carbon disulfide		239	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		52.7	ug/L	0.300	1.00
108-90-7	Chlorobenzene		46.2	ug/L	0.300	1.00
75-00-3	Chloroethane		44.2	ug/L	0.300	1.00
67-66-3	Chloroform		51.2	ug/L	0.300	1.00
74-87-3	Chloromethane		45.3	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		51.4	ug/L	0.300	1.00
74-95-3	Dibromomethane		52.8	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		43.5	ug/L	0.300	1.00
60-29-7	Ethyl ether		48.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		47.0	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		46.5	ug/L	0.300	1.00
74-88-4	Iodomethane		240	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		46.2	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		50.9	ug/L	1.00	10.0
91-20-3	Naphthalene		48.5	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		48.3	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.4	ug/L	0.300	1.00
108-88-3	Toluene		45.3	ug/L	0.300	1.00
79-01-6	Trichloroethylene		52.0	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		47.8	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		222	ug/L	1.50	5.00
75-01-4	Vinyl chloride		48.6	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		51.8	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		51.8	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		93.1	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5210	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		45.6	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		44.8	ug/L	0.300	1.00
95-47-6	o-Xylene		48.3	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		46.3	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-854	Date Collected:	11/09/2017 13:37	Matrix:	W
Lab Sample ID:	1203925227	Date Received:	11/14/2017 09:05		
Client Sample:	QC for batch 1721034	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-148071PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1721034	Inst:	VOA1.I	Dilution:	1
Run Date:	11/21/2017 19:19	Analyst:	PXY1	Purge Vol:	5 mL
Prep Date:	11/21/2017 19:19				
Data File:	112117V1\1J223.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		52.4	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		47.6	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		51.7	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		51.6	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	42.6	50.0	ug/L	85	(71%-134%)
Bromofluorobenzene	54.4	50.0	ug/L	109	(70%-131%)
Toluene-d8	44.6	50.0	ug/L	89	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-854	Date Collected: 11/09/2017 13:37	Matrix: W
Lab Sample ID: 1203925228	Date Received: 11/14/2017 09:05	
Client Sample: QC for batch 1721034	Client: ARSL004	Project: QC
Client ID: CAMO-18-148071PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1721034	Inst: VOA1.I	Dilution: 1
Run Date: 11/21/2017 20:16	Analyst: PXY1	Purge Vol: 5 mL
Prep Date: 11/21/2017 20:16		
Data File: 112117V1\1J225.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		43.7	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		207	ug/L	1.50	5.00
107-13-1	Acrylonitrile		229	ug/L	1.50	5.00
107-05-1	Allyl chloride		220	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-854	Date Collected: 11/09/2017 13:37	Matrix: W
Lab Sample ID: 1203925228	Date Received: 11/14/2017 09:05	
Client Sample: QC for batch 1721034	Client: ARSL004	Project: QC
Client ID: CAMO-18-148071PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1721034	Inst: VOA1.I	Dilution: 1
Run Date: 11/21/2017 20:16	Analyst: PXY1	Purge Vol: 5 mL
Prep Date: 11/21/2017 20:16		
Data File: 112117V1\1J225.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		208	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		2480	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		227	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		233	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		228	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		220	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:	2018-854	Date Collected:	11/09/2017 13:37	Matrix:	W
Lab Sample ID:	1203925228	Date Received:	11/14/2017 09:05		
Client Sample:	QC for batch 1721034	Client:	ARSL004	Project:	QC
Client ID:	CAMO-18-148071PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1721034	Inst:	VOA1.I	Dilution:	1
Run Date:	11/21/2017 20:16	Analyst:	PXY1	Purge Vol:	5 mL
Prep Date:	11/21/2017 20:16				
Data File:	112117V1\1J225.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	42.7	50.0	ug/L	85	(71%-134%)
Bromofluorobenzene	55.1	50.0	ug/L	110	(70%-131%)
Toluene-d8	44.0	50.0	ug/L	88	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-854

Matrix: WATER

Lab Sample ID: 1203925820

Client Sample: QC for batch 1721034

Client: ARSL004

Project: QC

Client ID: MB for batch 1721034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1721034

Inst: VOA1.I

Dilution: 1

Run Date: 11/21/2017 23:05

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 11/21/2017 23:05

Column: DB-624

Data File: 112117V1\1J231A.D

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-854
Lab Sample ID: 1203925820
Client Sample: QC for batch 1721034
Client ID: MB for batch 1721034
Batch ID: 1721034
Run Date: 11/21/2017 23:05
Prep Date: 11/21/2017 23:05
Data File: 112117V1\1J231A.D

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

Column: DB-624

Matrix: WATER

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

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

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-854	Matrix: WATER
Lab Sample ID: 1203925820	
Client Sample: QC for batch 1721034	Client: ARSL004
Client ID: MB for batch 1721034	Method: SW-846:8260B
Batch ID: 1721034	Project: QC
Run Date: 11/21/2017 23:05	SOP Ref: GL-OA-E-038
Prep Date: 11/21/2017 23:05	Dilution: 1
Data File: 112117V1\1J231A.D	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	42.6	50.0	ug/L 85	(71%-134%)
Bromofluorobenzene	59.6	50.0	ug/L 119	(70%-131%)
Toluene-d8	44.7	50.0	ug/L 89	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-854
Lab Sample ID: 1203925821
Client Sample: QC for batch 1721034
Client ID: LCS for batch 1721034
Batch ID: 1721034
Run Date: 11/21/2017 21:38
Prep Date: 11/21/2017 21:38
Data File: 112117V1\1J228A.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		50.3	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		48.2	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		45.2	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		48.7	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		50.7	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		49.7	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		48.5	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		49.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		47.3	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		52.3	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		45.7	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		44.2	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		50.6	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		45.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		52.4	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		50.1	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		46.0	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		43.2	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		47.9	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		44.1	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		48.3	ug/L	0.300	1.00
78-93-3	2-Butanone		215	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		45.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		202	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		45.1	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		47.3	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		216	ug/L	1.50	5.00
67-64-1	Acetone		206	ug/L	1.50	10.0
75-05-8	Acetonitrile		1130	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		48.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		46.2	ug/L	0.300	1.00
74-97-5	Bromochloromethane		51.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		53.2	ug/L	0.300	1.00
75-25-2	Bromoform		50.6	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-854
Lab Sample ID: 1203925821
Client Sample: QC for batch 1721034
Client ID: LCS for batch 1721034
Batch ID: 1721034
Run Date: 11/21/2017 21:38
Prep Date: 11/21/2017 21:38
Data File: 112117V1\1J228A.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		47.4	ug/L	0.300	1.00
75-15-0	Carbon disulfide		230	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		49.7	ug/L	0.300	1.00
108-90-7	Chlorobenzene		46.5	ug/L	0.300	1.00
75-00-3	Chloroethane		42.6	ug/L	0.300	1.00
67-66-3	Chloroform		50.3	ug/L	0.300	1.00
74-87-3	Chloromethane		44.5	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		51.6	ug/L	0.300	1.00
74-95-3	Dibromomethane		52.4	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		42.1	ug/L	0.300	1.00
60-29-7	Ethyl ether		48.5	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		45.8	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		50.1	ug/L	0.300	1.00
74-88-4	Iodomethane		239	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		45.1	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		51.8	ug/L	1.00	10.0
91-20-3	Naphthalene		49.7	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		48.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		44.6	ug/L	0.300	1.00
108-88-3	Toluene		45.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		50.6	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		43.6	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		221	ug/L	1.50	5.00
75-01-4	Vinyl chloride		45.9	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		51.6	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		52.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		91.2	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5040	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		46.9	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		44.3	ug/L	0.300	1.00
95-47-6	o-Xylene		47.9	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		45.7	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-854	Matrix:	WATER
Lab Sample ID:	1203925821		
Client Sample:	QC for batch 1721034	Client:	ARSL004
Client ID:	LCS for batch 1721034	Method:	SW-846:8260B
Batch ID:	1721034	Inst:	VOA1.I
Run Date:	11/21/2017 21:38	Analyst:	PXY1
Prep Date:	11/21/2017 21:38	Purge Vol:	5 mL
Data File:	112117V1\1J228A.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		54.3	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		47.0	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		50.6	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		52.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	42.0	50.0	ug/L	84	(71%-134%)
Bromofluorobenzene	54.1	50.0	ug/L	108	(70%-131%)
Toluene-d8	44.3	50.0	ug/L	89	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-854

Lab Sample ID: 1203925822

Client Sample: QC for batch 1721034

Client ID: LCS for batch 1721034

Batch ID: 1721034

Run Date: 11/21/2017 22:36

Prep Date: 11/21/2017 22:36

Data File: 112117V1\1J230A.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		41.2	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		259	ug/L	1.50	5.00
107-13-1	Acrylonitrile		223	ug/L	1.50	5.00
107-05-1	Allyl chloride		213	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: 2018-854
Lab Sample ID: 1203925822
Client Sample: QC for batch 1721034
Client ID: LCS for batch 1721034
Batch ID: 1721034
Run Date: 11/21/2017 22:36
Prep Date: 11/21/2017 22:36
Data File: 112117V1\1J230A.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		208	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2370	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		222	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		229	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		218	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		201	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: 2018-854
Lab Sample ID: 1203925822
Client Sample: QC for batch 1721034
Client ID: LCS for batch 1721034
Batch ID: 1721034
Run Date: 11/21/2017 22:36
Prep Date: 11/21/2017 22:36
Data File: 112117V1\1J230A.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
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	55.8	50.0	ug/L 112	(70%-131%)
Toluene-d8	45.0	50.0	ug/L 90	(74%-124%)

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-854
Work Order #: 437822**

Method/Analysis Information

Procedure:	Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry
Analytical Method:	SW846 3510C/8270D
Prep Method:	SW846 3510C
Analytical Batch Number:	1719087
Prep Batch Number:	1719086

Sample Analysis

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

Sample ID	Client ID
437822002	CAMO-18-148071
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CAMO-18-148000
437822013	CAMO-18-148010
437822016	CAMO-18-148001
1203920336	Method Blank (MB)
1203920337	Laboratory Control Sample (LCS)
1203920338	437822002(CAMO-18-148071) Matrix Spike (MS)
1203920339	437822002(CAMO-18-148071) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

SOP Reference

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

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

Calibration Information

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

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

Initial Calibration

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

CCV Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

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

Surrogate Recoveries

The MB(See Below) surrogate recovery for Phenol-d5 was slightly below the acceptance criteria. All surrogates for the LCS, MS, MSD and client samples were within acceptance criteria. All spike recoveries were within the acceptance criteria. The failure was limited to the MB only and the data were reported.

Sample	Analyte	Value
1203920336 (MB)	Phenol-d5	11* (15%-91%)

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 437822002 (CAMO-18-148071) 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**

Samples (See Below) were received within holding, but extracted out of holding. The samples were analyzed and the data have been reported and qualified accordingly.

Sample	Value
1203920338 (CAMO-18-148071MS)	Received 14-NOV-17, within holding, prepped 20-NOV-17, out of holding 16-NOV-17
1203920339 (CAMO-18-148071MSD)	Received 14-NOV-17, within holding, prepped 20-NOV-17, out of holding 16-NOV-17
437822002 (CAMO-18-148071)	Received 14-NOV-17, within holding, prepped 20-NOV-17, out of holding 16-NOV-17
437822007 (CAMO-18-148072)	Received 14-NOV-17, within holding, prepped 20-NOV-17, out of holding 16-NOV-17
437822010 (CAMO-18-148110)	Received 14-NOV-17, within holding, prepped 20-NOV-17, out of holding 16-NOV-17
437822012 (CAMO-18-148000)	Received 14-NOV-17, within holding, prepped 20-NOV-17, out of holding 16-NOV-17
437822013 (CAMO-18-148010)	Received 14-NOV-17, within holding, prepped 20-NOV-17, out of holding 16-NOV-17
437822016 (CAMO-18-148001)	Received 14-NOV-17, within holding, prepped 20-NOV-17, out of holding 16-NOV-17

Preparation/Analytical Method Verification

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

Sample Dilutions

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

Sample Re-extraction/Re-analysis

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

Miscellaneous Information:**Manual Integrations**

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

TIC Comment

Tentatively identified compounds (TIC) were requested for samples 437822002 (CAMO-18-148071), 437822007 (CAMO-18-148072), 437822010 (CAMO-18-148110), 437822012 (CAMO-18-148000), 437822013 (CAMO-18-148010) and 437822016 (CAMO-18-148001) in this SDG in this batch.

Additional Comments

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

Electronic Package Comment

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

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

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description
MSD4.I	Agilent 7890A/5975C GC/MS w/ 7683 Autosampler	HP6890/HP5973	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-854 GEL Work Order: 437822

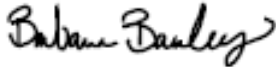
The Qualifiers in this report are defined as follows:

- * 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.
- h Preparation or preservation holding time was exceeded
- 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: 07 DEC 2017

Title: Data Validator

Sample Data Summary

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

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822002

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148071
Batch ID: 1719087
Run Date: 11/20/2017 16:37
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2009.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 1000 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	Uh	3.00	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene	Uh	3.00	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene	Uh	3.00	ug/L	3.00	10.0
122-66-7	Azobenzene	Uh	3.00	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	Uh	3.00	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene	Uh	3.00	ug/L	3.00	10.0
123-91-1	1,4-Dioxane	h	10.2	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene	Uh	0.300	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol	Uh	3.00	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol	Uh	3.00	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol	Uh	3.00	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol	Uh	3.00	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol	Uh	3.00	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol	Uh	5.00	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene	Uh	3.00	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene	Uh	3.00	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene	Uh	0.410	ug/L	0.410	1.00
95-57-8	2-Chlorophenol	Uh	3.00	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol	Uh	3.00	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene	Uh	0.300	ug/L	0.300	1.00
88-75-5	2-Nitrophenol	Uh	3.00	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine	Uh	3.00	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether	Uh	3.00	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol	Uh	3.00	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	Uh	3.30	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether	Uh	3.00	ug/L	3.00	10.0
100-02-7	4-Nitrophenol	Uh	3.00	ug/L	3.00	10.0
83-32-9	Acenaphthene	Uh	0.300	ug/L	0.300	1.00
208-96-8	Acenaphthylene	Uh	0.300	ug/L	0.300	1.00
62-53-3	Aniline	Uh	4.20	ug/L	4.20	10.0
120-12-7	Anthracene	Uh	0.300	ug/L	0.300	1.00
1912-24-9	Atrazine	Uh	3.00	ug/L	3.00	10.0
92-87-5	Benzidine	Uh	3.90	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene	Uh	0.300	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene	Uh	0.300	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene	Uh	0.300	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene	Uh	0.300	ug/L	0.300	1.00

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

Page 2 of 3

SDG Number: 2018-854
Lab Sample ID: 437822002

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148071
Batch ID: 1719087
Run Date: 11/20/2017 16:37
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2009.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 1000 mL
Column: DB-5ms

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

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

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

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SDG Number: 2018-854
Lab Sample ID: 437822002

Date Collected: 11/09/2017 13:37

Matrix: W

Date Received: 11/14/2017 09:05

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSD4.I

Dilution: 1

Batch ID: 1719087

Run Date: 11/20/2017 16:37

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 11/20/2017 05:30

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: s112017.B\s4k2009.D

Column: DB-5ms

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	65.0	100	ug/L 65	(32%-124%)
2-Fluorobiphenyl	34.8	50.0	ug/L 70	(32%-112%)
2-Fluorophenol	35.0	100	ug/L 35	(15%-88%)
Nitrobenzene-d5	36.3	50.0	ug/L 73	(36%-115%)
Phenol-d5	24.5	100	ug/L 24	(15%-91%)
p-Terphenyl-d14	43.3	50.0	ug/L 87	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.746	30.9	ug/L	0	J
	unknown	1.778	8.1	ug/L	0	J
	unknown	1.906	5.7	ug/L	0	J

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

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 437822007

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148072
Batch ID: 1719087
Run Date: 11/20/2017 18:03
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2012.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 950 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	Uh	3.16	ug/L	3.16	10.5
120-82-1	1,2,4-Trichlorobenzene	Uh	3.16	ug/L	3.16	10.5
95-50-1	1,2-Dichlorobenzene	Uh	3.16	ug/L	3.16	10.5
122-66-7	Azobenzene	Uh	3.16	ug/L	3.16	10.5
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	Uh	3.16	ug/L	3.16	10.5
106-46-7	1,4-Dichlorobenzene	Uh	3.16	ug/L	3.16	10.5
123-91-1	1,4-Dioxane	Uh	3.16	ug/L	3.16	10.5
90-12-0	1-Methylnaphthalene	Uh	0.316	ug/L	0.316	1.05
58-90-2	2,3,4,6-Tetrachlorophenol	Uh	3.16	ug/L	3.16	10.5
95-95-4	2,4,5-Trichlorophenol	Uh	3.16	ug/L	3.16	10.5
88-06-2	2,4,6-Trichlorophenol	Uh	3.16	ug/L	3.16	10.5
120-83-2	2,4-Dichlorophenol	Uh	3.16	ug/L	3.16	10.5
105-67-9	2,4-Dimethylphenol	Uh	3.16	ug/L	3.16	10.5
51-28-5	2,4-Dinitrophenol	Uh	5.26	ug/L	5.26	21.1
121-14-2	2,4-Dinitrotoluene	Uh	3.16	ug/L	3.16	10.5
606-20-2	2,6-Dinitrotoluene	Uh	3.16	ug/L	3.16	10.5
91-58-7	2-Chloronaphthalene	Uh	0.432	ug/L	0.432	1.05
95-57-8	2-Chlorophenol	Uh	3.16	ug/L	3.16	10.5
534-52-1	2-Methyl-4,6-dinitrophenol	Uh	3.16	ug/L	3.16	10.5
91-57-6	2-Methylnaphthalene	Uh	0.316	ug/L	0.316	1.05
88-75-5	2-Nitrophenol	Uh	3.16	ug/L	3.16	10.5
91-94-1	3,3'-Dichlorobenzidine	Uh	3.16	ug/L	3.16	10.5
101-55-3	4-Bromophenylphenylether	Uh	3.16	ug/L	3.16	10.5
59-50-7	Parachlorometa cresol	Uh	3.16	ug/L	3.16	10.5
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	Uh	3.47	ug/L	3.47	10.5
7005-72-3	4-Chlorophenylphenylether	Uh	3.16	ug/L	3.16	10.5
100-02-7	4-Nitrophenol	Uh	3.16	ug/L	3.16	10.5
83-32-9	Acenaphthene	Uh	0.316	ug/L	0.316	1.05
208-96-8	Acenaphthylene	Uh	0.316	ug/L	0.316	1.05
62-53-3	Aniline	Uh	4.42	ug/L	4.42	10.5
120-12-7	Anthracene	Uh	0.316	ug/L	0.316	1.05
1912-24-9	Atrazine	Uh	3.16	ug/L	3.16	10.5
92-87-5	Benzidine	Uh	4.11	ug/L	4.11	10.5
56-55-3	Benzo(a)anthracene	Uh	0.316	ug/L	0.316	1.05
50-32-8	Benzo(a)pyrene	Uh	0.316	ug/L	0.316	1.05
205-99-2	Benzo(b)fluoranthene	Uh	0.316	ug/L	0.316	1.05
191-24-2	Benzo(ghi)perylene	Uh	0.316	ug/L	0.316	1.05

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

Page 2 of 3

SDG Number: 2018-854
Lab Sample ID: 437822007

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148072
Batch ID: 1719087
Run Date: 11/20/2017 18:03
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2012.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 950 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	Uh	0.316	ug/L	0.316	1.05
65-85-0	Benzoic acid	Uh	6.32	ug/L	6.32	21.1
100-51-6	Benzyl alcohol	Uh	3.16	ug/L	3.16	10.5
85-68-7	Butylbenzylphthalate	Uh	3.16	ug/L	3.16	10.5
218-01-9	Chrysene	Uh	0.316	ug/L	0.316	1.05
84-74-2	Di-n-butylphthalate	Uh	3.16	ug/L	3.16	10.5
117-84-0	Di-n-octylphthalate	Uh	3.16	ug/L	3.16	10.5
53-70-3	Dibenzo(a,h)anthracene	Uh	0.316	ug/L	0.316	1.05
132-64-9	Dibenzofuran	Uh	3.16	ug/L	3.16	10.5
84-66-2	Diethylphthalate	Uh	3.16	ug/L	3.16	10.5
131-11-3	Dimethylphthalate	Uh	3.16	ug/L	3.16	10.5
88-85-7	Dinoseb	Uh	3.16	ug/L	3.16	10.5
122-39-4	Diphenylamine	Uh	3.16	ug/L	3.16	10.5
206-44-0	Fluoranthene	Uh	0.316	ug/L	0.316	1.05
86-73-7	Fluorene	Uh	0.316	ug/L	0.316	1.05
118-74-1	Hexachlorobenzene	Uh	3.16	ug/L	3.16	10.5
87-68-3	Hexachlorobutadiene	Uh	3.16	ug/L	3.16	10.5
77-47-4	Hexachlorocyclopentadiene	Uh	3.16	ug/L	3.16	10.5
67-72-1	Hexachloroethane	Uh	3.16	ug/L	3.16	10.5
193-39-5	Indeno(1,2,3-cd)pyrene	Uh	0.316	ug/L	0.316	1.05
78-59-1	Isophorone	Uh	3.68	ug/L	3.68	10.5
62-75-9	N-Methyl-N-nitrosomethylamine	Uh	3.16	ug/L	3.16	10.5
924-16-3	N-Nitrosodi-n-butylamine	Uh	3.16	ug/L	3.16	10.5
55-18-5	N-Nitrosodiethylamine	Uh	3.16	ug/L	3.16	10.5
621-64-7	N-Nitrosodi-n-propylamine	Uh	3.16	ug/L	3.16	10.5
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	Uh	3.16	ug/L	3.16	10.5
91-20-3	Naphthalene	Uh	0.316	ug/L	0.316	1.05
98-95-3	Nitrobenzene	Uh	3.16	ug/L	3.16	10.5
608-93-5	Pentachlorobenzene	Uh	3.16	ug/L	3.16	10.5
87-86-5	Pentachlorophenol	Uh	3.16	ug/L	3.16	10.5
85-01-8	Phenanthrene	Uh	0.316	ug/L	0.316	1.05
108-95-2	Phenol	Uh	3.16	ug/L	3.16	10.5
129-00-0	Pyrene	Uh	0.316	ug/L	0.316	1.05
110-86-1	Pyridine	Uh	3.16	ug/L	3.16	10.5
108-60-1	bis(2-Chloro-1-methylethyl)ether	Uh	3.16	ug/L	3.16	10.5
111-91-1	bis(2-Chloroethoxy)methane	Uh	3.16	ug/L	3.16	10.5
111-44-4	bis(2-Chloroethyl) ether	Uh	3.16	ug/L	3.16	10.5
117-81-7	bis(2-Ethylhexyl)phthalate	Uh	3.16	ug/L	3.16	10.5

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

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SDG Number: 2018-854
Lab Sample ID: 437822007

Date Collected: 11/09/2017 10:33

Matrix: W

Date Received: 11/14/2017 09:05

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSD4.I

Dilution: 1

Batch ID: 1719087

Run Date: 11/20/2017 18:03

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 11/20/2017 05:30

Aliquot: 950 mL

Final Volume: 1 mL

Data File: s112017.B\s4k2012.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	Uh	3.89	ug/L	3.89	10.5
99-09-2	3-Nitroaniline	Uh	3.16	ug/L	3.16	10.5
95-48-7	<i>m</i> -Nitroaniline	Uh	3.16	ug/L	3.16	10.5
88-74-4	2-Nitroaniline	Uh	3.16	ug/L	3.16	10.5
100-01-6	<i>o</i> -Nitroaniline	Uh	3.16	ug/L	3.16	10.5
	4-Nitroaniline	Uh	3.16	ug/L	3.16	10.5
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	66.1	105	ug/L	63 (32%-124%)
2-Fluorobiphenyl	40.1	52.6	ug/L	76 (32%-112%)
2-Fluorophenol	42.5	105	ug/L	40 (15%-88%)
Nitrobenzene-d5	43.0	52.6	ug/L	82 (36%-115%)
Phenol-d5	28.6	105	ug/L	27 (15%-91%)
p-Terphenyl-d14	47.5	52.6	ug/L	90 (36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.745	39.8	ug/L	0	J
	unknown	1.772	9.38	ug/L	0	J
	unknown	1.906	6.77	ug/L	0	J

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

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SDG Number: 2018-854
Lab Sample ID: 437822010

Date Collected: 11/09/2017 10:33

Matrix: W

Date Received: 11/14/2017 09:05

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSD4.I

Dilution: 1

Batch ID: 1719087

Analyst: JMB3

Inj. Vol: 1 uL

Run Date: 11/20/2017 18:31

Aliquot: 970 mL

Final Volume: 1 mL

Prep Date: 11/20/2017 05:30

Data File: s112017.B\s4k2013.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	Uh	3.09	ug/L	3.09	10.3
120-82-1	1,2,4-Trichlorobenzene	Uh	3.09	ug/L	3.09	10.3
95-50-1	1,2-Dichlorobenzene	Uh	3.09	ug/L	3.09	10.3
122-66-7	Azobenzene	Uh	3.09	ug/L	3.09	10.3
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	Uh	3.09	ug/L	3.09	10.3
106-46-7	1,4-Dichlorobenzene	Uh	3.09	ug/L	3.09	10.3
123-91-1	1,4-Dioxane	Uh	3.09	ug/L	3.09	10.3
90-12-0	1-Methylnaphthalene	Uh	0.309	ug/L	0.309	1.03
58-90-2	2,3,4,6-Tetrachlorophenol	Uh	3.09	ug/L	3.09	10.3
95-95-4	2,4,5-Trichlorophenol	Uh	3.09	ug/L	3.09	10.3
88-06-2	2,4,6-Trichlorophenol	Uh	3.09	ug/L	3.09	10.3
120-83-2	2,4-Dichlorophenol	Uh	3.09	ug/L	3.09	10.3
105-67-9	2,4-Dimethylphenol	Uh	3.09	ug/L	3.09	10.3
51-28-5	2,4-Dinitrophenol	Uh	5.15	ug/L	5.15	20.6
121-14-2	2,4-Dinitrotoluene	Uh	3.09	ug/L	3.09	10.3
606-20-2	2,6-Dinitrotoluene	Uh	3.09	ug/L	3.09	10.3
91-58-7	2-Chloronaphthalene	Uh	0.423	ug/L	0.423	1.03
95-57-8	2-Chlorophenol	Uh	3.09	ug/L	3.09	10.3
534-52-1	2-Methyl-4,6-dinitrophenol	Uh	3.09	ug/L	3.09	10.3
91-57-6	2-Methylnaphthalene	Uh	0.309	ug/L	0.309	1.03
88-75-5	2-Nitrophenol	Uh	3.09	ug/L	3.09	10.3
91-94-1	3,3'-Dichlorobenzidine	Uh	3.09	ug/L	3.09	10.3
101-55-3	4-Bromophenylphenylether	Uh	3.09	ug/L	3.09	10.3
59-50-7	Parachlorometa cresol	Uh	3.09	ug/L	3.09	10.3
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	Uh	3.40	ug/L	3.40	10.3
7005-72-3	4-Chlorophenylphenylether	Uh	3.09	ug/L	3.09	10.3
100-02-7	4-Nitrophenol	Uh	3.09	ug/L	3.09	10.3
83-32-9	Acenaphthene	Uh	0.309	ug/L	0.309	1.03
208-96-8	Acenaphthylene	Uh	0.309	ug/L	0.309	1.03
62-53-3	Aniline	Uh	4.33	ug/L	4.33	10.3
120-12-7	Anthracene	Uh	0.309	ug/L	0.309	1.03
1912-24-9	Atrazine	Uh	3.09	ug/L	3.09	10.3
92-87-5	Benzidine	Uh	4.02	ug/L	4.02	10.3
56-55-3	Benzo(a)anthracene	Uh	0.309	ug/L	0.309	1.03
50-32-8	Benzo(a)pyrene	Uh	0.309	ug/L	0.309	1.03
205-99-2	Benzo(b)fluoranthene	Uh	0.309	ug/L	0.309	1.03
191-24-2	Benzo(ghi)perylene	Uh	0.309	ug/L	0.309	1.03

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

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SDG Number: 2018-854
Lab Sample ID: 437822010

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148110
Batch ID: 1719087
Run Date: 11/20/2017 18:31
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2013.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 970 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	Uh	0.309	ug/L	0.309	1.03
65-85-0	Benzoic acid	Uh	6.19	ug/L	6.19	20.6
100-51-6	Benzyl alcohol	Uh	3.09	ug/L	3.09	10.3
85-68-7	Butylbenzylphthalate	Uh	3.09	ug/L	3.09	10.3
218-01-9	Chrysene	Uh	0.309	ug/L	0.309	1.03
84-74-2	Di-n-butylphthalate	Uh	3.09	ug/L	3.09	10.3
117-84-0	Di-n-octylphthalate	Uh	3.09	ug/L	3.09	10.3
53-70-3	Dibenzo(a,h)anthracene	Uh	0.309	ug/L	0.309	1.03
132-64-9	Dibenzofuran	Uh	3.09	ug/L	3.09	10.3
84-66-2	Diethylphthalate	Uh	3.09	ug/L	3.09	10.3
131-11-3	Dimethylphthalate	Uh	3.09	ug/L	3.09	10.3
88-85-7	Dinoseb	Uh	3.09	ug/L	3.09	10.3
122-39-4	Diphenylamine	Uh	3.09	ug/L	3.09	10.3
206-44-0	Fluoranthene	Uh	0.309	ug/L	0.309	1.03
86-73-7	Fluorene	Uh	0.309	ug/L	0.309	1.03
118-74-1	Hexachlorobenzene	Uh	3.09	ug/L	3.09	10.3
87-68-3	Hexachlorobutadiene	Uh	3.09	ug/L	3.09	10.3
77-47-4	Hexachlorocyclopentadiene	Uh	3.09	ug/L	3.09	10.3
67-72-1	Hexachloroethane	Uh	3.09	ug/L	3.09	10.3
193-39-5	Indeno(1,2,3-cd)pyrene	Uh	0.309	ug/L	0.309	1.03
78-59-1	Isophorone	Uh	3.61	ug/L	3.61	10.3
62-75-9	N-Methyl-N-nitrosomethylamine	Uh	3.09	ug/L	3.09	10.3
924-16-3	N-Nitrosodi-n-butylamine	Uh	3.09	ug/L	3.09	10.3
55-18-5	N-Nitrosodiethylamine	Uh	3.09	ug/L	3.09	10.3
621-64-7	N-Nitrosodi-n-propylamine	Uh	3.09	ug/L	3.09	10.3
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	Uh	3.09	ug/L	3.09	10.3
91-20-3	Naphthalene	Uh	0.309	ug/L	0.309	1.03
98-95-3	Nitrobenzene	Uh	3.09	ug/L	3.09	10.3
608-93-5	Pentachlorobenzene	Uh	3.09	ug/L	3.09	10.3
87-86-5	Pentachlorophenol	Uh	3.09	ug/L	3.09	10.3
85-01-8	Phenanthrene	Uh	0.309	ug/L	0.309	1.03
108-95-2	Phenol	Uh	3.09	ug/L	3.09	10.3
129-00-0	Pyrene	Uh	0.309	ug/L	0.309	1.03
110-86-1	Pyridine	Uh	3.09	ug/L	3.09	10.3
108-60-1	bis(2-Chloro-1-methylethyl)ether	Uh	3.09	ug/L	3.09	10.3
111-91-1	bis(2-Chloroethoxy)methane	Uh	3.09	ug/L	3.09	10.3
111-44-4	bis(2-Chloroethyl) ether	Uh	3.09	ug/L	3.09	10.3
117-81-7	bis(2-Ethylhexyl)phthalate	Uh	3.09	ug/L	3.09	10.3

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

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SDG Number: 2018-854
Lab Sample ID: 437822010

Date Collected: 11/09/2017 10:33

Matrix: W

Date Received: 11/14/2017 09:05

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSD4.I

Dilution: 1

Batch ID: 1719087

Analyst: JMB3

Inj. Vol: 1 uL

Run Date: 11/20/2017 18:31

Aliquot: 970 mL

Final Volume: 1 mL

Prep Date: 11/20/2017 05:30

Data File: s112017.B\s4k2013.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	Uh	3.81	ug/L	3.81	10.3
99-09-2	3-Nitroaniline	Uh	3.09	ug/L	3.09	10.3
95-48-7	<i>m</i> -Nitroaniline o-Cresol	Uh	3.09	ug/L	3.09	10.3
88-74-4	2-Nitroaniline	Uh	3.09	ug/L	3.09	10.3
100-01-6	<i>o</i> -Nitroaniline 4-Nitroaniline <i>p</i> -Nitroaniline	Uh	3.09	ug/L	3.09	10.3

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	57.6	103	ug/L	56 (32%-124%)
2-Fluorobiphenyl	34.0	51.5	ug/L	66 (32%-112%)
2-Fluorophenol	35.5	103	ug/L	34 (15%-88%)
Nitrobenzene-d5	36.4	51.5	ug/L	71 (36%-115%)
Phenol-d5	23.5	103	ug/L	23 (15%-91%)
p-Terphenyl-d14	41.8	51.5	ug/L	81 (36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.746	35.7	ug/L	0	J
000056-23-5	Carbon Tetrachloride	1.778	9.63	ug/L	86	NJ
001569-50-2	3-Penten-2-ol	1.911	7.3	ug/L	86	NJ

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

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SDG Number: 2018-854
Lab Sample ID: 437822012

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148000
Batch ID: 1719087
Run Date: 11/20/2017 19:00
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2014.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 950 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	Uh	3.16	ug/L	3.16	10.5
120-82-1	1,2,4-Trichlorobenzene	Uh	3.16	ug/L	3.16	10.5
95-50-1	1,2-Dichlorobenzene	Uh	3.16	ug/L	3.16	10.5
122-66-7	Azobenzene	Uh	3.16	ug/L	3.16	10.5
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	Uh	3.16	ug/L	3.16	10.5
106-46-7	1,4-Dichlorobenzene	Uh	3.16	ug/L	3.16	10.5
123-91-1	1,4-Dioxane	Uh	3.16	ug/L	3.16	10.5
90-12-0	1-Methylnaphthalene	Uh	0.316	ug/L	0.316	1.05
58-90-2	2,3,4,6-Tetrachlorophenol	Uh	3.16	ug/L	3.16	10.5
95-95-4	2,4,5-Trichlorophenol	Uh	3.16	ug/L	3.16	10.5
88-06-2	2,4,6-Trichlorophenol	Uh	3.16	ug/L	3.16	10.5
120-83-2	2,4-Dichlorophenol	Uh	3.16	ug/L	3.16	10.5
105-67-9	2,4-Dimethylphenol	Uh	3.16	ug/L	3.16	10.5
51-28-5	2,4-Dinitrophenol	Uh	5.26	ug/L	5.26	21.1
121-14-2	2,4-Dinitrotoluene	Uh	3.16	ug/L	3.16	10.5
606-20-2	2,6-Dinitrotoluene	Uh	3.16	ug/L	3.16	10.5
91-58-7	2-Chloronaphthalene	Uh	0.432	ug/L	0.432	1.05
95-57-8	2-Chlorophenol	Uh	3.16	ug/L	3.16	10.5
534-52-1	2-Methyl-4,6-dinitrophenol	Uh	3.16	ug/L	3.16	10.5
91-57-6	2-Methylnaphthalene	Uh	0.316	ug/L	0.316	1.05
88-75-5	2-Nitrophenol	Uh	3.16	ug/L	3.16	10.5
91-94-1	3,3'-Dichlorobenzidine	Uh	3.16	ug/L	3.16	10.5
101-55-3	4-Bromophenylphenylether	Uh	3.16	ug/L	3.16	10.5
59-50-7	Parachlorometa cresol	Uh	3.16	ug/L	3.16	10.5
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	Uh	3.47	ug/L	3.47	10.5
7005-72-3	4-Chlorophenylphenylether	Uh	3.16	ug/L	3.16	10.5
100-02-7	4-Nitrophenol	Uh	3.16	ug/L	3.16	10.5
83-32-9	Acenaphthene	Uh	0.316	ug/L	0.316	1.05
208-96-8	Acenaphthylene	Uh	0.316	ug/L	0.316	1.05
62-53-3	Aniline	Uh	4.42	ug/L	4.42	10.5
120-12-7	Anthracene	Uh	0.316	ug/L	0.316	1.05
1912-24-9	Atrazine	Uh	3.16	ug/L	3.16	10.5
92-87-5	Benzidine	Uh	4.11	ug/L	4.11	10.5
56-55-3	Benzo(a)anthracene	Uh	0.316	ug/L	0.316	1.05
50-32-8	Benzo(a)pyrene	Uh	0.316	ug/L	0.316	1.05
205-99-2	Benzo(b)fluoranthene	Uh	0.316	ug/L	0.316	1.05
191-24-2	Benzo(ghi)perylene	Uh	0.316	ug/L	0.316	1.05

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

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SDG Number: 2018-854
Lab Sample ID: 437822012

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148000
Batch ID: 1719087
Run Date: 11/20/2017 19:00
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2014.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 950 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	Uh	0.316	ug/L	0.316	1.05
65-85-0	Benzoic acid	Uh	6.32	ug/L	6.32	21.1
100-51-6	Benzyl alcohol	Uh	3.16	ug/L	3.16	10.5
85-68-7	Butylbenzylphthalate	Uh	3.16	ug/L	3.16	10.5
218-01-9	Chrysene	Uh	0.316	ug/L	0.316	1.05
84-74-2	Di-n-butylphthalate	Uh	3.16	ug/L	3.16	10.5
117-84-0	Di-n-octylphthalate	Uh	3.16	ug/L	3.16	10.5
53-70-3	Dibenzo(a,h)anthracene	Uh	0.316	ug/L	0.316	1.05
132-64-9	Dibenzofuran	Uh	3.16	ug/L	3.16	10.5
84-66-2	Diethylphthalate	Uh	3.16	ug/L	3.16	10.5
131-11-3	Dimethylphthalate	Uh	3.16	ug/L	3.16	10.5
88-85-7	Dinoseb	Uh	3.16	ug/L	3.16	10.5
122-39-4	Diphenylamine	Uh	3.16	ug/L	3.16	10.5
206-44-0	Fluoranthene	Uh	0.316	ug/L	0.316	1.05
86-73-7	Fluorene	Uh	0.316	ug/L	0.316	1.05
118-74-1	Hexachlorobenzene	Uh	3.16	ug/L	3.16	10.5
87-68-3	Hexachlorobutadiene	Uh	3.16	ug/L	3.16	10.5
77-47-4	Hexachlorocyclopentadiene	Uh	3.16	ug/L	3.16	10.5
67-72-1	Hexachloroethane	Uh	3.16	ug/L	3.16	10.5
193-39-5	Indeno(1,2,3-cd)pyrene	Uh	0.316	ug/L	0.316	1.05
78-59-1	Isophorone	Uh	3.68	ug/L	3.68	10.5
62-75-9	N-Methyl-N-nitrosomethylamine	Uh	3.16	ug/L	3.16	10.5
924-16-3	N-Nitrosodi-n-butylamine	Uh	3.16	ug/L	3.16	10.5
55-18-5	N-Nitrosodiethylamine	Uh	3.16	ug/L	3.16	10.5
621-64-7	N-Nitrosodi-n-propylamine	Uh	3.16	ug/L	3.16	10.5
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	Uh	3.16	ug/L	3.16	10.5
91-20-3	Naphthalene	Uh	0.316	ug/L	0.316	1.05
98-95-3	Nitrobenzene	Uh	3.16	ug/L	3.16	10.5
608-93-5	Pentachlorobenzene	Uh	3.16	ug/L	3.16	10.5
87-86-5	Pentachlorophenol	Uh	3.16	ug/L	3.16	10.5
85-01-8	Phenanthrene	Uh	0.316	ug/L	0.316	1.05
108-95-2	Phenol	Uh	3.16	ug/L	3.16	10.5
129-00-0	Pyrene	Uh	0.316	ug/L	0.316	1.05
110-86-1	Pyridine	Uh	3.16	ug/L	3.16	10.5
108-60-1	bis(2-Chloro-1-methylethyl)ether	Uh	3.16	ug/L	3.16	10.5
111-91-1	bis(2-Chloroethoxy)methane	Uh	3.16	ug/L	3.16	10.5
111-44-4	bis(2-Chloroethyl) ether	Uh	3.16	ug/L	3.16	10.5
117-81-7	bis(2-Ethylhexyl)phthalate	Uh	3.16	ug/L	3.16	10.5

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

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SDG Number: 2018-854
Lab Sample ID: 437822012

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148000
Batch ID: 1719087
Run Date: 11/20/2017 19:00
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2014.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 950 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	Uh	3.89	ug/L	3.89	10.5
99-09-2	3-Nitroaniline	Uh	3.16	ug/L	3.16	10.5
95-48-7	<i>m</i> -Nitroaniline o-Cresol	Uh	3.16	ug/L	3.16	10.5
88-74-4	2-Nitroaniline	Uh	3.16	ug/L	3.16	10.5
100-01-6	<i>o</i> -Nitroaniline 4-Nitroaniline <i>p</i> -Nitroaniline	Uh	3.16	ug/L	3.16	10.5

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	61.5	105	ug/L 58	(32%-124%)
2-Fluorobiphenyl	37.2	52.6	ug/L 71	(32%-112%)
2-Fluorophenol	38.3	105	ug/L 36	(15%-88%)
Nitrobenzene-d5	39.2	52.6	ug/L 74	(36%-115%)
Phenol-d5	25.2	105	ug/L 24	(15%-91%)
p-Terphenyl-d14	42.2	52.6	ug/L 80	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.745	71.8	ug/L	0	J
	unknown	1.906	5.66	ug/L	0	J

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

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SDG Number: 2018-854
Lab Sample ID: 437822013

Date Collected: 11/09/2017 12:46

Matrix: W

Date Received: 11/14/2017 09:05

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSD4.I

Dilution: 1

Batch ID: 1719087

Analyst: JMB3

Inj. Vol: 1 uL

Run Date: 11/20/2017 19:29

Aliquot: 950 mL

Final Volume: 1 mL

Prep Date: 11/20/2017 05:30

Data File: s112017.B\s4k2015.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	Uh	3.16	ug/L	3.16	10.5
120-82-1	1,2,4-Trichlorobenzene	Uh	3.16	ug/L	3.16	10.5
95-50-1	1,2-Dichlorobenzene	Uh	3.16	ug/L	3.16	10.5
122-66-7	Azobenzene	Uh	3.16	ug/L	3.16	10.5
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	Uh	3.16	ug/L	3.16	10.5
106-46-7	1,4-Dichlorobenzene	Uh	3.16	ug/L	3.16	10.5
123-91-1	1,4-Dioxane	Uh	3.16	ug/L	3.16	10.5
90-12-0	1-Methylnaphthalene	Uh	0.316	ug/L	0.316	1.05
58-90-2	2,3,4,6-Tetrachlorophenol	Uh	3.16	ug/L	3.16	10.5
95-95-4	2,4,5-Trichlorophenol	Uh	3.16	ug/L	3.16	10.5
88-06-2	2,4,6-Trichlorophenol	Uh	3.16	ug/L	3.16	10.5
120-83-2	2,4-Dichlorophenol	Uh	3.16	ug/L	3.16	10.5
105-67-9	2,4-Dimethylphenol	Uh	3.16	ug/L	3.16	10.5
51-28-5	2,4-Dinitrophenol	Uh	5.26	ug/L	5.26	21.1
121-14-2	2,4-Dinitrotoluene	Uh	3.16	ug/L	3.16	10.5
606-20-2	2,6-Dinitrotoluene	Uh	3.16	ug/L	3.16	10.5
91-58-7	2-Chloronaphthalene	Uh	0.432	ug/L	0.432	1.05
95-57-8	2-Chlorophenol	Uh	3.16	ug/L	3.16	10.5
534-52-1	2-Methyl-4,6-dinitrophenol	Uh	3.16	ug/L	3.16	10.5
91-57-6	2-Methylnaphthalene	Uh	0.316	ug/L	0.316	1.05
88-75-5	2-Nitrophenol	Uh	3.16	ug/L	3.16	10.5
91-94-1	3,3'-Dichlorobenzidine	Uh	3.16	ug/L	3.16	10.5
101-55-3	4-Bromophenylphenylether	Uh	3.16	ug/L	3.16	10.5
59-50-7	Parachlorometa cresol	Uh	3.16	ug/L	3.16	10.5
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	Uh	3.47	ug/L	3.47	10.5
7005-72-3	4-Chlorophenylphenylether	Uh	3.16	ug/L	3.16	10.5
100-02-7	4-Nitrophenol	Uh	3.16	ug/L	3.16	10.5
83-32-9	Acenaphthene	Uh	0.316	ug/L	0.316	1.05
208-96-8	Acenaphthylene	Uh	0.316	ug/L	0.316	1.05
62-53-3	Aniline	Uh	4.42	ug/L	4.42	10.5
120-12-7	Anthracene	Uh	0.316	ug/L	0.316	1.05
1912-24-9	Atrazine	Uh	3.16	ug/L	3.16	10.5
92-87-5	Benzidine	Uh	4.11	ug/L	4.11	10.5
56-55-3	Benzo(a)anthracene	Uh	0.316	ug/L	0.316	1.05
50-32-8	Benzo(a)pyrene	Uh	0.316	ug/L	0.316	1.05
205-99-2	Benzo(b)fluoranthene	Uh	0.316	ug/L	0.316	1.05
191-24-2	Benzo(ghi)perylene	Uh	0.316	ug/L	0.316	1.05

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

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SDG Number: 2018-854
Lab Sample ID: 437822013

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148010
Batch ID: 1719087
Run Date: 11/20/2017 19:29
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2015.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 950 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	Uh	0.316	ug/L	0.316	1.05
65-85-0	Benzoic acid	Uh	6.32	ug/L	6.32	21.1
100-51-6	Benzyl alcohol	Uh	3.16	ug/L	3.16	10.5
85-68-7	Butylbenzylphthalate	Uh	3.16	ug/L	3.16	10.5
218-01-9	Chrysene	Uh	0.316	ug/L	0.316	1.05
84-74-2	Di-n-butylphthalate	Uh	3.16	ug/L	3.16	10.5
117-84-0	Di-n-octylphthalate	Uh	3.16	ug/L	3.16	10.5
53-70-3	Dibenzo(a,h)anthracene	Uh	0.316	ug/L	0.316	1.05
132-64-9	Dibenzofuran	Uh	3.16	ug/L	3.16	10.5
84-66-2	Diethylphthalate	Uh	3.16	ug/L	3.16	10.5
131-11-3	Dimethylphthalate	Uh	3.16	ug/L	3.16	10.5
88-85-7	Dinoseb	Uh	3.16	ug/L	3.16	10.5
122-39-4	Diphenylamine	Uh	3.16	ug/L	3.16	10.5
206-44-0	Fluoranthene	Uh	0.316	ug/L	0.316	1.05
86-73-7	Fluorene	Uh	0.316	ug/L	0.316	1.05
118-74-1	Hexachlorobenzene	Uh	3.16	ug/L	3.16	10.5
87-68-3	Hexachlorobutadiene	Uh	3.16	ug/L	3.16	10.5
77-47-4	Hexachlorocyclopentadiene	Uh	3.16	ug/L	3.16	10.5
67-72-1	Hexachloroethane	Uh	3.16	ug/L	3.16	10.5
193-39-5	Indeno(1,2,3-cd)pyrene	Uh	0.316	ug/L	0.316	1.05
78-59-1	Isophorone	Uh	3.68	ug/L	3.68	10.5
62-75-9	N-Methyl-N-nitrosomethylamine	Uh	3.16	ug/L	3.16	10.5
924-16-3	N-Nitrosodi-n-butylamine	Uh	3.16	ug/L	3.16	10.5
55-18-5	N-Nitrosodiethylamine	Uh	3.16	ug/L	3.16	10.5
621-64-7	N-Nitrosodi-n-propylamine	Uh	3.16	ug/L	3.16	10.5
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	Uh	3.16	ug/L	3.16	10.5
91-20-3	Naphthalene	Uh	0.316	ug/L	0.316	1.05
98-95-3	Nitrobenzene	Uh	3.16	ug/L	3.16	10.5
608-93-5	Pentachlorobenzene	Uh	3.16	ug/L	3.16	10.5
87-86-5	Pentachlorophenol	Uh	3.16	ug/L	3.16	10.5
85-01-8	Phenanthrene	Uh	0.316	ug/L	0.316	1.05
108-95-2	Phenol	Uh	3.16	ug/L	3.16	10.5
129-00-0	Pyrene	Uh	0.316	ug/L	0.316	1.05
110-86-1	Pyridine	Uh	3.16	ug/L	3.16	10.5
108-60-1	bis(2-Chloro-1-methylethyl)ether	Uh	3.16	ug/L	3.16	10.5
111-91-1	bis(2-Chloroethoxy)methane	Uh	3.16	ug/L	3.16	10.5
111-44-4	bis(2-Chloroethyl) ether	Uh	3.16	ug/L	3.16	10.5
117-81-7	bis(2-Ethylhexyl)phthalate	Uh	3.16	ug/L	3.16	10.5

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

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SDG Number: 2018-854
Lab Sample ID: 437822013

Date Collected: 11/09/2017 12:46
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148010
Batch ID: 1719087
Run Date: 11/20/2017 19:29
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2015.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 950 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	Uh	3.89	ug/L	3.89	10.5
99-09-2	3-Nitroaniline	Uh	3.16	ug/L	3.16	10.5
95-48-7	<i>m</i> -Nitroaniline o-Cresol	Uh	3.16	ug/L	3.16	10.5
88-74-4	2-Nitroaniline	Uh	3.16	ug/L	3.16	10.5
100-01-6	<i>o</i> -Nitroaniline 4-Nitroaniline <i>p</i> -Nitroaniline	Uh	3.16	ug/L	3.16	10.5

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	43.2	105	ug/L 41	(32%-124%)
2-Fluorobiphenyl	22.1	52.6	ug/L 42	(32%-112%)
2-Fluorophenol	27.6	105	ug/L 26	(15%-88%)
Nitrobenzene-d5	26.7	52.6	ug/L 51	(36%-115%)
Phenol-d5	18.8	105	ug/L 18	(15%-91%)
p-Terphenyl-d14	29.5	52.6	ug/L 56	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.745	44.6	ug/L	0	J
	unknown	1.772	7.77	ug/L	0	J
	unknown	1.906	4.55	ug/L	0	J

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

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SDG Number: 2018-854
Lab Sample ID: 437822016

Date Collected: 11/09/2017 14:24
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148001
Batch ID: 1719087
Run Date: 11/20/2017 19:57
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2016.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 960 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	Uh	3.13	ug/L	3.13	10.4
120-82-1	1,2,4-Trichlorobenzene	Uh	3.13	ug/L	3.13	10.4
95-50-1	1,2-Dichlorobenzene	Uh	3.13	ug/L	3.13	10.4
122-66-7	Azobenzene	Uh	3.13	ug/L	3.13	10.4
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	Uh	3.13	ug/L	3.13	10.4
106-46-7	1,4-Dichlorobenzene	Uh	3.13	ug/L	3.13	10.4
123-91-1	1,4-Dioxane	Uh	3.13	ug/L	3.13	10.4
90-12-0	1-Methylnaphthalene	Uh	0.313	ug/L	0.313	1.04
58-90-2	2,3,4,6-Tetrachlorophenol	Uh	3.13	ug/L	3.13	10.4
95-95-4	2,4,5-Trichlorophenol	Uh	3.13	ug/L	3.13	10.4
88-06-2	2,4,6-Trichlorophenol	Uh	3.13	ug/L	3.13	10.4
120-83-2	2,4-Dichlorophenol	Uh	3.13	ug/L	3.13	10.4
105-67-9	2,4-Dimethylphenol	Uh	3.13	ug/L	3.13	10.4
51-28-5	2,4-Dinitrophenol	Uh	5.21	ug/L	5.21	20.8
121-14-2	2,4-Dinitrotoluene	Uh	3.13	ug/L	3.13	10.4
606-20-2	2,6-Dinitrotoluene	Uh	3.13	ug/L	3.13	10.4
91-58-7	2-Chloronaphthalene	Uh	0.427	ug/L	0.427	1.04
95-57-8	2-Chlorophenol	Uh	3.13	ug/L	3.13	10.4
534-52-1	2-Methyl-4,6-dinitrophenol	Uh	3.13	ug/L	3.13	10.4
91-57-6	2-Methylnaphthalene	Uh	0.313	ug/L	0.313	1.04
88-75-5	2-Nitrophenol	Uh	3.13	ug/L	3.13	10.4
91-94-1	3,3'-Dichlorobenzidine	Uh	3.13	ug/L	3.13	10.4
101-55-3	4-Bromophenylphenylether	Uh	3.13	ug/L	3.13	10.4
59-50-7	Parachlorometa cresol	Uh	3.13	ug/L	3.13	10.4
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	Uh	3.44	ug/L	3.44	10.4
7005-72-3	4-Chlorophenylphenylether	Uh	3.13	ug/L	3.13	10.4
100-02-7	4-Nitrophenol	Uh	3.13	ug/L	3.13	10.4
83-32-9	Acenaphthene	Uh	0.313	ug/L	0.313	1.04
208-96-8	Acenaphthylene	Uh	0.313	ug/L	0.313	1.04
62-53-3	Aniline	Uh	4.38	ug/L	4.38	10.4
120-12-7	Anthracene	Uh	0.313	ug/L	0.313	1.04
1912-24-9	Atrazine	Uh	3.13	ug/L	3.13	10.4
92-87-5	Benzidine	Uh	4.06	ug/L	4.06	10.4
56-55-3	Benzo(a)anthracene	Uh	0.313	ug/L	0.313	1.04
50-32-8	Benzo(a)pyrene	Uh	0.313	ug/L	0.313	1.04
205-99-2	Benzo(b)fluoranthene	Uh	0.313	ug/L	0.313	1.04
191-24-2	Benzo(ghi)perylene	Uh	0.313	ug/L	0.313	1.04

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

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SDG Number: 2018-854
Lab Sample ID: 437822016

Date Collected: 11/09/2017 14:24
Date Received: 11/14/2017 09:05

Matrix: W

Client ID: CAMO-18-148001
Batch ID: 1719087
Run Date: 11/20/2017 19:57
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2016.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 960 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	Uh	0.313	ug/L	0.313	1.04
65-85-0	Benzoic acid	Uh	6.25	ug/L	6.25	20.8
100-51-6	Benzyl alcohol	Uh	3.13	ug/L	3.13	10.4
85-68-7	Butylbenzylphthalate	Uh	3.13	ug/L	3.13	10.4
218-01-9	Chrysene	Uh	0.313	ug/L	0.313	1.04
84-74-2	Di-n-butylphthalate	Uh	3.13	ug/L	3.13	10.4
117-84-0	Di-n-octylphthalate	Uh	3.13	ug/L	3.13	10.4
53-70-3	Dibenzo(a,h)anthracene	Uh	0.313	ug/L	0.313	1.04
132-64-9	Dibenzofuran	Uh	3.13	ug/L	3.13	10.4
84-66-2	Diethylphthalate	Uh	3.13	ug/L	3.13	10.4
131-11-3	Dimethylphthalate	Uh	3.13	ug/L	3.13	10.4
88-85-7	Dinoseb	Uh	3.13	ug/L	3.13	10.4
122-39-4	Diphenylamine	Uh	3.13	ug/L	3.13	10.4
206-44-0	Fluoranthene	Uh	0.313	ug/L	0.313	1.04
86-73-7	Fluorene	Uh	0.313	ug/L	0.313	1.04
118-74-1	Hexachlorobenzene	Uh	3.13	ug/L	3.13	10.4
87-68-3	Hexachlorobutadiene	Uh	3.13	ug/L	3.13	10.4
77-47-4	Hexachlorocyclopentadiene	Uh	3.13	ug/L	3.13	10.4
67-72-1	Hexachloroethane	Uh	3.13	ug/L	3.13	10.4
193-39-5	Indeno(1,2,3-cd)pyrene	Uh	0.313	ug/L	0.313	1.04
78-59-1	Isophorone	Uh	3.65	ug/L	3.65	10.4
62-75-9	N-Methyl-N-nitrosomethylamine	Uh	3.13	ug/L	3.13	10.4
924-16-3	N-Nitrosodi-n-butylamine	Uh	3.13	ug/L	3.13	10.4
55-18-5	N-Nitrosodiethylamine	Uh	3.13	ug/L	3.13	10.4
621-64-7	N-Nitrosodi-n-propylamine	Uh	3.13	ug/L	3.13	10.4
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	Uh	3.13	ug/L	3.13	10.4
91-20-3	Naphthalene	Uh	0.313	ug/L	0.313	1.04
98-95-3	Nitrobenzene	Uh	3.13	ug/L	3.13	10.4
608-93-5	Pentachlorobenzene	Uh	3.13	ug/L	3.13	10.4
87-86-5	Pentachlorophenol	Uh	3.13	ug/L	3.13	10.4
85-01-8	Phenanthrene	Uh	0.313	ug/L	0.313	1.04
108-95-2	Phenol	Uh	3.13	ug/L	3.13	10.4
129-00-0	Pyrene	Uh	0.313	ug/L	0.313	1.04
110-86-1	Pyridine	Uh	3.13	ug/L	3.13	10.4
108-60-1	bis(2-Chloro-1-methylethyl)ether	Uh	3.13	ug/L	3.13	10.4
111-91-1	bis(2-Chloroethoxy)methane	Uh	3.13	ug/L	3.13	10.4
111-44-4	bis(2-Chloroethyl) ether	Uh	3.13	ug/L	3.13	10.4
117-81-7	bis(2-Ethylhexyl)phthalate	Uh	3.13	ug/L	3.13	10.4

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

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SDG Number: 2018-854
Lab Sample ID: 437822016

Client ID: CAMO-18-148001
Batch ID: 1719087
Run Date: 11/20/2017 19:57
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2016.D

Date Collected: 11/09/2017 14:24
Date Received: 11/14/2017 09:05
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 960 mL
Column: DB-5ms

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	Uh	3.85	ug/L	3.85	10.4
99-09-2	3-Nitroaniline	Uh	3.13	ug/L	3.13	10.4
95-48-7	<i>m</i> -Nitroaniline o-Cresol	Uh	3.13	ug/L	3.13	10.4
88-74-4	2-Nitroaniline	Uh	3.13	ug/L	3.13	10.4
100-01-6	<i>o</i> -Nitroaniline 4-Nitroaniline <i>p</i> -Nitroaniline	Uh	3.13	ug/L	3.13	10.4

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	65.9	104	ug/L	63	(32%-124%)
2-Fluorobiphenyl	39.3	52.1	ug/L	75	(32%-112%)
2-Fluorophenol	39.9	104	ug/L	38	(15%-88%)
Nitrobenzene-d5	41.9	52.1	ug/L	81	(36%-115%)
Phenol-d5	26.5	104	ug/L	25	(15%-91%)
p-Terphenyl-d14	44.6	52.1	ug/L	86	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.745	63.9	ug/L	0	J
	unknown	1.777	8.24	ug/L	0	J
	unknown	1.906	5.85	ug/L	0	J

Quality Control Summary

Semi-Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-854

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203920336	MB for batch 1719086	18	11 *	36	35	35	41
1203920337	LCS for batch 1719086	34	21	82	77	74	85
437822002	CAMO-18-148071	35	24	73	70	65	87
1203920338	CAMO-18-148071MS	53	43	77	76	67	100
1203920339	CAMO-18-148071MSD	56	45	81	77	69	100
437822007	CAMO-18-148072	40	27	82	76	63	90
437822010	CAMO-18-148110	34	23	71	66	56	81
437822012	CAMO-18-148000	36	24	74	71	58	80
437822013	CAMO-18-148010	26	18	51	42	41	56
437822016	CAMO-18-148001	38	25	81	75	63	86

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: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1719086

Matrix: WATER

Lab Sample ID 1203920337

Instrument: MSD4.I

Analysis Date: 11/20/2017 15:40

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

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	21.0	42	30-88
110-86-1	LCS Pyridine	50.0	0.0	21.2	42	27-89
62-53-3	LCS Aniline	50.0	0.0	34.1	68	49-112
108-95-2	LCS Phenol	50.0	0.0	10.9	22	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	40.6	81	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	33.9	68	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	33.6	67	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	34.2	68	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	35.8	72	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)ether	50.0	0.0	45.4	91	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	33.8	68	44-102
95-48-7	LCS o-Cresol	50.0	0.0	28.8	58	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	27.6	55	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	42.6	85	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	34.9	70	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	39.8	80	53-115
78-59-1	LCS Isophorone	50.0	0.0	39.0	78	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	39.6	79	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	30.5	61	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	40.6	81	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	37.9	76	53-109
65-85-0	LCS Benzoic acid	100	0.0	23.8	24	21-74

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1719086

Matrix: WATER

Lab Sample ID 1203920337

Instrument: MSD4.I

Analysis Date: 11/20/2017 15:40

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

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	47.3	95	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	33.1	66	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	38.0	76	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	36.8	74	42-103
91-20-3	LCS Naphthalene	50.0	0.0	37.4	75	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	38.0	76	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	31.9	64	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	36.4	73	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	37.8	76	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	36.7	73	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	41.6	83	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	48.3	97	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	40.2	80	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	39.4	79	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	40.8	82	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	38.8	78	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	41.4	83	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	39.3	79	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	38.1	76	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	41.5	83	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	8.92	18	15-137

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1719086

Matrix: WATER

Lab Sample ID 1203920337

Instrument: MSD4.I

Analysis Date: 11/20/2017 15:40

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

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	38.6	77	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	39.8	80	52-121
100-01-6	LCS 4-Nitroaniline	50.0	0.0	45.0	90	44-137
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	44.0	88	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	38.3	77	55-113
122-66-7	LCS Azobenzene	50.0	0.0	41.9	84	53-115
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	37.8	76	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	36.5	73	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	44.3	89	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	39.4	79	55-110
120-12-7	LCS Anthracene	50.0	0.0	39.3	79	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	42.2	84	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	40.1	80	54-118
129-00-0	LCS Pyrene	50.0	0.0	38.8	78	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	39.7	79	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	40.7	81	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	40.2	80	57-112
218-01-9	LCS Chrysene	50.0	0.0	40.7	81	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	37.8	76	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	40.5	81	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	41.8	84	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	39.0	78	40-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1719086

Matrix: WATER

Lab Sample ID 1203920337

Instrument: MSD4.I

Analysis Date: 11/20/2017 15:40

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

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	37.4	75	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	37.8	76	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	36.0	72	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	22.4	45	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	39.7	79	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	35.6	71	44-102
1912-24-9	LCS Atrazine	50.0	0.0	43.8	88	60-131
92-87-5	LCS Benzidine	100	0.0	26.0	26	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	40.7	81	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	36.3	73	39-99

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-854

Sample Type: Matrix Spike

Client ID: CAMO-18-148071MS

Matrix: W

Lab Sample ID 1203920338

Instrument: MSD4.I

Analysis Date: 11/20/2017 17:06

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

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	114	0.00	Uh	67.9	60 25-106
110-86-1	MS Pyridine	114	0.00	Uh	59.3	52 24-93
62-53-3	MS Aniline	114	0.00	Uh	86.4	76 37-113
108-95-2	MS Phenol	114	0.00	Uh	49.6	44 23-82
111-44-4	MS bis(2-Chloroethyl) ether	114	0.00	Uh	91.4	80 39-114
95-57-8	MS 2-Chlorophenol	114	0.00	Uh	80.9	71 37-108
541-73-1	MS 1,3-Dichlorobenzene	114	0.00	Uh	73.7	65 27-97
106-46-7	MS 1,4-Dichlorobenzene	114	0.00	Uh	74.2	65 28-97
95-50-1	MS 1,2-Dichlorobenzene	114	0.00	Uh	77.4	68 28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)ether	114	0.00	Uh	102	90 32-127
100-51-6	MS Benzyl alcohol	114	0.00	Uh	88.7	78 37-116
95-48-7	MS o-Cresol	114	0.00	Uh	78.8	69 34-109
65794-96-9	MS m,p-Cresols	114	0.00	Uh	83.7	74 36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	114	0.00	Uh	97.5	86 42-118
67-72-1	MS Hexachloroethane	114	0.00	Uh	73.1	64 29-94
98-95-3	MS Nitrobenzene	114	0.00	Uh	88.0	77 38-123
78-59-1	MS Isophorone	114	0.00	Uh	90.6	80 43-120
88-75-5	MS 2-Nitrophenol	114	0.00	Uh	88.5	78 39-115
105-67-9	MS 2,4-Dimethylphenol	114	0.00	Uh	71.2	63 39-107
111-91-1	MS bis(2-Chloroethoxy)methane	114	0.00	Uh	91.4	80 42-118
120-83-2	MS 2,4-Dichlorophenol	114	0.00	Uh	85.4	75 40-111
65-85-0	MS Benzoic acid	227	0.00	Uh	124	55 17-95

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-854

Sample Type: Matrix Spike

Client ID: CAMO-18-148071MS

Matrix: W

Lab Sample ID 1203920338

Instrument: MSD4.I

Analysis Date: 11/20/2017 17:06

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	114	0.00	Uh	110	97 44-138
87-68-3	MS Hexachlorobutadiene	114	0.00	Uh	69.6	61 26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	114	0.00	Uh	90.0	79 41-122
91-57-6	MS 2-Methylnaphthalene	114	0.00	Uh	81.3	72 29-109
91-20-3	MS Naphthalene	114	0.00	Uh	81.2	71 31-108
90-12-0	MS 1-Methylnaphthalene	114	0.00	Uh	83.3	73 33-112
77-47-4	MS Hexachlorocyclopentadiene	114	0.00	Uh	64.6	57 26-79
88-06-2	MS 2,4,6-Trichlorophenol	114	0.00	Uh	85.1	75 39-124
95-95-4	MS 2,4,5-Trichlorophenol	114	0.00	Uh	87.0	77 42-120
91-58-7	MS 2-Chloronaphthalene	114	0.00	Uh	82.5	73 29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	114	0.00	Uh	90.9	80 41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	114	0.00	Uh	103	91 42-144
131-11-3	MS Dimethylphthalate	114	0.00	Uh	92.7	82 45-128
606-20-2	MS 2,6-Dinitrotoluene	114	0.00	Uh	88.6	78 46-124
121-14-2	MS 2,4-Dinitrotoluene	114	0.00	Uh	86.7	76 45-125
208-96-8	MS Acenaphthylene	114	0.00	Uh	87.3	77 35-120
83-32-9	MS Acenaphthene	114	0.00	Uh	93.0	82 35-117
51-28-5	MS 2,4-Dinitrophenol	114	0.00	Uh	69.6	61 27-122
132-64-9	MS Dibenzofuran	114	0.00	Uh	86.6	76 38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	114	0.00	Uh	83.2	73 40-128
84-66-2	MS Diethylphthalate	114	0.00	Uh	93.3	82 43-127
100-02-7	MS 4-Nitrophenol	114	0.00	Uh	38.5	34 17-85

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 8

SDG Number: 2018-854

Sample Type: Matrix Spike

Client ID: CAMO-18-148071MS

Matrix: W

Lab Sample ID 1203920338

Instrument: MSD4.I

Analysis Date: 11/20/2017 17:06

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS Fluorene	114	0.00	Uh	84.0	74 39-117
7005-72-3	MS 4-Chlorophenylphenylether	114	0.00	Uh	88.5	78 39-121
100-01-6	MS 4-Nitroaniline	114	0.00	Uh	85.7	75 30-133
	<i>p</i> -Nitroaniline					
534-52-1	MS 2-Methyl-4,6-dinitrophenol	114	0.00	Uh	92.7	82 32-126
122-39-4	MS Diphenylamine	114	0.00	Uh	89.6	79 37-118
122-66-7	MS Azobenzene	114	0.00	Uh	99.3	87 38-120
	<i>1,2-Diphenylhydrazine</i>					
101-55-3	MS 4-Bromophenylphenylether	114	0.00	Uh	89.4	79 39-121
118-74-1	MS Hexachlorobenzene	114	0.00	Uh	86.6	76 40-118
87-86-5	MS Pentachlorophenol	114	0.00	Uh	99.3	87 35-121
85-01-8	MS Phenanthrene	114	0.00	Uh	90.5	80 40-115
120-12-7	MS Anthracene	114	0.00	Uh	89.3	79 38-120
84-74-2	MS Di-n-butylphthalate	114	0.00	Uh	101	89 41-128
206-44-0	MS Fluoranthene	114	0.00	Uh	87.5	77 41-119
129-00-0	MS Pyrene	114	0.00	Uh	111	97 35-128
85-68-7	MS Butylbenzylphthalate	114	0.00	Uh	107	94 40-129
117-81-7	MS bis(2-Ethylhexyl)phthalate	114	0.610	Uh	110	97 38-131
56-55-3	MS Benzo(a)anthracene	114	0.00	Uh	93.5	82 39-120
218-01-9	MS Chrysene	114	0.00	Uh	95.9	84 41-124
117-84-0	MS Di-n-octylphthalate	114	0.00	Uh	88.1	78 37-134
205-99-2	MS Benzo(b)fluoranthene	114	0.00	Uh	91.5	81 31-122
207-08-9	MS Benzo(k)fluoranthene	114	0.00	Uh	95.1	84 33-123
50-32-8	MS Benzo(a)pyrene	114	0.00	Uh	90.9	80 32-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 8

SDG Number: 2018-854

Sample Type: Matrix Spike

Client ID: CAMO-18-148071MS

Matrix: W

Lab Sample ID 1203920338

Instrument: MSD4.I

Analysis Date: 11/20/2017 17:06

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

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	114	0.00 Uh	89.3	79	27-121
53-70-3	MS Dibenzo(a,h)anthracene	114	0.00 Uh	91.2	80	30-125
191-24-2	MS Benzo(ghi)perylene	114	0.00 Uh	88.5	78	24-126
930-55-2	MS N-Nitrosopyrrolidine	114	0.00 Uh	98.1	86	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	114	0.00 Uh	79.9	70	32-101
1912-24-9	MS Atrazine	114	0.00 Uh	99.1	87	42-129
92-87-5	MS Benzidine	227	0.00 Uh	48.4	21	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	114	0.00 Uh	86.0	76	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	114	0.00 Uh	77.0	68	26-102
123-91-1	MS 1,4-Dioxane	114	10.2 h	90.4	71	24-110

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 5 of 8

SDG Number: 2018-854

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-148071MSD

Matrix: W

Lab Sample ID 1203920339

Instrument: MSD4.I

Analysis Date: 11/20/2017 17:35

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

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	114	0.00	Uh	71.8	63	25-106	6	0-30
110-86-1	MSD Pyridine	114	0.00	Uh	67.3	59	24-93	13	0-30
62-53-3	MSD Aniline	114	0.00	Uh	90.0	79	37-113	4	0-30
108-95-2	MSD Phenol	114	0.00	Uh	52.6	46	23-82	6	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	114	0.00	Uh	95.8	84	39-114	5	0-30
95-57-8	MSD 2-Chlorophenol	114	0.00	Uh	85.2	75	37-108	5	0-30
541-73-1	MSD 1,3-Dichlorobenzene	114	0.00	Uh	73.6	65	27-97	0	0-30
106-46-7	MSD 1,4-Dichlorobenzene	114	0.00	Uh	75.8	67	28-97	2	0-30
95-50-1	MSD 1,2-Dichlorobenzene	114	0.00	Uh	77.0	68	28-99	1	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)ether	114	0.00	Uh	106	93	32-127	3	0-30
100-51-6	MSD Benzyl alcohol	114	0.00	Uh	92.5	81	37-116	4	0-30
95-48-7	MSD o-Cresol	114	0.00	Uh	81.7	72	34-109	4	0-30
65794-96-9	MSD m,p-Cresols	114	0.00	Uh	83.8	74	36-120	0	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine N-Nitrosodipropylamine	114	0.00	Uh	98.2	86	42-118	1	0-30
67-72-1	MSD Hexachloroethane	114	0.00	Uh	73.5	65	29-94	1	0-30
98-95-3	MSD Nitrobenzene	114	0.00	Uh	92.8	82	38-123	5	0-30
78-59-1	MSD Isophorone	114	0.00	Uh	89.7	79	43-120	1	0-30
88-75-5	MSD 2-Nitrophenol	114	0.00	Uh	92.6	81	39-115	4	0-30
105-67-9	MSD 2,4-Dimethylphenol	114	0.00	Uh	71.6	63	39-107	0	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	114	0.00	Uh	93.3	82	42-118	2	0-30
120-83-2	MSD 2,4-Dichlorophenol	114	0.00	Uh	87.5	77	40-111	2	0-30
65-85-0	MSD Benzoic acid	227	0.00	Uh	129	57	17-95	4	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-854

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-148071MSD

Matrix: W

Lab Sample ID 1203920339

Instrument: MSD4.I

Analysis Date: 11/20/2017 17:35

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

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	114	0.00	Uh	111	97	44-138	0	0-30
87-68-3	MSD Hexachlorobutadiene	114	0.00	Uh	67.5	59	26-98	3	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	114	0.00	Uh	89.0	78	41-122	1	0-30
91-57-6	MSD 2-Methylnaphthalene	114	0.00	Uh	79.5	70	29-109	2	0-30
91-20-3	MSD Naphthalene	114	0.00	Uh	83.4	73	31-108	3	0-30
90-12-0	MSD 1-Methylnaphthalene	114	0.00	Uh	81.3	72	33-112	2	0-30
77-47-4	MSD Hexachlorocyclopentadiene	114	0.00	Uh	64.8	57	26-79	0	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	114	0.00	Uh	86.4	76	39-124	1	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	114	0.00	Uh	90.9	80	42-120	4	0-30
91-58-7	MSD 2-Chloronaphthalene	114	0.00	Uh	83.9	74	29-113	2	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	114	0.00	Uh	93.7	82	41-121	3	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	114	0.00	Uh	105	92	42-144	1	0-30
131-11-3	MSD Dimethylphthalate	114	0.00	Uh	95.1	84	45-128	3	0-30
606-20-2	MSD 2,6-Dinitrotoluene	114	0.00	Uh	89.9	79	46-124	1	0-30
121-14-2	MSD 2,4-Dinitrotoluene	114	0.00	Uh	90.7	80	45-125	5	0-30
208-96-8	MSD Acenaphthylene	114	0.00	Uh	88.0	77	35-120	1	0-30
83-32-9	MSD Acenaphthene	114	0.00	Uh	92.3	81	35-117	1	0-30
51-28-5	MSD 2,4-Dinitrophenol	114	0.00	Uh	73.9	65	27-122	6	0-30
132-64-9	MSD Dibenzofuran	114	0.00	Uh	87.2	77	38-113	1	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	114	0.00	Uh	85.7	75	40-128	3	0-30
84-66-2	MSD Diethylphthalate	114	0.00	Uh	96.4	85	43-127	3	0-30
100-02-7	MSD 4-Nitrophenol	114	0.00	Uh	37.5	33	17-85	2	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 7 of 8

SDG Number: 2018-854

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-148071MSD

Matrix: W

Lab Sample ID 1203920339

Instrument: MSD4.I

Analysis Date: 11/20/2017 17:35

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

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	114	0.00	Uh	85.5	75	39-117	2 0-30
7005-72-3	MSD 4-Chlorophenylphenylether	114	0.00	Uh	89.3	79	39-121	1 0-30
100-01-6	MSD 4-Nitroaniline <i>p-Nitroaniline</i>	114	0.00	Uh	88.3	78	30-133	3 0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	114	0.00	Uh	96.8	85	32-126	4 0-30
122-39-4	MSD Diphenylamine	114	0.00	Uh	91.5	80	37-118	2 0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	114	0.00	Uh	101	89	38-120	1 0-30
101-55-3	MSD 4-Bromophenylphenylether	114	0.00	Uh	91.7	81	39-121	2 0-30
118-74-1	MSD Hexachlorobenzene	114	0.00	Uh	88.1	78	40-118	2 0-30
87-86-5	MSD Pentachlorophenol	114	0.00	Uh	105	92	35-121	5 0-30
85-01-8	MSD Phenanthrene	114	0.00	Uh	92.5	81	40-115	2 0-30
120-12-7	MSD Anthracene	114	0.00	Uh	92.1	81	38-120	3 0-30
84-74-2	MSD Di-n-butylphthalate	114	0.00	Uh	104	91	41-128	3 0-30
206-44-0	MSD Fluoranthene	114	0.00	Uh	89.3	79	41-119	2 0-30
129-00-0	MSD Pyrene	114	0.00	Uh	109	96	35-128	2 0-30
85-68-7	MSD Butylbenzylphthalate	114	0.00	Uh	108	95	40-129	1 0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	114	0.610	Uh	111	97	38-131	1 0-30
56-55-3	MSD Benzo(a)anthracene	114	0.00	Uh	98.4	87	39-120	5 0-30
218-01-9	MSD Chrysene	114	0.00	Uh	99.7	88	41-124	4 0-30
117-84-0	MSD Di-n-octylphthalate	114	0.00	Uh	92.4	81	37-134	5 0-30
205-99-2	MSD Benzo(b)fluoranthene	114	0.00	Uh	96.3	85	31-122	5 0-30
207-08-9	MSD Benzo(k)fluoranthene	114	0.00	Uh	98.8	87	33-123	4 0-30
50-32-8	MSD Benzo(a)pyrene	114	0.00	Uh	93.3	82	32-118	3 0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 8 of 8

SDG Number: 2018-854

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-148071MSD

Matrix: W

Lab Sample ID 1203920339

Instrument: MSD4.I

Analysis Date: 11/20/2017 17:35

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1719086

Inj. Vol: 1 uL

Batch ID: 1719087

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	114	0.00	Uh	90.7	80	27-121	2 0-30
53-70-3	MSD Dibenzo(a,h)anthracene	114	0.00	Uh	90.2	79	30-125	1 0-30
191-24-2	MSD Benzo(ghi)perylene	114	0.00	Uh	87.1	77	24-126	2 0-30
930-55-2	MSD N-Nitrosopyrrolidine	114	0.00	Uh	96.7	85	47-119	1 0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	114	0.00	Uh	79.5	70	32-101	0 0-30
1912-24-9	MSD Atrazine	114	0.00	Uh	106	93	42-129	6 0-30
92-87-5	MSD Benzidine	227	0.00	Uh	60.2	26	15-130	22 0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	114	0.00	Uh	88.2	78	34-124	3 0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	114	0.00	Uh	76.7	68	26-102	0 0-30
123-91-1	MSD 1,4-Dioxane	114	10.2	h	95.7	75	24-110	6 0-30

Method Blank Summary

Page 1 of 1

SDG Number:	2018-854	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1719086	Instrument ID:	MSD4.I	Data File:	s112017.B\s4k2006.D
Lab Sample ID:	1203920336	Prep Date:	11/20/2017 05:30	Analyzed:	11/20/17 15:12
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 1719086	1203920337	s112017.B\s4k2007.D	11/20/17	1540
02 CAMO-18-148071	437822002	s112017.B\s4k2009.D	11/20/17	1637
03 CAMO-18-148071MS	1203920338	s112017.B\s4k2010.D	11/20/17	1706
04 CAMO-18-148071MSD	1203920339	s112017.B\s4k2011.D	11/20/17	1735
05 CAMO-18-148072	437822007	s112017.B\s4k2012.D	11/20/17	1803
06 CAMO-18-148110	437822010	s112017.B\s4k2013.D	11/20/17	1831
07 CAMO-18-148000	437822012	s112017.B\s4k2014.D	11/20/17	1900
08 CAMO-18-148010	437822013	s112017.B\s4k2015.D	11/20/17	1929
09 CAMO-18-148001	437822016	s112017.B\s4k2016.D	11/20/17	1957

Quality Control Data

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

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SDG Number: 2018-854

Lab Sample ID: 1203920336

Client Sample: QC for batch 1719086

Client ID: MB for batch 1719086

Batch ID: 1719087

Run Date: 11/20/2017 15:12

Prep Date: 11/20/2017 05:30

Data File: s112017.B\s4k2006.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD4.I

Analyst: JMB3

Aliquot: 1000 mL

Column: DB-5ms

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

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

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

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SDG Number: 2018-854
Lab Sample ID: 1203920336
Client Sample: QC for batch 1719086
Client ID: MB for batch 1719086
Batch ID: 1719087
Run Date: 11/20/2017 15:12
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2006.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 1000 mL
Column: DB-5ms

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

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

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

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SDG Number: 2018-854

Lab Sample ID: 1203920336

Client Sample: QC for batch 1719086

Client ID: MB for batch 1719086

Batch ID: 1719087

Run Date: 11/20/2017 15:12

Prep Date: 11/20/2017 05:30

Data File: s112017.B\s4k2006.D

Matrix: WATER

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD4.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
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	34.7	100	ug/L 35	(32%-124%)
2-Fluorobiphenyl	17.3	50.0	ug/L 35	(32%-112%)
2-Fluorophenol	17.8	100	ug/L 18	(15%-88%)
Nitrobenzene-d5	18.0	50.0	ug/L 36	(36%-115%)
Phenol-d5	11.2	100	ug/L 11	* (15%-91%)
p-Terphenyl-d14	20.6	50.0	ug/L 41	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.74	61.1	ug/L	0	J
001569-50-2	3-Penten-2-ol	1.9	6.35	ug/L	86	NJ

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

Page 1 of 3

SDG Number: 2018-854
Lab Sample ID: 1203920337
Client Sample: QC for batch 1719086
Client ID: LCS for batch 1719086
Batch ID: 1719087
Run Date: 11/20/2017 15:40
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2007.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.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		35.6	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		36.3	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		35.8	ug/L	3.00	10.0
122-66-7	Azobenzene		41.9	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		33.6	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		34.2	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		22.4	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		38.0	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		38.1	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		37.8	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		36.4	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		37.9	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		30.5	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		40.8	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		39.4	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		36.7	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		33.9	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		44.0	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		36.8	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		39.6	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		40.7	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		37.8	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		38.0	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		47.3	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		39.8	ug/L	3.00	10.0
100-02-7	4-Nitrophenol	J	8.92	ug/L	3.00	10.0
83-32-9	Acenaphthene		41.4	ug/L	0.300	1.00
208-96-8	Acenaphthylene		38.8	ug/L	0.300	1.00
62-53-3	Aniline		34.1	ug/L	4.20	10.0
120-12-7	Anthracene		39.3	ug/L	0.300	1.00
1912-24-9	Atrazine		43.8	ug/L	3.00	10.0
92-87-5	Benzidine		26.0	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		40.2	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		39.0	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		40.5	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		36.0	ug/L	0.300	1.00

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SDG Number: 2018-854
Lab Sample ID: 1203920337
Client Sample: QC for batch 1719086
Client ID: LCS for batch 1719086
Batch ID: 1719087
Run Date: 11/20/2017 15:40
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2007.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.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		41.8	ug/L	0.300	1.00
65-85-0	Benzoic acid		23.8	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		33.8	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		39.7	ug/L	3.00	10.0
218-01-9	Chrysene		40.7	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		42.2	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		37.8	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		37.8	ug/L	0.300	1.00
132-64-9	Dibenzofuran		39.3	ug/L	3.00	10.0
84-66-2	Diethylphthalate		41.5	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		40.2	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		38.3	ug/L	3.00	10.0
206-44-0	Fluoranthene		40.1	ug/L	0.300	1.00
86-73-7	Fluorene		38.6	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		36.5	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		33.1	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		31.9	ug/L	3.00	10.0
67-72-1	Hexachloroethane		34.9	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		37.4	ug/L	0.300	1.00
78-59-1	Isophorone		39.0	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		21.0	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		42.6	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		39.7	ug/L	3.00	10.0
91-20-3	Naphthalene		37.4	ug/L	0.300	1.00
98-95-3	Nitrobenzene		39.8	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		44.3	ug/L	3.00	10.0
85-01-8	Phenanthrene		39.4	ug/L	0.300	1.00
108-95-2	Phenol		10.9	ug/L	3.00	10.0
129-00-0	Pyrene		38.8	ug/L	0.300	1.00
110-86-1	Pyridine		21.2	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		45.4	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		40.6	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		40.6	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		40.7	ug/L	3.00	10.0

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SDG Number: 2018-854	Matrix: WATER
Lab Sample ID: 1203920337	
Client Sample: QC for batch 1719086	Client: ARSL004
Client ID: LCS for batch 1719086	Method: SW846 3510C/8270D
Batch ID: 1719087	Inst: MSD4.I
Run Date: 11/20/2017 15:40	Analyst: JMB3
Prep Date: 11/20/2017 05:30	Aliquot: 1000 mL
Data File: s112017.B\s4k2007.D	Column: DB-5ms
	Project: QC
	SOP Ref: GL-OA-E-009
	Dilution: 1
	Inj. Vol: 1 uL
	Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		27.6	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		48.3	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		28.8	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		41.6	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		45.0	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	74.2	100	ug/L	74	(32%-124%)
2-Fluorobiphenyl	38.3	50.0	ug/L	77	(32%-112%)
2-Fluorophenol	34.2	100	ug/L	34	(15%-88%)
Nitrobenzene-d5	41.0	50.0	ug/L	82	(36%-115%)
Phenol-d5	21.4	100	ug/L	21	(15%-91%)
p-Terphenyl-d14	42.4	50.0	ug/L	85	(36%-121%)

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SDG Number: 2018-854
Lab Sample ID: 1203920338
Client Sample: QC for batch 1719086
Client ID: CAMO-18-148071MS
Batch ID: 1719087
Run Date: 11/20/2017 17:06
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2010.D

Date Collected: 11/14/2017 12:00
Date Received: 11/14/2017 12:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 440 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	h	79.9	ug/L	6.82	22.7
120-82-1	1,2,4-Trichlorobenzene	h	77.0	ug/L	6.82	22.7
95-50-1	1,2-Dichlorobenzene	h	77.4	ug/L	6.82	22.7
122-66-7	Azobenzene	h	99.3	ug/L	6.82	22.7
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	h	73.7	ug/L	6.82	22.7
106-46-7	1,4-Dichlorobenzene	h	74.2	ug/L	6.82	22.7
123-91-1	1,4-Dioxane	h	90.4	ug/L	6.82	22.7
90-12-0	1-Methylnaphthalene	h	83.3	ug/L	0.682	2.27
58-90-2	2,3,4,6-Tetrachlorophenol	h	83.2	ug/L	6.82	22.7
95-95-4	2,4,5-Trichlorophenol	h	87.0	ug/L	6.82	22.7
88-06-2	2,4,6-Trichlorophenol	h	85.1	ug/L	6.82	22.7
120-83-2	2,4-Dichlorophenol	h	85.4	ug/L	6.82	22.7
105-67-9	2,4-Dimethylphenol	h	71.2	ug/L	6.82	22.7
51-28-5	2,4-Dinitrophenol	h	69.6	ug/L	11.4	45.5
121-14-2	2,4-Dinitrotoluene	h	86.7	ug/L	6.82	22.7
606-20-2	2,6-Dinitrotoluene	h	88.6	ug/L	6.82	22.7
91-58-7	2-Chloronaphthalene	h	82.5	ug/L	0.932	2.27
95-57-8	2-Chlorophenol	h	80.9	ug/L	6.82	22.7
534-52-1	2-Methyl-4,6-dinitrophenol	h	92.7	ug/L	6.82	22.7
91-57-6	2-Methylnaphthalene	h	81.3	ug/L	0.682	2.27
88-75-5	2-Nitrophenol	h	88.5	ug/L	6.82	22.7
91-94-1	3,3'-Dichlorobenzidine	h	86.0	ug/L	6.82	22.7
101-55-3	4-Bromophenylphenylether	h	89.4	ug/L	6.82	22.7
59-50-7	Parachlorometa cresol	h	90.0	ug/L	6.82	22.7
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	h	110	ug/L	7.50	22.7
7005-72-3	4-Chlorophenylphenylether	h	88.5	ug/L	6.82	22.7
100-02-7	4-Nitrophenol	h	38.5	ug/L	6.82	22.7
83-32-9	Acenaphthene	h	93.0	ug/L	0.682	2.27
208-96-8	Acenaphthylene	h	87.3	ug/L	0.682	2.27
62-53-3	Aniline	h	86.4	ug/L	9.55	22.7
120-12-7	Anthracene	h	89.3	ug/L	0.682	2.27
1912-24-9	Atrazine	h	99.1	ug/L	6.82	22.7
92-87-5	Benzidine	h	48.4	ug/L	8.86	22.7
56-55-3	Benzo(a)anthracene	h	93.5	ug/L	0.682	2.27
50-32-8	Benzo(a)pyrene	h	90.9	ug/L	0.682	2.27
205-99-2	Benzo(b)fluoranthene	h	91.5	ug/L	0.682	2.27
191-24-2	Benzo(ghi)perylene	h	88.5	ug/L	0.682	2.27

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SDG Number: 2018-854
Lab Sample ID: 1203920338
Client Sample: QC for batch 1719086
Client ID: CAMO-18-148071MS
Batch ID: 1719087
Run Date: 11/20/2017 17:06
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2010.D

Date Collected: 11/14/2017 12:00
Date Received: 11/14/2017 12:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 440 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	h	95.1	ug/L	0.682	2.27
65-85-0	Benzoic acid	h	124	ug/L	13.6	45.5
100-51-6	Benzyl alcohol	h	88.7	ug/L	6.82	22.7
85-68-7	Butylbenzylphthalate	h	107	ug/L	6.82	22.7
218-01-9	Chrysene	h	95.9	ug/L	0.682	2.27
84-74-2	Di-n-butylphthalate	h	101	ug/L	6.82	22.7
117-84-0	Di-n-octylphthalate	h	88.1	ug/L	6.82	22.7
53-70-3	Dibenzo(a,h)anthracene	h	91.2	ug/L	0.682	2.27
132-64-9	Dibenzofuran	h	86.6	ug/L	6.82	22.7
84-66-2	Diethylphthalate	h	93.3	ug/L	6.82	22.7
131-11-3	Dimethylphthalate	h	92.7	ug/L	6.82	22.7
88-85-7	Dinoseb	Uh	6.82	ug/L	6.82	22.7
122-39-4	Diphenylamine	h	89.6	ug/L	6.82	22.7
206-44-0	Fluoranthene	h	87.5	ug/L	0.682	2.27
86-73-7	Fluorene	h	84.0	ug/L	0.682	2.27
118-74-1	Hexachlorobenzene	h	86.6	ug/L	6.82	22.7
87-68-3	Hexachlorobutadiene	h	69.6	ug/L	6.82	22.7
77-47-4	Hexachlorocyclopentadiene	h	64.6	ug/L	6.82	22.7
67-72-1	Hexachloroethane	h	73.1	ug/L	6.82	22.7
193-39-5	Indeno(1,2,3-cd)pyrene	h	89.3	ug/L	0.682	2.27
78-59-1	Isophorone	h	90.6	ug/L	7.95	22.7
62-75-9	N-Methyl-N-nitrosomethylamine	h	67.9	ug/L	6.82	22.7
924-16-3	N-Nitrosodi-n-butylamine	Uh	6.82	ug/L	6.82	22.7
55-18-5	N-Nitrosodiethylamine	Uh	6.82	ug/L	6.82	22.7
621-64-7	N-Nitrosodi-n-propylamine	h	97.5	ug/L	6.82	22.7
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	h	98.1	ug/L	6.82	22.7
91-20-3	Naphthalene	h	81.2	ug/L	0.682	2.27
98-95-3	Nitrobenzene	h	88.0	ug/L	6.82	22.7
608-93-5	Pentachlorobenzene	Uh	6.82	ug/L	6.82	22.7
87-86-5	Pentachlorophenol	h	99.3	ug/L	6.82	22.7
85-01-8	Phenanthrene	h	90.5	ug/L	0.682	2.27
108-95-2	Phenol	h	49.6	ug/L	6.82	22.7
129-00-0	Pyrene	h	111	ug/L	0.682	2.27
110-86-1	Pyridine	h	59.3	ug/L	6.82	22.7
108-60-1	bis(2-Chloro-1-methylethyl)ether	h	102	ug/L	6.82	22.7
111-91-1	bis(2-Chloroethoxy)methane	h	91.4	ug/L	6.82	22.7
111-44-4	bis(2-Chloroethyl) ether	h	91.4	ug/L	6.82	22.7
117-81-7	bis(2-Ethylhexyl)phthalate	h	110	ug/L	6.82	22.7

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SDG Number: 2018-854
Lab Sample ID: 1203920338
Client Sample: QC for batch 1719086
Client ID: CAMO-18-148071MS
Batch ID: 1719087
Run Date: 11/20/2017 17:06
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2010.D

Date Collected: 11/14/2017 12:00
Date Received: 11/14/2017 12:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 440 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	h	83.7	ug/L	8.41	22.7
99-09-2	3-Nitroaniline	h	103	ug/L	6.82	22.7
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol	h	78.8	ug/L	6.82	22.7
88-74-4	2-Nitroaniline	h	90.9	ug/L	6.82	22.7
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	h	85.7	ug/L	6.82	22.7
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	152	227	ug/L	67	(32%-124%)
2-Fluorobiphenyl	86.2	114	ug/L	76	(32%-112%)
2-Fluorophenol	121	227	ug/L	53	(15%-88%)
Nitrobenzene-d5	87.5	114	ug/L	77	(36%-115%)
Phenol-d5	97.1	227	ug/L	43	(15%-91%)
p-Terphenyl-d14	114	114	ug/L	100	(36%-121%)

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SDG Number: 2018-854
Lab Sample ID: 1203920339
Client Sample: QC for batch 1719086
Client ID: CAMO-18-148071MSD
Batch ID: 1719087
Run Date: 11/20/2017 17:35
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2011.D

Date Collected: 11/14/2017 12:00
Date Received: 11/14/2017 12:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 440 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	h	79.5	ug/L	6.82	22.7
120-82-1	1,2,4-Trichlorobenzene	h	76.7	ug/L	6.82	22.7
95-50-1	1,2-Dichlorobenzene	h	77.0	ug/L	6.82	22.7
122-66-7	Azobenzene	h	101	ug/L	6.82	22.7
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	h	73.6	ug/L	6.82	22.7
106-46-7	1,4-Dichlorobenzene	h	75.8	ug/L	6.82	22.7
123-91-1	1,4-Dioxane	h	95.7	ug/L	6.82	22.7
90-12-0	1-Methylnaphthalene	h	81.3	ug/L	0.682	2.27
58-90-2	2,3,4,6-Tetrachlorophenol	h	85.7	ug/L	6.82	22.7
95-95-4	2,4,5-Trichlorophenol	h	90.9	ug/L	6.82	22.7
88-06-2	2,4,6-Trichlorophenol	h	86.4	ug/L	6.82	22.7
120-83-2	2,4-Dichlorophenol	h	87.5	ug/L	6.82	22.7
105-67-9	2,4-Dimethylphenol	h	71.6	ug/L	6.82	22.7
51-28-5	2,4-Dinitrophenol	h	73.9	ug/L	11.4	45.5
121-14-2	2,4-Dinitrotoluene	h	90.7	ug/L	6.82	22.7
606-20-2	2,6-Dinitrotoluene	h	89.9	ug/L	6.82	22.7
91-58-7	2-Chloronaphthalene	h	83.9	ug/L	0.932	2.27
95-57-8	2-Chlorophenol	h	85.2	ug/L	6.82	22.7
534-52-1	2-Methyl-4,6-dinitrophenol	h	96.8	ug/L	6.82	22.7
91-57-6	2-Methylnaphthalene	h	79.5	ug/L	0.682	2.27
88-75-5	2-Nitrophenol	h	92.6	ug/L	6.82	22.7
91-94-1	3,3'-Dichlorobenzidine	h	88.2	ug/L	6.82	22.7
101-55-3	4-Bromophenylphenylether	h	91.7	ug/L	6.82	22.7
59-50-7	Parachlorometa cresol	h	89.0	ug/L	6.82	22.7
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	h	111	ug/L	7.50	22.7
7005-72-3	4-Chlorophenylphenylether	h	89.3	ug/L	6.82	22.7
100-02-7	4-Nitrophenol	h	37.5	ug/L	6.82	22.7
83-32-9	Acenaphthene	h	92.3	ug/L	0.682	2.27
208-96-8	Acenaphthylene	h	88.0	ug/L	0.682	2.27
62-53-3	Aniline	h	90.0	ug/L	9.55	22.7
120-12-7	Anthracene	h	92.1	ug/L	0.682	2.27
1912-24-9	Atrazine	h	106	ug/L	6.82	22.7
92-87-5	Benzidine	h	60.2	ug/L	8.86	22.7
56-55-3	Benzo(a)anthracene	h	98.4	ug/L	0.682	2.27
50-32-8	Benzo(a)pyrene	h	93.3	ug/L	0.682	2.27
205-99-2	Benzo(b)fluoranthene	h	96.3	ug/L	0.682	2.27
191-24-2	Benzo(ghi)perylene	h	87.1	ug/L	0.682	2.27

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

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SDG Number: 2018-854
Lab Sample ID: 1203920339
Client Sample: QC for batch 1719086
Client ID: CAMO-18-148071MSD
Batch ID: 1719087
Run Date: 11/20/2017 17:35
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2011.D

Date Collected: 11/14/2017 12:00
Date Received: 11/14/2017 12:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 440 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	h	98.8	ug/L	0.682	2.27
65-85-0	Benzoic acid	h	129	ug/L	13.6	45.5
100-51-6	Benzyl alcohol	h	92.5	ug/L	6.82	22.7
85-68-7	Butylbenzylphthalate	h	108	ug/L	6.82	22.7
218-01-9	Chrysene	h	99.7	ug/L	0.682	2.27
84-74-2	Di-n-butylphthalate	h	104	ug/L	6.82	22.7
117-84-0	Di-n-octylphthalate	h	92.4	ug/L	6.82	22.7
53-70-3	Dibenzo(a,h)anthracene	h	90.2	ug/L	0.682	2.27
132-64-9	Dibenzofuran	h	87.2	ug/L	6.82	22.7
84-66-2	Diethylphthalate	h	96.4	ug/L	6.82	22.7
131-11-3	Dimethylphthalate	h	95.1	ug/L	6.82	22.7
88-85-7	Dinoseb	Uh	6.82	ug/L	6.82	22.7
122-39-4	Diphenylamine	h	91.5	ug/L	6.82	22.7
206-44-0	Fluoranthene	h	89.3	ug/L	0.682	2.27
86-73-7	Fluorene	h	85.5	ug/L	0.682	2.27
118-74-1	Hexachlorobenzene	h	88.1	ug/L	6.82	22.7
87-68-3	Hexachlorobutadiene	h	67.5	ug/L	6.82	22.7
77-47-4	Hexachlorocyclopentadiene	h	64.8	ug/L	6.82	22.7
67-72-1	Hexachloroethane	h	73.5	ug/L	6.82	22.7
193-39-5	Indeno(1,2,3-cd)pyrene	h	90.7	ug/L	0.682	2.27
78-59-1	Isophorone	h	89.7	ug/L	7.95	22.7
62-75-9	N-Methyl-N-nitrosomethylamine	h	71.8	ug/L	6.82	22.7
924-16-3	N-Nitrosodi-n-butylamine	Uh	6.82	ug/L	6.82	22.7
55-18-5	N-Nitrosodiethylamine	Uh	6.82	ug/L	6.82	22.7
621-64-7	N-Nitrosodi-n-propylamine	h	98.2	ug/L	6.82	22.7
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	h	96.7	ug/L	6.82	22.7
91-20-3	Naphthalene	h	83.4	ug/L	0.682	2.27
98-95-3	Nitrobenzene	h	92.8	ug/L	6.82	22.7
608-93-5	Pentachlorobenzene	Uh	6.82	ug/L	6.82	22.7
87-86-5	Pentachlorophenol	h	105	ug/L	6.82	22.7
85-01-8	Phenanthrene	h	92.5	ug/L	0.682	2.27
108-95-2	Phenol	h	52.6	ug/L	6.82	22.7
129-00-0	Pyrene	h	109	ug/L	0.682	2.27
110-86-1	Pyridine	h	67.3	ug/L	6.82	22.7
108-60-1	bis(2-Chloro-1-methylethyl)ether	h	106	ug/L	6.82	22.7
111-91-1	bis(2-Chloroethoxy)methane	h	93.3	ug/L	6.82	22.7
111-44-4	bis(2-Chloroethyl) ether	h	95.8	ug/L	6.82	22.7
117-81-7	bis(2-Ethylhexyl)phthalate	h	111	ug/L	6.82	22.7

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

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SDG Number: 2018-854
Lab Sample ID: 1203920339
Client Sample: QC for batch 1719086
Client ID: CAMO-18-148071MSD
Batch ID: 1719087
Run Date: 11/20/2017 17:35
Prep Date: 11/20/2017 05:30
Data File: s112017.B\s4k2011.D

Date Collected: 11/14/2017 12:00
Date Received: 11/14/2017 12:00
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD4.I
Analyst: JMB3
Aliquot: 440 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	h	83.8	ug/L	8.41	22.7
99-09-2	3-Nitroaniline	h	105	ug/L	6.82	22.7
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol	h	81.7	ug/L	6.82	22.7
88-74-4	2-Nitroaniline	h	93.7	ug/L	6.82	22.7
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline	h	88.3	ug/L	6.82	22.7
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	158	227	ug/L	69	(32%-124%)
2-Fluorobiphenyl	87.1	114	ug/L	77	(32%-112%)
2-Fluorophenol	128	227	ug/L	56	(15%-88%)
Nitrobenzene-d5	92.5	114	ug/L	81	(36%-115%)
Phenol-d5	103	227	ug/L	45	(15%-91%)
p-Terphenyl-d14	114	114	ug/L	100	(36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-854
Work Order #: 437822**

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: 1721630

Prep Batch Number: 1721628

Sample Analysis

Sample ID	Client ID
437822001	437822001 (CAMO-18-148055)
437822005	437822005 (CAMO-18-148056)
437822008	437822008 (CAMO-18-148108)
437822011	437822011 (CAMO-18-148993)
437822015	437822015 (CAMO-18-147994)
1203926747	Interference Check Sample (ICS)
1203926679	Method Blank (MB)
1203926680	Laboratory Control Sample (LCS)
1203926748	437822001(CAMO-18-148055) Matrix Spike (MS)
1203926749	437822001(CAMO-18-148055) 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 437822001 (CAMO-18-148055) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

One or more of the required spiking analytes were not within the acceptance limits in 1203926748 (CAMO-18-148055MS) and 1203926749 (CAMO-18-148055MSD)). A 0% recovery for Perchlorate and Perchlorate-101 was observed in both matrix spikes. The acceptance range is from 75-125%. The non-conforming recoveries are due to the background concentration in the parent sample, 437822001 (CAMO-18-148055) and the need to dilute all at a 1:100 dilution.

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard Area Acceptance

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

Retention Time

During the analysis of Perchlorate by LC/MS/MS, retention time shifts are commonly observed. These retention time shifts, which are caused by fouling of the column by the sample matrices, are problematic when the retention time is used as one of the criterion for confirmation. To overcome this problem, a known amount of O(18) labeled Perchlorate was added to each sample as a retention time standard. The presence of Perchlorate was confirmed by the relative retention time (RRT) of the Perchlorate peak and the O(18) standard. A RRT window of 0.98 to 1.02, as required by DOD QSM 5.0, has been used. In addition to the isotopic ratio, the

presence of Perchlorate in the samples associated with this data package have been confirmed using the relative retention criteria stated above, not the absolute retention time.

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Samples 1203926748 (CAMO-18-148055MS), 1203926749 (CAMO-18-148055MSD) and 437822001 (CAMO-18-148055) were diluted to bring the over range concentrations within the calibration range.

Sample Re-extraction/Re-analysis

The analytical batch was re-analyzed due to non-conforming CCV and CRI recoveries in the original analysis. The re-analysis data are reported.

Miscellaneous Information

Manual Integrations

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

Method Comments

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

Additional Comments

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

Perchlorate Isotope Ratio

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

System Configuration

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

Electronic Packaging Comment

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

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

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

Chromatographic Columns

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

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

Dionex: IonPac AG-16 2 x 50 mm.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-854 GEL Work Order: 437822

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: 01 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: 1721628Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148055Date Received: 14-NOV-17GEL Job No (SDG): 2018-854GEL Sample ID: 437822001Date Filtered: 27-NOV-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	5	20	87.5	ug/L		100	28-NOV-17 18:30	per1128016a
	Perchlorate Isotope Ratio			2.85			100	28-NOV-17 18:30	per1128016a
14797-73-0	Perchlorate-101	5	20	88.5	ug/L		100	28-NOV-17 18:30	per1128016a
	Perchlorate-O(18)			50.4	ug/L		100	28-NOV-17 18:30	per1128016a

^ 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: 1721628Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148056Date Received: 14-NOV-17GEL Job No (SDG): 2018-854GEL Sample ID: 437822005Date Filtered: 27-NOV-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.336	ug/L		1	28-NOV-17 19:03	per1128019a
	Perchlorate Isotope Ratio			2.99			1	28-NOV-17 19:03	per1128019a
14797-73-0	Perchlorate-101	.05	.2	0.324	ug/L		1	28-NOV-17 19:03	per1128019a
	Perchlorate-O(18)			0.519	ug/L		1	28-NOV-17 19:03	per1128019a

^ 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: 1721628Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148108Date Received: 14-NOV-17GEL Job No (SDG): 2018-854GEL Sample ID: 437822008Date Filtered: 27-NOV-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.334	ug/L		1	28-NOV-17 19:14	per1128020a
	Perchlorate Isotope Ratio			2.99			1	28-NOV-17 19:14	per1128020a
14797-73-0	Perchlorate-101	.05	.2	0.322	ug/L		1	28-NOV-17 19:14	per1128020a
	Perchlorate-O(18)			0.531	ug/L		1	28-NOV-17 19:14	per1128020a

^ 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: 1721628Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148993Date Received: 14-NOV-17GEL Job No (SDG): 2018-854GEL Sample ID: 437822011Date Filtered: 27-NOV-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.847	ug/L		1	28-NOV-17 19:25	per1128021a
	Perchlorate Isotope Ratio			3.04			1	28-NOV-17 19:25	per1128021a
14797-73-0	Perchlorate-101	.05	.2	0.802	ug/L		1	28-NOV-17 19:25	per1128021a
	Perchlorate-O(18)			0.547	ug/L		1	28-NOV-17 19:25	per1128021a

^ 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: 1721628Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-147994Date Received: 14-NOV-17GEL Job No (SDG): 2018-854GEL Sample ID: 437822015Date Filtered: 27-NOV-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.875	ug/L		1	28-NOV-17 19:36	per1128022a
	Perchlorate Isotope Ratio			2.92			1	28-NOV-17 19:36	per1128022a
14797-73-0	Perchlorate-101	.05	.2	0.864	ug/L		1	28-NOV-17 19:36	per1128022a
	Perchlorate-O(18)			0.544	ug/L		1	28-NOV-17 19:36	per1128022a

^ 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): 2018-854

Extract Batch Code: 1721628

Date Filtered: 27-NOV-17

Matrix: WATER

Sample ID: 1203926680

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.193	ug/L	97		85 - 115
Perchlorate Isotope Ratio		3.02				-
Perchlorate-101	0.200	.184	ug/L	92		85 - 115
Perchlorate-O(18)		.264	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): 2018-854

Extract Batch Code: 1721628

Date Extracted: 27-NOV-17

GEL MS/PS ID: 1203926748

Client ID: CAMO-18-148055

GEL MSD/PSD ID: 1203926749

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	87.5	ug/L	86.4	0 *	84.8	0 *	2	30	75 - 125
Perchlorate Isotope Ratio	0	2.85		3.2		3.02		6		-
Perchlorate-101	0.200	88.5	ug/L	77.7	0 *	80.8	0 *	4	30	75 - 125
Perchlorate-O(18)	0	50.4	ug/L	53.0		50.4		5		-

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

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

MBLab Code: GELDate Received: 27-NOV-17Instrument: LCMSMSGEL Job No (SDG): 2018-854Method: EPA 6850 ModifiedGEL Sample ID: 1203926679Matrix: WATERDate Filtered: 27-NOV-17Extraction Batch ID: 1721628Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL%Solids: Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.050	ug/L	U	1	28-NOV-17 17:57	per1128013a
	Perchlorate Isotope Ratio						1	28-NOV-17 17:57	per1128013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	28-NOV-17 17:57	per1128013a
	Perchlorate-O(18)			0.295	ug/L		1	28-NOV-17 17:57	per1128013a

^ 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: 1721628Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 27-NOV-17GEL Job No (SDG): 2018-854GEL Sample ID: 1203926680Date Filtered: 27-NOV-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.193	ug/L	J	1	28-NOV-17 18:08	per1128014a
	Perchlorate Isotope Ratio			3.02			1	28-NOV-17 18:08	per1128014a
14797-73-0	Perchlorate-101	.05	.2	0.184	ug/L	J	1	28-NOV-17 18:08	per1128014a
	Perchlorate-O(18)			0.264	ug/L		1	28-NOV-17 18:08	per1128014a

^ 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: 1721628Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-854GEL Sample ID: 1203926747Date Filtered: 27-NOV-17Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.234	ug/L		1	28-NOV-17 18:19	per1128015a
	Perchlorate Isotope Ratio			3.1			1	28-NOV-17 18:19	per1128015a
14797-73-0	Perchlorate-101	.05	.2	0.217	ug/L		1	28-NOV-17 18:19	per1128015a
	Perchlorate-O(18)			0.257	ug/L		1	28-NOV-17 18:19	per1128015a

^ 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: 1721628Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148055MSDate Received: 14-NOV-17GEL Job No (SDG): 2018-854GEL Sample ID: 1203926748Date Filtered: 27-NOV-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	5	20	86.4	ug/L		100	28-NOV-17 18:41	per1128017a
	Perchlorate Isotope Ratio			3.2			100	28-NOV-17 18:41	per1128017a
14797-73-0	Perchlorate-101	5	20	77.7	ug/L		100	28-NOV-17 18:41	per1128017a
	Perchlorate-O(18)			53.0	ug/L		100	28-NOV-17 18:41	per1128017a

^ 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: 1721628Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-18-148055MSDDate Received: 14-NOV-17GEL Job No (SDG): 2018-854GEL Sample ID: 1203926749Date Filtered: 27-NOV-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	5	20	84.8	ug/L		100	28-NOV-17 18:52	per1128018a
	Perchlorate Isotope Ratio			3.02			100	28-NOV-17 18:52	per1128018a
14797-73-0	Perchlorate-101	5	20	80.8	ug/L		100	28-NOV-17 18:52	per1128018a
	Perchlorate-O(18)			50.4	ug/L		100	28-NOV-17 18:52	per1128018a

^ 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 =

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

PCB Analysis

Case Narrative

**GC Semivolatile PCB
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-854
Work Order #: 437822**

Method/Analysis Information

Procedure:	Analysis of The Analysis of Polychlorinated Biphenyls by GC/ECD by ECD
Analytical Method:	SW846 3535A/8082
Prep Method:	SW846 3535A
Analytical Batch Number:	1722631
Prep Batch Number:	1722630

Sample Analysis

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

Sample ID	Client ID
437822003	CAMO-18-148071
437822006	CAMO-18-148072
437822009	CAMO-18-148110
1203929169	Method Blank (MB)
1203929170	Laboratory Control Sample (LCS)
1203929171	437508003(CAMO-18-148117) Matrix Spike (MS)
1203929172	437508003(CAMO-18-148117) 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 calibration verification standards(ICV or CCV) did not meet acceptance criteria with a positive bias. As there were no target analytes detected in the associated environmental samples, the sample results were not adversely affected.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

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 437508003 (CAMO-18-148117) 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 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 lower results from either column have been chosen and reported in the data package for the client samples, MB and LCS. The data reported for the MS/MSD are from the same analytical column as the parent sample.

System Configuration

The Semi-Volatiles-PCB analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD9A.I_1	Agilent 7890A Gas Chromatograph/Dual ECD w/ 7693 Autosampler	7890A GC/ECD	Restek Rtx-CLPest 1	30m x 0.25mm, 0.25um
ECD9A.I_2	Agilent 7890A Gas Chromatograph/Dual ECD w/ 7693 Autosampler	7890A GC/ECD	Restek Rtx-CLPest 2	30m x 0.25mm, 0.20um

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: 2018-854 GEL Work Order: 437822

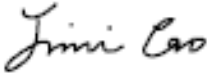
The Qualifiers in this report are defined as follows:

- * 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: 05 DEC 2017

Title: Data Validator

Sample Data Summary

PCB
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: 2018-854
Lab Sample ID: 437822003
Client Sample: PCB
Client ID: CAMO-18-148071
Batch ID: 1722631
Run Date: 12/01/2017 18:37
Prep Date: 12/01/2017 04:50
Data File: 120117.S\E910157.D
 120117.S\E910157.D

Date Collected: 11/09/2017 13:37
Date Received: 11/14/2017 09:05
Client: ARSL004
Method: SW846 3535A/8082
Inst: ECD9A.I
Analyst: YS1
Aliquot: 940 mL
Column: 1 RTX-CLPEST 1
 2 RTX-CLPEST 2

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	0.118	0.213	ug/L 56	(33%-122%)
Decachlorobiphenyl	0.195	0.213	ug/L 91	(35%-138%)

PCB
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: 2018-854
Lab Sample ID: 437822006
Client Sample: PCB
Client ID: CAMO-18-148072
Batch ID: 1722631
Run Date: 12/01/2017 18:53
Prep Date: 12/01/2017 04:50
Data File: 120117.S\E9I0158.D
 120117.S\E9I0158.D

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05
Client: ARSL004
Method: SW846 3535A/8082
Inst: ECD9A.I
Analyst: YS1
Aliquot: 930 mL
Column: 1 RTX-CLPEST 1
 2 RTX-CLPEST 2

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	0.0358	ug/L	0.0358	0.108	1
11104-28-2	Aroclor-1221	U	0.0358	ug/L	0.0358	0.108	1
11141-16-5	Aroclor-1232	U	0.0358	ug/L	0.0358	0.108	1
53469-21-9	Aroclor-1242	U	0.0358	ug/L	0.0358	0.108	1
12672-29-6	Aroclor-1248	U	0.0358	ug/L	0.0358	0.108	1
11097-69-1	Aroclor-1254	U	0.0358	ug/L	0.0358	0.108	1
11096-82-5	Aroclor-1260	U	0.0358	ug/L	0.0358	0.108	1
37324-23-5	Aroclor-1262	U	0.0358	ug/L	0.0358	0.108	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.160	0.215	ug/L 75	(33%-122%)
Decachlorobiphenyl	0.235	0.215	ug/L 109	(35%-138%)

PCB
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: 2018-854
Lab Sample ID: 437822009
Client Sample: PCB
Client ID: CAMO-18-148110
Batch ID: 1722631
Run Date: 12/01/2017 19:09
Prep Date: 12/01/2017 04:50
Data File: 120117.S\E9I0159.D
 120117.S\E9I0159.D

Date Collected: 11/09/2017 10:33
Date Received: 11/14/2017 09:05
Client: ARSL004
Method: SW846 3535A/8082
Inst: ECD9A.I
Analyst: YS1
Aliquot: 940 mL
Column: 1 RTX-CLPEST 1
 2 RTX-CLPEST 2

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	0.169	0.213	ug/L 80	(33%-122%)
Decachlorobiphenyl	0.192	0.213	ug/L 90	(35%-138%)

Quality Control Summary

PCB
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-854**Matrix Type: LIQUID**

Sample ID	Client ID	4CMX 1 %REC #	4CMX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #
1203929169	MB for batch 1722630	94	89	115	107
1203929170	LCS for batch 1722630	62	61	78	75
1203929171	CAMO-18-148117MS	74	71	82	83
1203929172	CAMO-18-148117MSD	64	62	75	72
437822003	CAMO-18-148071	58	56	97	91
437822006	CAMO-18-148072	82	75	115	109
437822009	CAMO-18-148110	83	80	93	90

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: 2018-854

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1722630

Matrix: WATER

Lab Sample ID 1203929170

Instrument: ECD9A.I

Analysis Date: 12/01/2017 15:50

Dilution: 1

Analyst: YS1

Prep Batch ID: 1722630

Inj. Vol: 1 uL

Batch ID: 1722631

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	0.639	64	45-101
11096-82-5	LCS	Aroclor-1260		1.00	0.0	0.814	81	52-113

PCB
Quality Control Summary
Spike Recovery Report

Page 1 of 2

SDG Number: 2018-854

Sample Type: Matrix Spike

Client ID: CAMO-18-148117MS

Matrix: W

Lab Sample ID 1203929171

Instrument: ECD9A.I

Analysis Date: 12/01/2017 16:19

Dilution: 1

Analyst: YS1

Prep Batch ID: 1722630

Inj. Vol: 1 uL

Batch ID: 1722631

CAS No			Parmname		Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits
12674-11-2	MS	Aroclor-1016			1.00	0.00	U	0.792	79	26-110
11096-82-5	MS	Aroclor-1260			1.00	0.00	U	0.759	76	30-127

PCB
Quality Control Summary
Spike Recovery Report

Page 2 of 2

SDG Number: 2018-854

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-148117MSD

Matrix: W

Lab Sample ID 1203929172

Instrument: ECD9A.I

Analysis Date: 12/01/2017 16:35

Dilution: 1

Analyst: YS1

Prep Batch ID: 1722630

Inj. Vol: 1 uL

Batch ID: 1722631

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	1.00	0.00	U	0.707	71	26-110	11	0-27
11096-82-5	MSD Aroclor-1260	1.00	0.00	U	0.677	68	30-127	11	0-29

Method Blank Summary

Page 1 of 1

SDG Number:	2018-854	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1722630	Instrument ID:	ECD9A.I_1	Data File:	120117.S\E9I0145.D
Lab Sample ID:	1203929169		ECD9A.I_2		120117.S\E9I0145.D
Column:	RTX-CLPEST 1	Prep Date:	12/01/2017 04:50	Analyzed:	12/01/17 15:38
	RTX-CLPEST 2				

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 1722630	1203929170	120117.S\E9I0146.D 120117.S\E9I0146.D	12/01/17	1550
02 CAMO-18-148117MS	1203929171	120117.S\E9I0148.D 120117.S\E9I0148.D	12/01/17	1619
03 CAMO-18-148117MSD	1203929172	120117.S\E9I0149.D 120117.S\E9I0149.D	12/01/17	1635
04 CAMO-18-148071	437822003	120117.S\E9I0157.D 120117.S\E9I0157.D	12/01/17	1837
05 CAMO-18-148072	437822006	120117.S\E9I0158.D 120117.S\E9I0158.D	12/01/17	1853
06 CAMO-18-148110	437822009	120117.S\E9I0159.D 120117.S\E9I0159.D	12/01/17	1909

Quality Control Data

PCB
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: 2018-854
Lab Sample ID: 1203929169
Client Sample: QC for batch 1722630
Client ID: MB for batch 1722630
Batch ID: 1722631
Run Date: 12/01/2017 15:38
Prep Date: 12/01/2017 04:50
Data File: 120117.S\E910145.D
120117.S\E910145.D

Client: ARSL004
Method: SW846 3535A/8082
Inst: ECD9A.I
Analyst: YS1
Aliquot: 1000 mL
Column: 1 RTX-CLPEST 1
2 RTX-CLPEST 2

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	0.179	0.200	ug/L 89	(33%-122%)
Decachlorobiphenyl	0.215	0.200	ug/L 107	(35%-138%)

PCB
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: 2018-854
Lab Sample ID: 1203929170
Client Sample: QC for batch 1722630
Client ID: LCS for batch 1722630
Batch ID: 1722631
Run Date: 12/01/2017 15:50
Prep Date: 12/01/2017 04:50
Data File: 120117.S\E9I0146.D
 120117.S\E9I0146.D

Client: ARSL004
Method: SW846 3535A/8082
Inst: ECD9A.I
Analyst: YS1
Aliquot: 1000 mL
Column: 1 RTX-CLPEST 1
 2 RTX-CLPEST 2

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		0.639	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		0.814	ug/L	0.0333	0.100	2
37324-23-5	Aroclor-1262	U	0.0333	ug/L	0.0333	0.100	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.121	0.200	ug/L 61	(33%-122%)
Decachlorobiphenyl	0.150	0.200	ug/L 75	(35%-138%)

PCB
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: 2018-854
Lab Sample ID: 1203929171
Client Sample: QC for batch 1722630
Client ID: CAMO-18-148117MS
Batch ID: 1722631
Run Date: 12/01/2017 16:19
Prep Date: 12/01/2017 04:50
Data File: 120117.S\E910148.D
 120117.S\E910148.D

Date Collected: 11/07/2017 12:21
Date Received: 11/09/2017 09:00
Client: ARSL004
Method: SW846 3535A/8082
Inst: ECD9A.I
Analyst: YS1
Aliquot: 500 mL
Column: 1 RTX-CLPEST 1
 2 RTX-CLPEST 2

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		0.792	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		0.759	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	0.141	0.200	ug/L 71	(33%-122%)
Decachlorobiphenyl	0.165	0.200	ug/L 83	(35%-138%)

PCB
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: 2018-854	Date Collected: 11/07/2017 12:21	Matrix: W
Lab Sample ID: 1203929172	Date Received: 11/09/2017 09:00	
Client Sample: QC for batch 1722630	Client: ARSL004	Project: QC
Client ID: CAMO-18-148117MSD	Method: SW846 3535A/8082	SOP Ref: GL-OA-E-040
Batch ID: 1722631	Inst: ECD9A.I	Dilution: 1
Run Date: 12/01/2017 16:35	Analyst: YS1	Inj. Vol: 1 uL
Prep Date: 12/01/2017 04:50	Aliquot: 500 mL	Final Volume: .5 mL
Data File: 120117.S\E910149.D	Column: 1 RTX-CLPEST 1	
120117.S\E910149.D	2 RTX-CLPEST 2	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016		0.707	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		0.677	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	0.124	0.200	ug/L 62	(33%-122%)
Decachlorobiphenyl	0.143	0.200	ug/L 72	(35%-138%)

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-854
Work Order #: 437822

Sample ID	Client ID
437822001	CAMO-18-148055
437822002	CAMO-18-148071
437822005	CAMO-18-148056
437822007	CAMO-18-148072
437822008	CAMO-18-148108
437822010	CAMO-18-148110
437822011	CASA-18-147993
437822012	CASA-18-148000
437822015	CASA-18-147994
437822016	CASA-18-148001
1203919761	Method Blank (MB) ICP
1203919762	Laboratory Control Sample (LCS)
1203919765	437794001(CAMO-18-148054L) Serial Dilution (SD)
1203919763	437794001(CAMO-18-148054D) Sample Duplicate (DUP)
1203919764	437794001(CAMO-18-148054S) Matrix Spike (MS)
1203919771	Method Blank (MB) ICP-MS
1203919772	Laboratory Control Sample (LCS)
1203919775	437794001(CAMO-18-148054L) Serial Dilution (SD)
1203919773	437794001(CAMO-18-148054D) Sample Duplicate (DUP)
1203919774	437794001(CAMO-18-148054S) Matrix Spike (MS)
1203929926	Method Blank (MB) CVAA
1203929927	Laboratory Control Sample (LCS)
1203929932	437822001(CAMO-18-148055L) Serial Dilution (SD)
1203929928	437822001(CAMO-18-148055D) Sample Duplicate (DUP)
1203929930	437822001(CAMO-18-148055S) Matrix Spike (MS)

Sample Analysis

Samples 437822001,002,005,007,008,010,011,012,015 and 016 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1718859, 1718865, 1722939 and 1725385
Prep Batch :	1718858, 1718864 and 1722938
Standard Operating Procedures:	GL-MA-E-013 REV# 30, GL-MA-E-006 REV# 14, GL-MA-E-014 REV# 32, GL-MA-E-010 REV# 36 and GL-GC-E-107 REV# 10
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

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

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm.

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 437822001 (CAMO-18-148055), 437822005 (CAMO-18-148056), 437822008 (CAMO-18-148108), 437822011 (CASA-18-147993) and 437822015 (CASA-18-147994)-ICP.

ICSA/ICSAB Statement

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

Continuing Calibration Blanks (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 437794001 (CAMO-18-148054)-ICP and ICP-MS and 437822001 (CAMO-18-148055)-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: 2018-854 GEL Work Order: 437822

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: 11 DEC 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437822001**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CAMO-18-148055**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	12/04/17 10:28	120417W1-4	1722939

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 437822001

BASIS: As Received

DATE COLLECTED 09-NOV-17

CLIENT ID: CAMO-18-148055

LEVEL: Low

DATE RECEIVED 14-NOV-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7440-39-3	Barium	40.9	ug/L		1	5	5	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7440-42-8	Boron	52.3	ug/L		15	50	50	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7440-70-2	Calcium	64400	ug/L		50	200	200	1	P	HSC	12/11/17 09:51	121117A-2	1718859
7440-47-3	Chromium	69.4	ug/L		3	10	10	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7440-50-8	Copper	5.65	ug/L	J	3	10	10	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	12/11/17 09:51	121117A-2	1718859
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7439-95-4	Magnesium	13200	ug/L		110	300	300	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7439-96-5	Manganese	3.39	ug/L	J	2	10	10	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7439-98-7	Molybdenum	1.97	ug/L		0.2	0.5	0.5	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7440-02-0	Nickel	27.9	ug/L		0.6	2	2	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7440-09-7	Potassium	889	ug/L		50	150	150	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7631-86-9	Silica	69600	ug/L		53	213	213	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7440-23-5	Sodium	25600	ug/L		100	300	300	1	P	HSC	12/11/17 09:51	121117A-2	1718859
7440-24-6	Strontium	283	ug/L		1	5	5	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7440-31-5	Tin	6.47	ug/L	J	2.5	10	10	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7440-61-1	Uranium	0.829	ug/L		0.067	0.2	0.2	1	MS	BAJ	11/30/17 20:06	171130-3	1718865
7440-62-2	Vanadium	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:10	120717A-1	1718859
7440-66-6	Zinc	26.3	ug/L		3.3	10	10	1	P	HSC	12/11/17 09:51	121117A-2	1718859

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 437822001**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CAMO-18-148055**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	215	mg/L		0.453	1.24	1.24	1		TXT1	12/11/17 12:59		1725385

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1718859	1718858	SW846 3005A	50	mL	50	mL	11/14/17	JXM8
1718865	1718864	SW846 3005A	50	mL	50	mL	11/14/17	JXM8
1722939	1722938	EPA 245.1/245.2 Prep	20	mL	20	mL	12/01/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437822002**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CAMO-18-148071**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	12/04/17 10:36	120417W1-4	1722939

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1722939	1722938	EPA 245.1/245.2 Prep	20	mL	20	mL	12/01/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437822005**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CAMO-18-148056**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	12/04/17 10:38	120417W1-4	1722939

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 437822005

BASIS: As Received

DATE COLLECTED 09-NOV-17

CLIENT ID: CAMO-18-148056

LEVEL: Low

DATE RECEIVED 14-NOV-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7440-38-2	Arsenic	2.36	ug/L	J	2	5	5	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7440-39-3	Barium	13.5	ug/L		1	5	5	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7440-70-2	Calcium	11300	ug/L		50	200	200	1	P	HSC	12/11/17 09:55	121117A-2	1718859
7440-47-3	Chromium	5.95	ug/L	J	3	10	10	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	12/11/17 09:55	121117A-2	1718859
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7439-95-4	Magnesium	4090	ug/L		110	300	300	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7439-98-7	Molybdenum	1.08	ug/L		0.2	0.5	0.5	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7440-02-0	Nickel	1.95	ug/L	J	0.6	2	2	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7440-09-7	Potassium	1670	ug/L		50	150	150	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7631-86-9	Silica	74700	ug/L		53	213	213	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7440-23-5	Sodium	11300	ug/L		100	300	300	1	P	HSC	12/11/17 09:55	121117A-2	1718859
7440-24-6	Strontium	51.2	ug/L		1	5	5	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7440-61-1	Uranium	0.775	ug/L		0.067	0.2	0.2	1	MS	BAJ	11/30/17 20:10	171130-3	1718865
7440-62-2	Vanadium	7.33	ug/L		1	5	5	1	P	HSC	12/07/17 17:13	120717A-1	1718859
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	12/11/17 09:55	121117A-2	1718859

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 437822005**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CAMO-18-148056**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	45.1	mg/L		0.453	1.24	1.24	1		TXT1	12/11/17 12:59		1725385

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1718859	1718858	SW846 3005A	50	mL	50	mL	11/14/17	JXM8
1718865	1718864	SW846 3005A	50	mL	50	mL	11/14/17	JXM8
1722939	1722938	EPA 245.1/245.2 Prep	20	mL	20	mL	12/01/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437822007**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CAMO-18-148072**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	12/04/17 10:39	120417W1-4	1722939

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1722939	1722938	EPA 245.1/245.2 Prep	20	mL	20	mL	12/01/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437822008**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CAMO-18-148108**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	12/04/17 10:44	120417W1-4	1722939

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 437822008

BASIS: As Received

DATE COLLECTED 09-NOV-17

CLIENT ID: CAMO-18-148108

LEVEL: Low

DATE RECEIVED 14-NOV-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7440-38-2	Arsenic	2.05	ug/L	J	2	5	5	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7440-39-3	Barium	13.6	ug/L		1	5	5	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7440-70-2	Calcium	11400	ug/L		50	200	200	1	P	HSC	12/11/17 09:58	121117A-2	1718859
7440-47-3	Chromium	6.11	ug/L	J	3	10	10	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	12/11/17 09:58	121117A-2	1718859
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7439-95-4	Magnesium	3990	ug/L		110	300	300	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7439-98-7	Molybdenum	1.03	ug/L		0.2	0.5	0.5	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7440-02-0	Nickel	1.96	ug/L	J	0.6	2	2	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7440-09-7	Potassium	1710	ug/L		50	150	150	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7631-86-9	Silica	75600	ug/L		53	213	213	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7440-23-5	Sodium	11000	ug/L		100	300	300	1	P	HSC	12/11/17 09:58	121117A-2	1718859
7440-24-6	Strontium	50.7	ug/L		1	5	5	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7440-61-1	Uranium	0.774	ug/L		0.067	0.2	0.2	1	MS	BAJ	11/30/17 20:13	171130-3	1718865
7440-62-2	Vanadium	7.97	ug/L		1	5	5	1	P	HSC	12/07/17 17:16	120717A-1	1718859
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	12/11/17 09:58	121117A-2	1718859

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 437822008**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CAMO-18-148108**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	45	mg/L		0.453	1.24	1.24	1		TXT1	12/11/17 12:59		1725385

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1718859	1718858	SW846 3005A	50	mL	50	mL	11/14/17	JXM8
1718865	1718864	SW846 3005A	50	mL	50	mL	11/14/17	JXM8
1722939	1722938	EPA 245.1/245.2 Prep	20	mL	20	mL	12/01/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437822010**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CAMO-18-148110**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	12/04/17 10:46	120417W1-4	1722939

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1722939	1722938	EPA 245.1/245.2 Prep	20	mL	20	mL	12/01/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437822011**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CASA-18-147993**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	12/04/17 10:48	120417W1-4	1722939

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 437822011

BASIS: As Received

DATE COLLECTED 09-NOV-17

CLIENT ID: CASA-18-147993

LEVEL: Low

DATE RECEIVED 14-NOV-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7440-38-2	Arsenic	2.08	ug/L	J	2	5	5	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7440-39-3	Barium	25.1	ug/L		1	5	5	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7440-42-8	Boron	16.3	ug/L	J	15	50	50	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7440-70-2	Calcium	20500	ug/L		50	200	200	1	P	HSC	12/11/17 10:01	121117A-2	1718859
7440-47-3	Chromium	178	ug/L		3	10	10	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	12/11/17 10:01	121117A-2	1718859
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7439-95-4	Magnesium	4510	ug/L		110	300	300	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7439-98-7	Molybdenum	1.22	ug/L		0.2	0.5	0.5	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7440-02-0	Nickel	5.83	ug/L		0.6	2	2	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7440-09-7	Potassium	1660	ug/L		50	150	150	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7782-49-2	Selenium	2.12	ug/L	J	2	5	5	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7631-86-9	Silica	74100	ug/L		53	213	213	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7440-23-5	Sodium	10600	ug/L		100	300	300	1	P	HSC	12/11/17 10:01	121117A-2	1718859
7440-24-6	Strontium	76.1	ug/L		1	5	5	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7440-61-1	Uranium	0.099	ug/L	J	0.067	0.2	0.2	1	MS	BAJ	11/30/17 20:16	171130-3	1718865
7440-62-2	Vanadium	6.39	ug/L		1	5	5	1	P	HSC	12/07/17 17:19	120717A-1	1718859
7440-66-6	Zinc	8.25	ug/L	J	3.3	10	10	1	P	HSC	12/11/17 10:01	121117A-2	1718859

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 437822011**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CASA-18-147993**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	69.8	mg/L		0.453	1.24	1.24	1		TXT1	12/11/17 12:59		1725385

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1718859	1718858	SW846 3005A	50	mL	50	mL	11/14/17	JXM8
1718865	1718864	SW846 3005A	50	mL	50	mL	11/14/17	JXM8
1722939	1722938	EPA 245.1/245.2 Prep	20	mL	20	mL	12/01/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437822012**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CASA-18-148000**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	12/04/17 10:49	120417W1-4	1722939

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1722939	1722938	EPA 245.1/245.2 Prep	20	mL	20	mL	12/01/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437822015**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CASA-18-147994**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	12/04/17 10:51	120417W1-4	1722939

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 437822015

BASIS: As Received

DATE COLLECTED 09-NOV-17

CLIENT ID: CASA-18-147994

LEVEL: Low

DATE RECEIVED 14-NOV-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7440-38-2	Arsenic	2.29	ug/L	J	2	5	5	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7440-39-3	Barium	23.1	ug/L		1	5	5	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7440-42-8	Boron	30	ug/L	J	15	50	50	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7440-70-2	Calcium	17100	ug/L		50	200	200	1	P	HSC	12/11/17 10:04	121117A-2	1718859
7440-47-3	Chromium	17.5	ug/L		3	10	10	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	12/11/17 10:04	121117A-2	1718859
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7439-95-4	Magnesium	4060	ug/L		110	300	300	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7439-98-7	Molybdenum	1.51	ug/L		0.2	0.5	0.5	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7440-09-7	Potassium	1290	ug/L		50	150	150	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7631-86-9	Silica	63700	ug/L		53	213	213	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7440-23-5	Sodium	13700	ug/L		100	300	300	1	P	HSC	12/11/17 10:04	121117A-2	1718859
7440-24-6	Strontium	100	ug/L		1	5	5	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7440-31-5	Tin	2.75	ug/L	J	2.5	10	10	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7440-61-1	Uranium	0.374	ug/L		0.067	0.2	0.2	1	MS	BAJ	11/30/17 20:20	171130-3	1718865
7440-62-2	Vanadium	7.12	ug/L		1	5	5	1	P	HSC	12/07/17 17:23	120717A-1	1718859
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	12/11/17 10:04	121117A-2	1718859

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 437822015**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CASA-18-147994**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	59.3	mg/L		0.453	1.24	1.24	1		TXT1	12/11/17 12:59		1725385

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1718859	1718858	SW846 3005A	50	mL	50	mL	11/14/17	JXM8
1718865	1718864	SW846 3005A	50	mL	50	mL	11/14/17	JXM8
1722939	1722938	EPA 245.1/245.2 Prep	20	mL	20	mL	12/01/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-854**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 437822016**BASIS:** As Received**DATE COLLECTED** 09-NOV-17**CLIENT ID:** CASA-18-148001**LEVEL:** Low**DATE RECEIVED** 14-NOV-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	12/04/17 10:53	120417W1-4	1722939

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1722939	1722938	EPA 245.1/245.2 Prep	20	mL	20	mL	12/01/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2018-854
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>
1203919761	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	153	ug/L	+/-300	J	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203919771	Antimony	1.2	ug/L	+/-3	J	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
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Lead	0.5	ug/L	+/-2	U	MS	0.5	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
1203929926	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. 2018-854 Client ID CAMO-18-148054S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 437794001 Spike ID: 1203919764

<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>
Magnesium	ug/L	75-125	11600		6770		5000	97.4		P
Manganese	ug/L	75-125	488		2	U	500	97.5		P
Potassium	ug/L	75-125	5540		655		5000	97.6		P
Silica	ug/L		73100		63200		10700	92.3	N/A	P
Sodium	ug/L	75-125	20500		15900		5000	93.3		P
Strontium	ug/L	75-125	637		160		500	95.5		P
Tin	ug/L	75-125	500		3.87	J	500	99.2		P
Vanadium	ug/L	75-125	498		1.51	J	500	99.3		P
Zinc	ug/L	75-125	450		5.93	J	500	88.9		P
Aluminum	ug/L	75-125	4830		68	U	5000	96.4		P
Barium	ug/L	75-125	511		27.9		500	96.6		P
Beryllium	ug/L	75-125	492		1	U	500	98.3		P
Boron	ug/L	75-125	531		21.7	J	500	102		P
Calcium	ug/L		40400		36000		5000	88.2	N/A	P
Cobalt	ug/L	75-125	486		1	U	500	97.2		P
Copper	ug/L	75-125	499		3	U	500	99.4		P
Iron	ug/L	75-125	4810		30	U	5000	95.8		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-854 **Client ID:** CAMO-18-148054S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 437794001 **Spike ID:** 1203919774

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	49.7		1	U	50	98.5		MS
Arsenic	ug/L	75-125	54.8		2.14	J	50	105		MS
Cadmium	ug/L	75-125	49.8		0.3	U	50	99.6		MS
Chromium	ug/L	75-125	56		6.2	J	50	99.7		MS
Lead	ug/L	75-125	47.5		0.5	U	50	95		MS
Molybdenum	ug/L	75-125	50.4		0.914		50	98.9		MS
Nickel	ug/L	75-125	51.9		1.42	J	50	101		MS
Selenium	ug/L	75-125	53.6		2	U	50	106		MS
Silver	ug/L	75-125	49.5		0.3	U	50	98.8		MS
Thallium	ug/L	75-125	47.1		0.6	U	50	94.1		MS
Uranium	ug/L	75-125	46.1		0.145	J	50	92		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-854 **Client ID:** CAMO-18-148055S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 437822001 **Spike ID:** 1203929930

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	2.06		0.067	U	2	103		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-854

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-18-148054D

Matrix: WATER

Level: Low

Sample ID: 437794001

Duplicate ID: 1203919763

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-20%	27.9		26.7		4.22		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	21.7 J		20.8 J		3.92		P
Calcium	ug/L	+/-20%	36000		34600		3.97		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%	6770		6450		4.86		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-150	655		632		3.49		P
Silica	ug/L	+/-20%	63200		60800		4.02		P
Sodium	ug/L	+/-20%	15900		15300		3.78		P
Strontium	ug/L	+/-20%	160		155		3.22		P
Tin	ug/L	+/-10	3.87 J		2.53 J		41.9		P
Vanadium	ug/L	+/-5	1.51 J		1.48 J		1.5		P
Zinc	ug/L		5.93 J		3.3 U		200		P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-854

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-18-148054D

Matrix: WATER

Level: Low

Sample ID: 437794001

Duplicate ID: 1203919773

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	2.14 J		2.08 J		2.9		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-10	6.2 J		6.19 J		.258		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.914		0.893		2.32		MS
Nickel	ug/L	+/-2	1.42 J		1.54 J		7.63		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	0.145 J		0.151 J		4.05		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
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Duplicate Sample Summary

SDG No.: 2018–854**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAMO–18–148055D**Matrix:** WATER**Level:** Low**Sample ID:** 437822001**Duplicate ID:** 1203929928**Percent Solids for Dup:** N/A

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

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-854

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>
1203919762								
	Aluminum	ug/L	5000	4960		99.2	80-120	P
	Barium	ug/L	500	496		99.2	80-120	P
	Beryllium	ug/L	500	497		99.3	80-120	P
	Boron	ug/L	500	508		102	80-120	P
	Calcium	ug/L	5000	4840		96.9	80-120	P
	Cobalt	ug/L	500	506		101	80-120	P
	Copper	ug/L	500	499		99.8	80-120	P
	Iron	ug/L	5000	4800		96	80-120	P
	Magnesium	ug/L	5000	5150		103	80-120	P
	Manganese	ug/L	500	502		100	80-120	P
	Potassium	ug/L	5000	4980		99.6	80-120	P
	Silica	ug/L	10700	10100		94.5	80-120	P
	Sodium	ug/L	5000	4550		91	80-120	P
	Strontium	ug/L	500	483		96.7	80-120	P
	Tin	ug/L	500	497		99.4	80-120	P
	Vanadium	ug/L	500	498		99.5	80-120	P
	Zinc	ug/L	500	465		93.1	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-854

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>
1203919772								
	Antimony	ug/L	50	51.6		103	80-120	MS
	Arsenic	ug/L	50	51.8		104	80-120	MS
	Cadmium	ug/L	50	50.7		101	80-120	MS
	Chromium	ug/L	50	49.8		99.5	80-120	MS
	Lead	ug/L	50	49.6		99.2	80-120	MS
	Molybdenum	ug/L	50	51.7		103	80-120	MS
	Nickel	ug/L	50	49.3		98.6	80-120	MS
	Selenium	ug/L	50	51.3		103	80-120	MS
	Silver	ug/L	50	53		106	80-120	MS
	Thallium	ug/L	50	48.4		96.9	80-120	MS
	Uranium	ug/L	50	48.5		97.1	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-854

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>
1203929927	Mercury	ug/L	2	2.06		103	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-854

Client ID: CAMO-18-148054L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 437794001

Serial Dilution ID: 1203919765

<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	27.9		28.9		3.769			P
Beryllium	1	U	5	U				P
Boron	21.7	J	75	U	19.531			P
Calcium	36000		37100		3.223		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	6770		6840		.933		10	P
Manganese	2	U	10	U				P
Potassium	655		685	J	4.577			P
Silica	63200		63900		1.094		10	P
Sodium	15900		17200		8.695		10	P
Strontium	160		164		2.744		10	P
Tin	3.87	J	12.5	U	21.878			P
Vanadium	1.51	J	5	U	26.926			P
Zinc	5.93	J	39.8	J	570.657			P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-854

Client ID: CAMO-18-148054L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 437794001

Serial Dilution ID: 1203919775

<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	2.14	J	10	U	85.54			MS
Cadmium	.3	U	1.5	U				MS
Chromium	6.2	J	15	U	3.079			MS
Lead	.5	U	2.5	U				MS
Molybdenum	.914		1	U	5.58			MS
Nickel	1.42	J	3	U	16.222			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.145	J	.335	U	51.724			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-854 **Client ID:** CAMO-18-148055L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 437822001 **Serial Dilution ID:** 1203929932

<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 #: 2018-854
Work Order #: 437822**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1717990

Method: SW 9060 Total Organic Carbon

Sample Analysis

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

Sample ID	Client ID
437822002	CAMO-18-148071
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CAMO-18-148000
437822016	CAMO-18-148001
1203920734	Method Blank (MB)
1203920735	Laboratory Control Sample (LCS)
1203920738	437822002(CAMO-18-148071) Sample Duplicate (DUP)
1203920741	437822002(CAMO-18-148071) 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 437822002 (CAMO-18-148071) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product:	Cyanide and Total		
Analytical Batch:	1718779	Method:	WSP-CN(T)
Prep Batch :	1718777	Method:	EPA 335.4

Sample Analysis

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

Sample ID	Client ID
437822002	CAMO-18-148071
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CAMO-18-148000
437822016	CAMO-18-148001
1203919598	Method Blank (MB)
1203919599	Laboratory Control Sample (LCS)
1203919601	437794002(CAMO-18-148070) Sample Duplicate (DUP)
1203919605	437794002(CAMO-18-148070) 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 437794002 (CAMO-18-148070) 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

Sample1203919599 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1719403

Method: WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
437822001	CAMO-18-148055
437822005	CAMO-18-148056
437822008	CAMO-18-148108
437822011	CAMO-18-148993
437822015	CAMO-18-147994
1203921020	Method Blank (MB)
1203921021	Laboratory Control Sample (LCS)
1203921022	437794001(CAMO-18-148054) Sample Duplicate (DUP)
1203921023	437794001(CAMO-18-148054) 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-5000 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 437794001 (CAMO-18-148054) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following samples 1203921022 (CAMO-18-148054DUP), 1203921023 (CAMO-18-148054PS) and 437822001 (CAMO-18-148055) 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	437822
	001
Chloride	10X
Sulfate	10X

Sample Re-analysis

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

Miscellaneous Information**Manual Integrations**

Samples 1203921022 (CAMO-18-148054DUP), 1203921023 (CAMO-18-148054PS), 437822001 (CAMO-18-148055), 437822005 (CAMO-18-148056), 437822008 (CAMO-18-148108), 437822011 (CAMO-18-148993) and 437822015 (CAMO-18-147994) 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: 1718942 **Method:** NH3
Prep Batch : 1718941 **Method:** EPA 350.1 Prep

Sample Analysis

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

Sample ID	Client ID
437822001	CAMO-18-148055
437822005	CAMO-18-148056
437822008	CAMO-18-148108
437822011	CAMO-18-148993
437822015	CAMO-18-147994
1203919945	Method Blank (MB)
1203919946	Laboratory Control Sample (LCS)
1203919947	437828001(WST35-18-148795) Sample Duplicate (DUP)
1203919948	437828001(WST35-18-148795) 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 437828001 (WST35-18-148795) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1718944	Method:	TKN
Prep Batch :	1718943	Method:	EPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
437822002	CAMO-18-148071
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CAMO-18-148000
437822016	CAMO-18-148001
1203919951	Method Blank (MB)
1203919952	Laboratory Control Sample (LCS)
1203919953	437828001(WST35-18-148795) Sample Duplicate (DUP)
1203919954	437828001(WST35-18-148795) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-104 REV# 15.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 437828001 (WST35-18-148795) 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

Sample1203919952 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported. Samples1203919953 (WST35-18-148795DUP), 1203919954 (WST35-18-148795MS), 437822012 (CAMO-18-148000) and 437822016 (CAMO-18-148001) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported. Samples437822007 (CAMO-18-148072), 437822010 (CAMO-18-148110) and 437822012 (CAMO-18-148000) were re-analyzed to verify the results.

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: 1718948

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
437822001	CAMO-18-148055
437822005	CAMO-18-148056
437822008	CAMO-18-148108
437822011	CAMO-18-148993
437822015	CAMO-18-147994
1203919966	Method Blank (MB)
1203919967	Laboratory Control Sample (LCS)
1203919968	437828001(WST35-18-148795) Sample Duplicate (DUP)
1203919972	437828001(WST35-18-148795) 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 437828001 (WST35-18-148795) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The following samples 437822001 (CAMO-18-148055), 437822011 (CAMO-18-148993) and 437822015 (CAMO-18-147994) 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	437822		
	001	011	015
Nitrogen, Nitrate/Nitrite	50X	10X	10X

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1718946	Method:	PO4
Prep Batch :	1718945	Method:	EPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
437822001	CAMO-18-148055
437822005	CAMO-18-148056
437822008	CAMO-18-148108
437822011	CAMO-18-148993
437822015	CAMO-18-147994
1203919957	Method Blank (MB)
1203919958	Laboratory Control Sample (LCS)
1203919961	437828001(WST35-18-148795) Sample Duplicate (DUP)
1203919962	437828001(WST35-18-148795) 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 437828001 (WST35-18-148795) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1718228

Method: TDS

Sample Analysis

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

Sample ID	Client ID
437822001	CAMO-18-148055
437822005	CAMO-18-148056
437822008	CAMO-18-148108
437822011	CAMO-18-148993
437822015	CAMO-18-147994
1203918125	Method Blank (MB)
1203918126	Laboratory Control Sample (LCS)
1203919676	437794004(CAMO-18-147995) 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 437794004 (CAMO-18-147995) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample:

Analyte	Sample	Value
Total Dissolved Solids	1203919676 (CAMO-18-147995DUP)	8.19* (0%-5%)

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:
Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1719249

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
437822001	CAMO-18-148055
437822005	CAMO-18-148056
437822008	CAMO-18-148108
437822011	CAMO-18-148993
437822015	CAMO-18-147994
1203920717	Laboratory Control Sample (LCS)
1203920718	437595001(WST05-18-148663) Sample Duplicate (DUP)
1203920719	437605001(WST05-18-148658) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 437595001 (WST05-18-148663) and 437605001 (WST05-18-148658) were selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH

Analytical Batch: 1720201 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
437822001	CAMO-18-148055
437822005	CAMO-18-148056
437822008	CAMO-18-148108
437822011	CAMO-18-148993
437822015	CAMO-18-147994
1203923055	Laboratory Control Sample (LCS)
1203923056	437780001(WST60-18-148791) Sample Duplicate (DUP)
1203923057	437822001(CAMO-18-148055) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 437780001 (WST60-18-148791) and 437822001 (CAMO-18-148055) 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
1203923056 (WST60-18-148791DUP)	pH	Received 14-NOV-17, out of holding 09-NOV-17
1203923057 (CAMO-18-148055DUP)	pH	Received 14-NOV-17, out of holding 09-NOV-17
437822001 (CAMO-18-148055)	pH	Received 14-NOV-17, out of holding 09-NOV-17
437822005 (CAMO-18-148056)	pH	Received 14-NOV-17, out of holding 09-NOV-17
437822008 (CAMO-18-148108)	pH	Received 14-NOV-17, out of holding 09-NOV-17
437822011 (CAMO-18-148993)	pH	Received 14-NOV-17, out of holding 09-NOV-17
437822015 (CAMO-18-147994)	pH	Received 14-NOV-17, out of holding 09-NOV-17

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

scanned and inserted into the electronic package.

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1720200 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
437822001	CAMO-18-148055
437822005	CAMO-18-148056
437822008	CAMO-18-148108
437822011	CAMO-18-148993
437822015	CAMO-18-147994
1203923046	Laboratory Control Sample (LCS)
1203923050	437822001(CAMO-18-148055) Sample Duplicate (DUP)
1203923054	437822001(CAMO-18-148055) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 437822001 (CAMO-18-148055) 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

Samples (See Below) were accidentally analyzed outside of the method specified holding time. The analysis was performed as soon as possible by the analyst. The data is qualified.

Sample	Analyte	Value
1203923050 (CAMO-18-148055DUP)	Alkalinity, Total as CaCO ₃ and Carbonate alkalinity (CaCO ₃)	Received 14-NOV-17, within holding, analyzed 24-NOV-17, out of holding 23-NOV-17
1203923054 (CAMO-18-148055MS)	Alkalinity, Total as CaCO ₃	Received 14-NOV-17, within holding, analyzed 24-NOV-17, out of holding 23-NOV-17
437822001 (CAMO-18-148055)	Alkalinity, Total as CaCO ₃ and Carbonate alkalinity (CaCO ₃)	Received 14-NOV-17, within holding, analyzed 24-NOV-17, out of holding 23-NOV-17
437822005 (CAMO-18-148056)	Alkalinity, Total as CaCO ₃ and Carbonate alkalinity (CaCO ₃)	Received 14-NOV-17, within holding, analyzed 24-NOV-17, out of holding 23-NOV-17
437822008 (CAMO-18-148108)	Alkalinity, Total as CaCO ₃ and Carbonate alkalinity (CaCO ₃)	Received 14-NOV-17, within holding, analyzed 24-NOV-17, out of holding 23-NOV-17
437822011 (CAMO-18-148993)	Alkalinity, Total as CaCO ₃ and Carbonate alkalinity (CaCO ₃)	Received 14-NOV-17, within holding, analyzed 24-NOV-17, out of holding 23-NOV-17
437822015 (CAMO-18-147994)	Alkalinity, Total as CaCO ₃ and Carbonate alkalinity (CaCO ₃)	Received 14-NOV-17, within holding, analyzed 24-NOV-17, out of holding 23-NOV-17

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2018-854 GEL Work Order: 437822

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: 05 DEC 2017

Title: Team Leader

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: December 5, 2017

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

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

Client SDG: 2018-854

Client Sample ID: CAMO-18-148055
Sample ID: 437822001
Matrix: W
Collect Date: 09-NOV-17 13:37
Receive Date: 14-NOV-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide		0.516	0.067	0.200	mg/L		1	MXL2	11/16/17	0623	1719403	1
Fluoride		0.473	0.033	0.100	mg/L		1					
Chloride		53.5	0.670	2.00	mg/L		10	MXL2	11/16/17	2000	1719403	2
Sulfate		53.4	1.33	4.00	mg/L		10					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0303	0.017	0.050	mg/L	1.00	1	KLP1	11/16/17	1414	1718942	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		11.5	0.850	2.50	mg/L		50	KLP1	11/16/17	1356	1718948	4
PO4 "As Received"												
Phosphorus, Total as P		0.102	0.020	0.050	mg/L	1.00	1	KLP1	11/16/17	1557	1718946	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		391	3.40	14.3	mg/L			KLP1	11/15/17	1350	1718228	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3	H	91.7	1.45	4.00	mg/L			RXB5	11/24/17	1416	1720200	7
Carbonate alkalinity (CaCO3)	HU	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		576	1.00	1.00	umhos/cm		1	VH1	11/21/17	1321	1719249	8
PH "As Received"												
pH at Temp 16.2C	H	7.48	0.010	0.100	SU		1	RXB5	11/24/17	1414	1720201	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	11/16/17	1204	1718941
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	11/16/17	0930	1718945

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Certificate of Analysis

Report Date: December 5, 2017

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

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

Client SDG: 2018-854

Client Sample ID: CAMO-18-148055
Sample ID: 437822001

Project: ESHL00114
Client ID: ARSL004

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: December 5, 2017

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-854

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148071

Project: ESHL00114

Sample ID: 437822002

Client ID: ARSL004

Matrix: W

Collect Date: 09-NOV-17 13:37

Receive Date: 14-NOV-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.959	0.330	1.00	mg/L		1	TSM	11/18/17	0532	1717990	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	J	2.54	1.67	5.00	ug/L	1.00	1	AXH3	11/15/17	0810	1718779	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/16/17	1200	1718944	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/15/17	0704	1718777
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	11/16/17	0930	1718943

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

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Certificate of Analysis

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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: 2018-854

Client Sample ID: CAMO-18-148056
Sample ID: 437822005
Matrix: W
Collect Date: 09-NOV-17 10:33
Receive Date: 14-NOV-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	11/16/17	0652	1719403	1
Chloride		1.82	0.067	0.200	mg/L		1					
Fluoride	J	0.088	0.033	0.100	mg/L		1					
Sulfate		2.25	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0477	0.017	0.050	mg/L	1.00	1	KLP1	11/16/17	1415	1718942	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.316	0.017	0.050	mg/L		1	KLP1	11/16/17	1357	1718948	3
PO4 "As Received"												
Phosphorus, Total as P		0.0826	0.020	0.050	mg/L	1.00	1	KLP1	11/16/17	1558	1718946	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		98.6	3.40	14.3	mg/L			KLP1	11/15/17	1350	1718228	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3	H	68.3	1.45	4.00	mg/L			RXB5	11/24/17	1423	1720200	6
Carbonate alkalinity (CaCO3)	HU	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		145	1.00	1.00	umhos/cm		1	VH1	11/21/17	1321	1719249	7
PH "As Received"												
pH at Temp 16.8C	H	8.12	0.010	0.100	SU		1	RXB5	11/24/17	1426	1720201	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	11/16/17	1204	1718941
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	11/16/17	0930	1718945

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Certificate of Analysis

Report Date: December 5, 2017

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

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

Client SDG: 2018-854

Client Sample ID: CAMO-18-148056
Sample ID: 437822005

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

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Report Date: December 5, 2017

Company : Los Alamos National Laboratory
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Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-854

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148072

Project: ESHL00114

Sample ID: 437822007

Client ID: ARSL004

Matrix: W

Collect Date: 09-NOV-17 10:33

Receive Date: 14-NOV-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	11/18/17	0753	1717990	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	11/15/17	0817	1718779	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/16/17	1235	1718944	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/15/17	0704	1718777
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	11/16/17	0930	1718943

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: December 5, 2017

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

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

Client SDG: 2018-854

Client Sample ID: CAMO-18-148108
Sample ID: 437822008
Matrix: W
Collect Date: 09-NOV-17 10:33
Receive Date: 14-NOV-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	11/16/17	0721	1719403	1
Chloride		1.85	0.067	0.200	mg/L		1					
Fluoride	J	0.0887	0.033	0.100	mg/L		1					
Sulfate		2.25	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0193	0.017	0.050	mg/L	1.00	1	KLP1	11/16/17	1416	1718942	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.316	0.017	0.050	mg/L		1	KLP1	11/16/17	1358	1718948	3
PO4 "As Received"												
Phosphorus, Total as P		0.0865	0.020	0.050	mg/L	1.00	1	KLP1	11/16/17	1558	1718946	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		136	3.40	14.3	mg/L			KLP1	11/15/17	1350	1718228	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3	H	66.7	1.45	4.00	mg/L			RXB5	11/24/17	1428	1720200	6
Carbonate alkalinity (CaCO3)	HU	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		142	1.00	1.00	umhos/cm		1	VH1	11/21/17	1322	1719249	7
PH "As Received"												
pH at Temp 16.0C	H	7.99	0.010	0.100	SU		1	RXB5	11/24/17	1428	1720201	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	11/16/17	1204	1718941
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	11/16/17	0930	1718945

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Certificate of Analysis

Report Date: December 5, 2017

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

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

Client SDG: 2018-854

Client Sample ID: CAMO-18-148108
Sample ID: 437822008

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

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Certificate of Analysis

Report Date: December 5, 2017

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

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

Client SDG: 2018-854

Client Sample ID: CAMO-18-148110
Sample ID: 437822010
Matrix: W
Collect Date: 09-NOV-17 10:33
Receive Date: 14-NOV-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	11/18/17	0840	1717990	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	11/15/17	0818	1718779	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	J	0.0723	0.033	0.100	mg/L	1.00	1	KLP1	11/16/17	1235	1718944	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/15/17	0704	1718777
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	11/16/17	0930	1718943

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

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Report Date: December 5, 2017

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

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

Client SDG: 2018-854

Client Sample ID: CAMO-18-148993
Sample ID: 437822011
Matrix: W
Collect Date: 09-NOV-17 12:46
Receive Date: 14-NOV-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	J	0.0913	0.067	0.200	mg/L		1	MXL2	11/16/17	0750	1719403	1
Chloride		8.28	0.067	0.200	mg/L		1					
Fluoride		0.270	0.033	0.100	mg/L		1					
Sulfate		17.1	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0318	0.017	0.050	mg/L	1.00	1	KLP1	11/16/17	1417	1718942	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		5.43	0.170	0.500	mg/L		10	KLP1	11/16/17	1359	1718948	3
PO4 "As Received"												
Phosphorus, Total as P		0.0525	0.020	0.050	mg/L	1.00	1	KLP1	11/16/17	1604	1718946	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		157	3.40	14.3	mg/L			KLP1	11/15/17	1350	1718228	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3	H	44.6	1.45	4.00	mg/L			RXB5	11/24/17	1433	1720200	6
Carbonate alkalinity (CaCO3)	HU	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		205	1.00	1.00	umhos/cm		1	VH1	11/21/17	1322	1719249	7
PH "As Received"												
pH at Temp 15.6C	H	7.96	0.010	0.100	SU		1	RXB5	11/24/17	1431	1720201	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	11/16/17	1204	1718941
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	11/16/17	0930	1718945

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Address : TA-00, SM1237, Rm104C

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

Client SDG: 2018-854

Client Sample ID: CAMO-18-148993
Sample ID: 437822011

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

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Certificate of Analysis

Report Date: December 5, 2017

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-854

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148000

Project: ESHL00114

Sample ID: 437822012

Client ID: ARSL004

Matrix: W

Collect Date: 09-NOV-17 12:46

Receive Date: 14-NOV-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.657	0.330	1.00	mg/L		1	TSM	11/18/17	0927	1717990	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	11/15/17	0819	1718779	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/16/17	1250	1718944	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/15/17	0704	1718777
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	11/16/17	0930	1718943

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

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Certificate of Analysis

Report Date: December 5, 2017

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

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

Client SDG: 2018-854

Client Sample ID: CAMO-18-147994
Sample ID: 437822015
Matrix: W
Collect Date: 09-NOV-17 14:24
Receive Date: 14-NOV-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	J	0.0878	0.067	0.200	mg/L		1	MXL2	11/16/17	2029	1719403	1
Chloride		5.88	0.067	0.200	mg/L		1					
Fluoride		0.233	0.033	0.100	mg/L		1					
Sulfate		8.78	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0276	0.017	0.050	mg/L	1.00	1	KLP1	11/16/17	1417	1718942	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		3.86	0.170	0.500	mg/L		10	KLP1	11/16/17	1400	1718948	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.039	0.020	0.050	mg/L	1.00	1	KLP1	11/16/17	1605	1718946	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		160	3.40	14.3	mg/L			KLP1	11/15/17	1350	1718228	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3	H	67.5	1.45	4.00	mg/L			RXB5	11/24/17	1436	1720200	6
Carbonate alkalinity (CaCO3)	H	8.87	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		205	1.00	1.00	umhos/cm		1	VH1	11/21/17	1322	1719249	7
PH "As Received"												
pH at Temp 15.7C	H	8.67	0.010	0.100	SU		1	RXB5	11/24/17	1436	1720201	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	11/16/17	1204	1718941
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	11/16/17	0930	1718945

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Certificate of Analysis

Report Date: December 5, 2017

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

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

Client SDG: 2018-854

Client Sample ID: CAMO-18-147994
Sample ID: 437822015

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

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Certificate of Analysis

Report Date: December 5, 2017

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-854

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148001

Project: ESHL00114

Sample ID: 437822016

Client ID: ARSL004

Matrix: W

Collect Date: 09-NOV-17 14:24

Receive Date: 14-NOV-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.355	0.330	1.00	mg/L		1	TSM	11/18/17	1014	1717990	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	11/15/17	0820	1718779	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/16/17	1237	1718944	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/15/17	0704	1718777
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	11/16/17	0930	1718943

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: December 5, 2017

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

Contact: Ms. Nita Patel

Workorder: 437822

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1717990										
QC1203920738	437822002	DUP									
Total Organic Carbon Average		J	0.959	1.02	mg/L	5.77	^	(+/-1.00)	TSM	11/18/17	06:19
QC1203920735	LCS										
Total Organic Carbon Average	10.0			10.5	mg/L			(80%-120%)		11/17/17	14:30
QC1203920734	MB										
Total Organic Carbon Average			U	ND	mg/L					11/17/17	14:18
QC1203920741	437822002	PS									
Total Organic Carbon Average	10.0	J	0.959	11.4	mg/L			(75%-125%)		11/18/17	07:06
Flow Injection Analysis											
Batch	1718779										
QC1203919601	437794002	DUP									
Cyanide, Total		J	3.81	J	4.10	ug/L	7.33	^	(+/-5.00)	AXH3	11/15/17 08:04
QC1203919599	LCS										
Cyanide, Total	50.0			52.7	ug/L			(90%-110%)		11/15/17	08:16
QC1203919598	MB										
Cyanide, Total			U	ND	ug/L					11/15/17	07:48
QC1203919605	437794002	MS									
Cyanide, Total	100	J	3.81	114	ug/L			(90%-110%)		11/15/17	08:05
Ion Chromatography											
Batch	1719403										
QC1203921022	437794001	DUP									
Bromide			0.234	0.238	mg/L	1.82	^	(+/-0.200)	MXL2	11/16/17	04:56

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QC Summary

Workorder: 437822

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1719403										
Chloride		14.6		14.5	mg/L	0.207		(0%-20%)	MXL2	11/16/17	19:02
Fluoride		0.114		0.116	mg/L	1.3	^	(+/-0.100)		11/16/17	04:56
Sulfate		31.0		30.9	mg/L	0.393		(0%-20%)		11/16/17	19:02
QC1203921021 LCS											
Bromide	1.25			1.32	mg/L		105	(80%-120%)		11/16/17	03:58
Chloride	5.00			4.66	mg/L		93.2	(80%-120%)			
Fluoride	2.50			2.47	mg/L		98.6	(80%-120%)			
Sulfate	10.0			9.70	mg/L		97	(80%-120%)			
QC1203921020 MB											
Bromide			U	ND	mg/L					11/16/17	03:30
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203921023 437794001 PS											
Bromide	1.25	0.234		1.47	mg/L		98.7	(75%-125%)		11/16/17	05:25
Chloride	5.00	7.29		12.9	mg/L		112	(75%-125%)		11/16/17	19:31
Fluoride	2.50	0.114		2.55	mg/L		97.5	(75%-125%)		11/16/17	05:25
Sulfate	10.0	15.5		26.3	mg/L		108	(75%-125%)		11/16/17	19:31

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QC Summary

Workorder: 437822

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1718942										
QC1203919947	437828001	DUP									
Nitrogen, Ammonia		J	0.0258	J	0.0417	mg/L	47.1 ^	(+/-0.050)	KLP1	11/16/17	14:19
QC1203919946	LCS										
Nitrogen, Ammonia	1.00				0.958	mg/L		95.8 (90%-110%)		11/16/17	14:03
QC1203919945	MB										
Nitrogen, Ammonia			U		ND	mg/L				11/16/17	14:02
QC1203919948	437828001	MS									
Nitrogen, Ammonia	1.00	J	0.0258		1.08	mg/L		105 (90%-110%)		11/16/17	14:20
Batch	1718944										
QC1203919953	437828001	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	11/16/17	12:39
QC1203919952	LCS										
Nitrogen, Total Kjeldahl	1.00				0.943	mg/L		94.3 (90%-110%)		11/16/17	12:33
QC1203919951	MB										
Nitrogen, Total Kjeldahl			J		0.0803	mg/L				11/16/17	11:55
QC1203919954	437828001	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND		0.970	mg/L		96.9 (90%-110%)		11/16/17	12:39
Batch	1718946										
QC1203919961	437828001	DUP									
Phosphorus, Total as P			0.130		0.102	mg/L	24.1 ^	(+/-0.050)	KLP1	11/16/17	16:06
QC1203919958	LCS										
Phosphorus, Total as P	1.00				1.01	mg/L		101 (80%-124%)		11/16/17	15:52
QC1203919957	MB										
Phosphorus, Total as P			U		ND	mg/L				11/16/17	15:51

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QC Summary

Workorder: 437822

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1718946										
QC1203919962	437828001	MS									
Phosphorus, Total as P	1.00	0.130		1.17	mg/L		104	(63%-139%)	KLP1	11/16/17	16:07
Batch	1718948										
QC1203919968	437828001	DUP									
Nitrogen, Nitrate/Nitrite		0.916		0.919	mg/L	0.327		(0%-20%)	KLP1	11/16/17	14:03
QC1203919967	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.955	mg/L		95.5	(90%-110%)		11/16/17	13:37
QC1203919966	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					11/16/17	13:36
QC1203919972	437828001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.916		1.83	mg/L		91.4	(90%-110%)		11/16/17	14:09
Solids Analysis											
Batch	1718228										
QC1203919676	437794004	DUP									
Total Dissolved Solids		127		117	mg/L	8.19*		(0%-5%)	KLP1	11/15/17	13:50
QC1203918126	LCS										
Total Dissolved Solids	300			289	mg/L		96.2	(95%-105%)		11/15/17	13:50
QC1203918125	MB										
Total Dissolved Solids			U	ND	mg/L					11/15/17	13:50
Titration and Ion Analysis											
Batch	1719249										
QC1203920718	437595001	DUP									
Conductivity		195		195	umhos/cm	0.103		(0%-10%)	VH1	11/21/17	13:16
QC1203920719	437605001	DUP									
Conductivity		176		177	umhos/cm	0.509		(0%-10%)		11/21/17	13:17

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QC Summary

Workorder: 437822

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1719249										
QC1203920717	LCS										
Conductivity	1410			1400	umhos/cm		99.3	(95%-105%)	VH1	11/21/17	13:14
Batch	1720200										
QC1203923050	437822001	DUP									
Alkalinity, Total as CaCO3	H	91.7	H	90.3	mg/L	1.55		(0%-20%)	RXB5	11/24/17	14:19
Carbonate alkalinity (CaCO3)	HU	ND	HU	ND	mg/L	N/A					
QC1203923046	LCS										
Alkalinity, Total as CaCO3	100			108	mg/L		108	(90%-110%)		11/24/17	13:15
QC1203923054	437822001	MS									
Alkalinity, Total as CaCO3	100	H	91.7	H	195	mg/L		103	(80%-120%)		11/24/17 14:20
Batch	1720201										
QC1203923056	437780001	DUP									
pH	H	9.15	H	9.15	SU	0		(0%-5%)	RXB5	11/24/17	14:22
QC1203923057	437822001	DUP									
pH	H	7.48	H	7.40	SU	1.08		(0%-5%)		11/24/17	14:18
QC1203923055	LCS										
pH	7.00			6.99	SU		99.9	(99%-101%)		11/24/17	13:16

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

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QC Summary

Workorder: 437822

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

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

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

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

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

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

Radiological Analysis

Case Narrative

**Radiochemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-854
Work Order #: 437822**

Method/Analysis Information

Product: Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1719849

Sample ID	Client ID
437822002	CAMO-18-148071
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CASA-18-148000
437822016	CASA-18-148001
1203922090	Method Blank (MB)
1203922092	Laboratory Control Sample (LCS)
1203922091	437794002(CAMO-18-148070) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in November 2017.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203922090 (MB) and 1203922092 (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: 437794002 (CAMO-18-148070). The QC was from ARSL work order 437794.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

Samples 1203922090 (MB) and 1203922091 (CAMO-18-148070DUP) were recounted due to a peak shift. The recounts are reported. Samples 437822002 (CAMO-18-148071), 437822007 (CAMO-18-148072), 437822010 (CAMO-18-148110), 437822012 (CASA-18-148000) and 437822016 (CASA-18-148001) were recounted due to detector error. The recounts are reported.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	IsoU
Analytical Method:	HASL-300:ISOU
Analytical Batch Number:	1719851

Sample ID	Client ID
437822002	CAMO-18-148071
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CASA-18-148000
437822016	CASA-18-148001
1203922096	Method Blank (MB)
1203922098	Laboratory Control Sample (LCS)
1203922097	437794002(CAMO-18-148070) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in November 2017.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203922096 (MB) and 1203922098 (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
1203922096 (MB)	Uranium-233/234 and Uranium-235/236	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
1203922096 (MB)	Uranium-233/234 and Uranium-235/236	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: 437794002 (CAMO-18-148070). The QC was from ARSL work order 437794.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:

Holding Time

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: ISOPU
Analytical Method: HASL-300:ISOPU
Analytical Batch Number: 1723433

Sample ID	Client ID
437822002	CAMO-18-148071
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CASA-18-148000
437822016	CASA-18-148001
1203931265	Method Blank (MB)
1203931267	Laboratory Control Sample (LCS)
1203931266	438005005(WST05-18-148670) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in November 2017.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:**Blank Information**

Aliquots for samples 1203931265 (MB) and 1203931267 (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: 438005005 (WST05-18-148670). The QC was from ARSL work order 438005.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the matrix of the samples. The samples were counted the maximum count time in order to achieve the lowest possible MDAs.

Sample	Analyte	Value
1203931266 (WST05-18-148670DUP)	Plutonium-238	Result -0.0188 < MDA 0.0691 > RDL 0.05 pCi/L
	Plutonium-239/240	Result 0.00000000156 < MDA 0.0988 > RDL 0.05 pCi/L
437822002 (CAMO-18-148071)	Plutonium-238	Result -0.0299 < MDA 0.0733 > RDL 0.05 pCi/L
	Plutonium-239/240	Result 0.00995 < MDA 0.105 > RDL 0.05 pCi/L
437822007 (CAMO-18-148072)	Plutonium-238	Result -0.00461 < MDA 0.068 > RDL 0.05 pCi/L
	Plutonium-239/240	Result -0.0138 < MDA 0.0971 > RDL 0.05 pCi/L
437822010 (CAMO-18-148110)	Plutonium-238	Result 0.0102 < MDA 0.0749 > RDL 0.05 pCi/L
	Plutonium-239/240	Result 0.00508 < MDA 0.107 > RDL 0.05 pCi/L
437822012 (CASA-18-148000)	Plutonium-238	Result 0.0173 < MDA 0.0639 > RDL 0.05 pCi/L
	Plutonium-239/240	Result -0.00867 < MDA 0.0914 > RDL 0.05 pCi/L
437822016 (CASA-18-148001)	Plutonium-238	Result 0 < MDA 0.0894 > RDL 0.05 pCi/L
	Plutonium-239/240	Result 0.0242 < MDA 0.128 > RDL 0.05 pCi/L

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

Samples were reprepared due to low carrier/tracer yield. The re-analysis is being reported.

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

Samples 1203931266 (WST05-18-148670DUP) and 1203931267 (LCS) did not meet the resolution requirement of having a full width half maximum of 100 keV or less for the tracer; however, the tracer yield requirement was met and the tracer peaks are within the tracer region of interest.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: **Gammaspec**

Analytical Method: EPA:901.1

Analytical Batch Number: 1718868

Sample ID	Client ID
437822002	CAMO-18-148071
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CASA-18-148000
437822016	CASA-18-148001
1203919782	Method Blank (MB)
1203919784	Laboratory Control Sample (LCS)
1203919783	437794002(CAMO-18-148070) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. The initial Calibrations were performed in August 2017, July 2017, May 2017, November 2017, October 2017 and September 2017.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 437794002 (CAMO-18-148070). The QC was from ARSL work order 437794.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

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

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GFPC, Sr90, liquid

Analytical Method: EPA:905.0

Analytical Batch Number: 1720044

Sample ID	Client ID
437822002	CAMO-18-148071
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CASA-18-148000
437822016	CASA-18-148001
1203922619	Method Blank (MB)
1203922622	Laboratory Control Sample (LCS)
1203922620	437632002(CAMO-18-148073) Sample Duplicate (DUP)
1203922621	437632002(CAMO-18-148073) Matrix Spike (MS)

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

SOP Reference

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

Calibration Information:**Calibration Information**

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

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:**Blank Information**

Aliquots for samples 1203922619 (MB) and 1203922622 (LCS) were changed to 1.0 per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 437632002 (CAMO-18-148073). The QC was from ARSL work order 437632.

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

Sample 437822012 (CASA-18-148000) was recounted due to results more negative than the three sigma TPU. The second count is reported.

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

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

Additional Comments

The matrix spike, 1203922621 (CAMO-18-148073MS), aliquot was reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: WSP-GrossA/B
Analytical Method: EPA 900.0/SW846 9310
Analytical Batch Number: 1720050

Sample ID	Client ID
437822002	CAMO-18-148071
437822007	CAMO-18-148072
437822010	CAMO-18-148110
437822012	CASA-18-148000
437822016	CASA-18-148001
1203922639	Method Blank (MB)
1203922643	Laboratory Control Sample (LCS)
1203922640	437508002(CAMO-18-148117) Sample Duplicate (DUP)
1203922641	437508002(CAMO-18-148117) Matrix Spike (MS)
1203922642	437508002(CAMO-18-148117) Matrix Spike Duplicate (MSD)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 REV# 19.

Calibration Information:**Calibration Information**

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

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203922639 (MB) and 1203922643 (LCS) were changed to 1.0 per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 437508002 (CAMO-18-148117). The QC was from ARSL work order 437508.

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between MS and MSD

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

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:

Holding Time

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating, especially to a dull red heat. For this sample set, the prepared planchet was counted for beta activity before being flamed. After flaming, the planchet was counted for alpha activity.

Recounts

Sample 1203922641 (CAMO-18-148117MS) was recounted due to high recovery. The recount is reported.

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

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

Additional Comments

The matrix spike and matrix spike duplicate, 1203922641 (CAMO-18-148117MS) and 1203922642 (CAMO-18-148117MSD), aliquots were reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: WSP-H-3
Analytical Method: EPA:906.0
Analytical Batch Number: 1719185

Sample ID	Client ID
437822002	CAMO-18-148071
1203920573	Method Blank (MB)
1203920576	Laboratory Control Sample (LCS)
1203920574	437314001(WST03-18-148752) Sample Duplicate (DUP)
1203920575	437314001(WST03-18-148752) 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-002 REV# 22.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in 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: 437314001 (WST03-18-148752). The QC was from ARSL work order 437314.

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

Sample 437822002 (CAMO-18-148071) was recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

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

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

Additional Comments

The matrix spike, 1203920575 (WST03-18-148752MS), 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: 2018-854 GEL Work Order: 437822


The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Theresa Austin

Date: 11 DEC 2017

Title: Group Leader

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: December 11, 2017

Client Sample ID: CAMO-18-148071
Sample ID: 437822002
Matrix: W
Collect Date: 09-NOV-17
Receive Date: 14-NOV-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

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

Alphaspec Am241 Liquid "As Received"

Americium-241	U	-0.00756	+/-0.00667	0.0448	0.019	+/-0.00667	0.050	pCi/L			JXR5	12/02/17	1753	1719849	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	-0.0299	+/-0.0263	0.0733	0.0299	+/-0.0263	0.050	pCi/L			JXR5	12/05/17	1352	1723433	2
Plutonium-239/240	U	0.00995	+/-0.0211	0.105	0.0457	+/-0.0211	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.721	+/-0.0424	0.116	0.0547	+/-0.0547	1.00	pCi/L			JXR5	11/29/17	1544	1719851	3
Uranium-235/236		0.106	+/-0.0184	0.0501	0.0211	+/-0.0191	1.00	pCi/L							
Uranium-238		0.351	+/-0.029	0.0678	0.0307	+/-0.0335	0.500	pCi/L							

Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	-1.06	+/-0.856	2.84	1.26	+/-0.891	8.00	pCi/L			BSW1	11/29/17	0745	1718868	4
Cobalt-60	U	-0.952	+/-1.10	3.88	1.70	+/-1.13	8.00	pCi/L							
Neptunium-237	U	-0.374	+/-1.62	5.33	2.44	+/-1.62		pCi/L							
Potassium-40	U	-3.6	+/-13.4	50.0	22.6	+/-13.4		pCi/L							
Sodium-22	U	0.184	+/-0.749	3.04	1.28	+/-0.750		pCi/L							

Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	-0.115	+/-0.110	0.446	0.195	+/-0.110	0.500	pCi/L			LXB3	11/29/17	0740	1720044	5
<i>WSP-GrossA/B "As Received"</i>															
Beta		3.00	+/-0.961	2.88	1.29	+/-0.995	3.00	pCi/L			AXH4	11/28/17	1344	1720050	6
Alpha	U	0.113	+/-0.745	2.91	1.20	+/-0.745	3.00	pCi/L			AXH4	11/29/17	1142	1720050	7

Rad Liquid Scintillation Analysis

WSP-H-3 "As Received"

Tritium		3200	+/-107	145	68.1	+/-333	200	pCi/L			BXM4	11/24/17	2312	1719185	8
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The following Analytical Methods were performed

Method	Description
1	HASL-300:AM-241
2	HASL-300:ISOPU
3	HASL-300:ISOU
4	EPA:901.1
5	EPA:905.0
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310
8	EPA:906.0

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148071

Sample ID: 437822002

Project: ESHL00114

Client ID: ARSL004

Report Date: December 11, 2017

Parameter	Qualifier	Result Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"							1719849	80.5	(50%-105%)				
Plutonium-242 Tracer	ISOPU "As Received"							1723433	77.7	(50%-105%)				
Uranium-232 Tracer	IsoU "As Received"							1719851	74.4	(50%-105%)				
Strontium Carrier	GFPC, Sr90, liquid "As Received"							1720044	77.7	(50%-105%)				

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

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Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148072

Sample ID: 437822007

Matrix: W

Collect Date: 09-NOV-17

Receive Date: 14-NOV-17

Collector: Client

Report Date: December 11, 2017

Project: ESHL00114

Client ID: ARSL004

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

Alphaspec Am241 Liquid "As Received"

Americium-241	U	0.00	+/-0.00544	0.0343	0.0145	+/-0.00545	0.050	pCi/L			JXR5	12/02/17	1753	1719849	1
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ISOPU "As Received"

Plutonium-238	U	-0.00461	+/-0.0103	0.068	0.0277	+/-0.0103	0.050	pCi/L			JXR5	12/05/17	1352	1723433	2
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Plutonium-239/240	U	-0.0138	+/-0.0138	0.0971	0.0423	+/-0.0138	0.050	pCi/L							
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IsoU "As Received"

Uranium-234		0.713	+/-0.0418	0.116	0.0548	+/-0.054	1.00	pCi/L			JXR5	11/29/17	1544	1719851	3
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Uranium-235/236		0.0547	+/-0.016	0.0501	0.0212	+/-0.0162	1.00	pCi/L							
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Uranium-238		0.324	+/-0.0286	0.0678	0.0308	+/-0.0326	0.500	pCi/L							
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Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	0.919	+/-0.901	3.54	1.58	+/-0.926	8.00	pCi/L			BSW1	11/29/17	0746	1718868	4
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Cobalt-60	U	-0.695	+/-0.933	3.44	1.44	+/-0.947	8.00	pCi/L							
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Neptunium-237	U	0.206	+/-1.73	6.38	2.94	+/-1.73		pCi/L							
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Potassium-40	U	17.2	+/-19.6	35.5	14.9	+/-19.7		pCi/L							
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Sodium-22	U	-0.583	+/-0.868	3.25	1.35	+/-0.879		pCi/L							
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Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	0.021	+/-0.122	0.452	0.198	+/-0.122	0.500	pCi/L			LXB3	11/29/17	0844	1720044	5
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WSP-GrossA/B "As Received"

Beta	U	2.25	+/-0.922	2.88	1.30	+/-0.944	3.00	pCi/L			AXH4	11/28/17	1345	1720050	6
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Alpha	U	-0.359	+/-0.463	1.92	0.820	+/-0.463	3.00	pCi/L			AXH4	11/29/17	1143	1720050	7
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The following Analytical Methods were performed

Method	Description
1	HASL-300:AM-241
2	HASL-300:ISOPU
3	HASL-300:ISOU
4	EPA:901.1
5	EPA:905.0
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer	Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer		Alphaspec Am241 Liquid "As Received"	1719849	86	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1723433	74.6	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1719851	73	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1720044	95.5	(50%-105%)

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Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148072

Sample ID: 437822007

Report Date: December 11, 2017

Project: ESHL00114

Client ID: ARSL004

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

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

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Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148110

Sample ID: 437822010

Matrix: W

Collect Date: 09-NOV-17

Receive Date: 14-NOV-17

Collector: Client

Report Date: December 11, 2017

Project: ESHL00114

Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	0.0201	+/-0.00837	0.0325	0.0138	+/-0.00841	0.050	pCi/L			JXR5	12/02/17	1753	1719849	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.0102	+/-0.0102	0.0749	0.0306	+/-0.0102	0.050	pCi/L			JXR5	12/05/17	1352	1723433	2
Plutonium-239/240	U	0.00508	+/-0.0114	0.107	0.0466	+/-0.0114	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.765	+/-0.0443	0.122	0.0577	+/-0.0579	1.00	pCi/L			JXR5	11/29/17	1544	1719851	3
Uranium-235/236		0.091	+/-0.0182	0.0528	0.0223	+/-0.0187	1.00	pCi/L							
Uranium-238		0.373	+/-0.0322	0.0715	0.0324	+/-0.037	0.500	pCi/L							
Rad Gamma Spec Analysis															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	3.78	+/-1.28	3.85	1.71	+/-1.30	8.00	pCi/L			BSW1	11/29/17	0746	1718868	4
Cobalt-60	U	-0.151	+/-1.07	4.09	1.72	+/-1.07	8.00	pCi/L							
Neptunium-237	U	-0.854	+/-1.84	6.67	3.06	+/-1.85		pCi/L							
Potassium-40	U	-34.6	+/-16.3	46.2	19.9	+/-18.3		pCi/L							
Sodium-22	U	-0.0407	+/-1.09	4.20	1.79	+/-1.09		pCi/L							
Rad Gas Flow Proportional Counting															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.113	+/-0.102	0.425	0.184	+/-0.102	0.500	pCi/L			LXB3	11/29/17	0844	1720044	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	1.16	+/-0.637	2.05	0.870	+/-0.645	3.00	pCi/L			AXH4	11/28/17	1345	1720050	6
Alpha	U	0.573	+/-0.532	1.87	0.778	+/-0.535	3.00	pCi/L			AXH4	11/29/17	1143	1720050	7

The following Analytical Methods were performed

Method	Description
1	HASL-300:AM-241
2	HASL-300:ISOPU
3	HASL-300:ISOU
4	EPA:901.1
5	EPA:905.0
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer	Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer		Alphaspec Am241 Liquid "As Received"	1719849	94.6	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1723433	71.2	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1719851	68	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1720044	91.7	(50%-105%)

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Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAMO-18-148110

Sample ID: 437822010

Project: ESHL00114

Client ID: ARSL004

Report Date: December 11, 2017

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

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

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Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CASA-18-148000

Sample ID: 437822012

Matrix: W

Collect Date: 09-NOV-17

Receive Date: 14-NOV-17

Collector: Client

Report Date: December 11, 2017

Project: ESHL00114

Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	-0.00461	+/-0.00565	0.0411	0.0174	+/-0.00565	0.050	pCi/L			JXR5	12/02/17	1753	1719849	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.0173	+/-0.0106	0.0639	0.0261	+/-0.0106	0.050	pCi/L			JXR5	12/05/17	1352	1723433	2
Plutonium-239/240	U	-0.00867	+/-0.00867	0.0914	0.0398	+/-0.00867	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.187	+/-0.0225	0.119	0.0565	+/-0.0243	1.00	pCi/L			JXR5	11/29/17	1544	1719851	3
Uranium-235/236	U	0.0386	+/-0.0122	0.0517	0.0218	+/-0.0124	1.00	pCi/L							
Uranium-238	U	0.0528	+/-0.014	0.0699	0.0317	+/-0.0142	0.500	pCi/L							
Rad Gamma Spec Analysis															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	1.54	+/-1.48	5.90	2.62	+/-1.52	8.00	pCi/L			BSW1	11/29/17	0806	1718868	4
Cobalt-60	U	1.38	+/-1.21	5.70	2.35	+/-1.26	8.00	pCi/L							
Neptunium-237	U	0.830	+/-2.62	9.80	4.47	+/-2.63		pCi/L							
Potassium-40	U	-4.91	+/-19.6	75.7	32.8	+/-19.6		pCi/L							
Sodium-22	U	3.07	+/-1.46	5.21	2.11	+/-1.46		pCi/L							
Rad Gas Flow Proportional Counting															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.13	+/-0.129	0.494	0.225	+/-0.129	0.500	pCi/L			LXB3	11/30/17	1640	1720044	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	-0.709	+/-0.502	2.15	0.917	+/-0.502	3.00	pCi/L			AXH4	11/28/17	1345	1720050	6
Alpha	U	-1.22	+/-0.662	2.93	1.27	+/-0.662	3.00	pCi/L			AXH4	11/29/17	1143	1720050	7

The following Analytical Methods were performed

Method	Description
1	HASL-300:AM-241
2	HASL-300:ISOPU
3	HASL-300:ISOU
4	EPA:901.1
5	EPA:905.0
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer	Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer		Alphaspec Am241 Liquid "As Received"	1719849	75.4	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1723433	79.7	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1719851	78.8	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1720044	95.5	(50%-105%)

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Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CASA-18-148000

Sample ID: 437822012

Project: ESHL00114

Client ID: ARSL004

Report Date: December 11, 2017

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

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

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Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CASA-18-148001

Sample ID: 437822016

Matrix: W

Collect Date: 09-NOV-17

Receive Date: 14-NOV-17

Collector: Client

Report Date: December 11, 2017

Project: ESHL00114

Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	0.0034	+/-0.0068	0.0303	0.0128	+/-0.0068	0.050	pCi/L			JXR5	12/02/17	1753	1719849	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.00	+/-0.0149	0.0894	0.0365	+/-0.0149	0.050	pCi/L			JXR5	12/05/17	1352	1723433	2
Plutonium-239/240	U	0.0242	+/-0.0171	0.128	0.0557	+/-0.0172	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.478	+/-0.0362	0.131	0.0618	+/-0.0432	1.00	pCi/L			JXR5	11/29/17	1544	1719851	3
Uranium-235/236	U	0.052	+/-0.0145	0.0566	0.0239	+/-0.0147	1.00	pCi/L							
Uranium-238		0.200	+/-0.0235	0.0765	0.0347	+/-0.0255	0.500	pCi/L							
Rad Gamma Spec Analysis															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	-0.605	+/-1.17	4.25	1.81	+/-1.18	8.00	pCi/L			BSW1	11/29/17	0807	1718868	4
Cobalt-60	U	-0.397	+/-1.02	4.11	1.58	+/-1.02	8.00	pCi/L							
Neptunium-237	U	-0.769	+/-2.27	8.43	3.80	+/-2.28		pCi/L							
Potassium-40	U	1.23	+/-17.3	68.7	29.6	+/-17.3		pCi/L							
Sodium-22	U	0.0562	+/-0.820	3.70	1.39	+/-0.820		pCi/L							
Rad Gas Flow Proportional Counting															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	0.371	+/-0.144	0.438	0.189	+/-0.147	0.500	pCi/L			LXB3	11/29/17	0845	1720044	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	0.247	+/-0.586	2.15	0.919	+/-0.587	3.00	pCi/L			AXH4	11/28/17	1345	1720050	6
Alpha	U	-0.401	+/-0.357	1.54	0.654	+/-0.357	3.00	pCi/L			AXH4	11/29/17	1144	1720050	7

The following Analytical Methods were performed

Method	Description
1	HASL-300:AM-241
2	HASL-300:ISOPU
3	HASL-300:ISOU
4	EPA:901.1
5	EPA:905.0
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer	Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer		Alphaspec Am241 Liquid "As Received"	1719849	103	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1723433	66.2	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1719851	69.7	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1720044	90.4	(50%-105%)

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Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CASA-18-148001

Sample ID: 437822016

Project: ESHL00114

Client ID: ARSL004

Report Date: December 11, 2017

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

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

Quality Control Summary

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QC Summary

Report Date: December 11, 2017

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

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 437822

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1719849										
QC1203922091	437794002	DUP									
Americium-241	U	0.0124	U	0.0159	pCi/L	0.11		(0-1)	JXR5	11/30/17	15:07
	Uncert:	+/-0.00587		+/-0.00991							
	TPU:	+/-0.0059		+/-0.00994							
**Americium-243 Tracer	2.62	2.45		1.87	pCi/L		71.5	(50%-105%)			
	Uncert:	+/-0.068		+/-0.0835							
	TPU:	+/-0.130		+/-0.147							
QC1203922092	LCS										
Americium-241	1.97			1.82	pCi/L		92.6	(80%-120%)	JXR5	11/29/17	13:51
	Uncert:			+/-0.057							
	TPU:			+/-0.099							
**Americium-243 Tracer	2.10			2.06	pCi/L		98.3	(50%-105%)			
	Uncert:			+/-0.0607							
	TPU:			+/-0.111							
QC1203922090	MB										
Americium-241			U	0.00141	pCi/L				JXR5	11/30/17	15:07
	Uncert:			+/-0.00424							
	TPU:			+/-0.00424							
**Americium-243 Tracer	2.10			1.99	pCi/L		94.7	(50%-105%)			
	Uncert:			+/-0.0541							
	TPU:			+/-0.104							
Batch	1719851										
QC1203922097	437794002	DUP									
Uranium-234		0.132		0.219	pCi/L	0.763		(0-1)	JXR5	11/29/17	15:46
	Uncert:	+/-0.0243		+/-0.0303							
	TPU:	+/-0.0251		+/-0.0324							
Uranium-235/236	U	0.0531	U	0.0222	pCi/L	0.486		(0-1)			
	Uncert:	+/-0.0168		+/-0.0147							
	TPU:	+/-0.017		+/-0.0148							
Uranium-238		0.0784		0.111	pCi/L	0.401		(0-1)			
	Uncert:	+/-0.0188		+/-0.0213							
	TPU:	+/-0.0191		+/-0.0221							
**Uranium-232 Tracer	2.62	1.96		1.84	pCi/L		70.1	(50%-105%)			
	Uncert:	+/-0.0835		+/-0.098							
	TPU:	+/-0.153		+/-0.170							
QC1203922098	LCS										
Uranium-234				2.61	pCi/L				JXR5	11/29/17	15:46
	Uncert:			+/-0.0782							
	TPU:			+/-0.153							
Uranium-235/236				0.242	pCi/L						
	Uncert:			+/-0.0267							
	TPU:			+/-0.0293							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1719851										
Uranium-238	2.70			2.78	pCi/L		103	(80%-120%)			
	Uncert:			+/-0.0805							
	TPU:			+/-0.161							
**Uranium-232 Tracer	2.09			1.58	pCi/L		75.6	(50%-105%)			
	Uncert:			+/-0.0707							
	TPU:			+/-0.127							
QC1203922096 MB											
Uranium-234			U	0.052	pCi/L				JXR5	11/29/17	15:46
	Uncert:			+/-0.013							
	TPU:			+/-0.0132							
Uranium-235/236			U	0.0214	pCi/L						
	Uncert:			+/-0.00927							
	TPU:			+/-0.00933							
Uranium-238			U	0.00866	pCi/L						
	Uncert:			+/-0.0081							
	TPU:			+/-0.00811							
**Uranium-232 Tracer	2.09			1.77	pCi/L		84.4	(50%-105%)			
	Uncert:			+/-0.0678							
	TPU:			+/-0.124							
Batch	1723433										
QC1203931266 438005005 DUP											
Plutonium-238		U	-0.0048	U	-0.0188	pCi/L	0.223	(0-1)	JXR5	12/05/17	13:52
	Uncert:		+/-0.0198		+/-0.0115						
	TPU:		+/-0.0198		+/-0.0115						
Plutonium-239/240		U	0.0048	U	1.56E-09	pCi/L	0.108	(0-1)			
	Uncert:		+/-0.0107		+/-0.0115						
	TPU:		+/-0.0107		+/-0.0115						
**Plutonium-242 Tracer	4.89		3.82		3.38	pCi/L		69.1	(50%-105%)		
	Uncert:		+/-0.154		+/-0.152						
	TPU:		+/-0.259		+/-0.255						
QC1203931267 LCS											
Plutonium-238				U	0.00714	pCi/L		(80%-120%)	JXR5	12/05/17	13:52
	Uncert:				+/-0.0079						
	TPU:				+/-0.0079						
Plutonium-239/240	1.98				1.90	pCi/L		95.9	(80%-120%)		
	Uncert:				+/-0.0675						
	TPU:				+/-0.108						
**Plutonium-242 Tracer	1.97				1.13	pCi/L		57.2	(50%-105%)		
	Uncert:				+/-0.0687						
	TPU:				+/-0.112						
QC1203931265 MB											
Plutonium-238				U	-0.008	pCi/L			JXR5	12/05/17	13:52
	Uncert:				+/-0.00566						
	TPU:				+/-0.00566						
Plutonium-239/240				U	0.002	pCi/L					
	Uncert:				+/-0.00346						

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1723433										
**Plutonium-242 Tracer	TPU:			+/-0.00347							
	1.97			1.58	pCi/L		80	(50%-105%)			
	Uncert:			+/-0.0632							
	TPU:			+/-0.105							
Rad Gamma Spec											
Batch	1718868										
QC1203919783	437794002	DUP									
Cesium-137	U	-0.654	U	3.18	pCi/L	0.63		(0-1)	BSW1	11/29/17	09:48
	Uncert:	+/-0.897		+/-2.00							
	TPU:	+/-0.910		+/-2.14							
Cobalt-60	U	0.0595	U	-1.66	pCi/L	0.298		(0-1)			
	Uncert:	+/-1.08		+/-1.76							
	TPU:	+/-1.08		+/-1.81							
Neptunium-237	U	-2.34	U	2.91	pCi/L	0.514		(0-1)			
	Uncert:	+/-2.01		+/-2.95							
	TPU:	+/-2.08		+/-3.03							
Potassium-40	U	13.2	U	-54.2	pCi/L	0.777		(0-1)			
	Uncert:	+/-18.2		+/-21.8							
	TPU:	+/-18.2		+/-25.2							
Sodium-22	U	-0.477	U	-0.193	pCi/L	0.0561		(0-1)			
	Uncert:	+/-1.07		+/-1.45							
	TPU:	+/-1.08		+/-1.45							
QC1203919784	LCS										
Americium-241	34300			34100	pCi/L		99.4	(80%-120%)	BSW1	11/29/17	09:20
	Uncert:			+/-968							
	TPU:			+/-3380							
Cesium-137	13000			13900	pCi/L		107	(80%-120%)			
	Uncert:			+/-177							
	TPU:			+/-927							
Cobalt-60	11200			11500	pCi/L		102	(80%-120%)			
	Uncert:			+/-175							
	TPU:			+/-515							
Neptunium-237			U	20.5	pCi/L						
	Uncert:			+/-61.6							
	TPU:			+/-61.8							
Potassium-40			U	-33.3	pCi/L						
	Uncert:			+/-98.0							
	TPU:			+/-98.3							
Sodium-22			U	-23.6	pCi/L						
	Uncert:			+/-17.4							
	TPU:			+/-18.2							
QC1203919782	MB										
Cesium-137			U	0.875	pCi/L				BSW1	11/29/17	09:20
	Uncert:			+/-1.65							
	TPU:			+/-1.65							
Cobalt-60			U	-1.12	pCi/L						

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Parmlname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
Batch	1718868										
Neptunium-237	Uncert:			+/-0.969							
	TPU:			+/-1.00							
			U	-1.46	pCi/L						
Potassium-40	Uncert:			+/-2.03							
	TPU:			+/-2.06							
			U	-31.4	pCi/L						
Sodium-22	Uncert:			+/-12.8							
	TPU:			+/-14.8							
			U	0.841	pCi/L						
	Uncert:			+/-0.615							
	TPU:			+/-0.646							
Rad Gas Flow											
Batch	1720044										
QC1203922620	437632002	DUP									
Strontium-90		U	-0.0581	U	0.0685	pCi/L	0.252	(0-1)	LXB3	11/29/17	08:46
		Uncert:	+/-0.123		+/-0.128						
		TPU:	+/-0.123		+/-0.128						
**Strontium Carrier	7.85	7.30			5.70	mg		72.6	(50%-105%)		
QC1203922622	LCS										
Strontium-90	23.7				27.2	pCi/L		115	(80%-120%)	LXB3	11/29/17
		Uncert:			+/-0.765						
		TPU:			+/-2.39						
**Strontium Carrier	7.85				5.50	mg		70.1	(50%-105%)		
QC1203922619	MB										
Strontium-90				U	-0.172	pCi/L			LXB3	11/29/17	08:45
		Uncert:			+/-0.0647						
		TPU:			+/-0.0647						
**Strontium Carrier	7.85				6.90	mg		87.9	(50%-105%)		
QC1203922621	437632002	MS									
Strontium-90	474	U	-0.0581		451	pCi/L		95.1	(75%-125%)	LXB3	11/29/17
		Uncert:	+/-0.123		+/-12.4						
		TPU:	+/-0.123		+/-39.3						
**Strontium Carrier	7.85	7.30			6.90	mg		87.9	(50%-105%)		
Batch	1720050										
QC1203922640	437508002	DUP									
Alpha		U	0.372	U	0.551	pCi/L	0.0795	(0-1)	AXH4	11/29/17	11:44
		Uncert:	+/-0.611		+/-0.511						
		TPU:	+/-0.612		+/-0.514						
Beta			1.86	U	2.24	pCi/L	0.124	(0-1)		11/28/17	13:44
		Uncert:	+/-0.620		+/-0.846						
		TPU:	+/-0.640		+/-0.868						
QC1203922643	LCS										
Alpha	12.1				13.7	pCi/L		113	(80%-120%)	AXH4	11/29/17
		Uncert:			+/-0.705						
		TPU:			+/-1.35						

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1720050										
Beta	47.4			46.9	pCi/L		99	(80%-120%)			
	Uncert:			+/-0.856							
	TPU:			+/-4.03							
QC1203922639	MB										
Alpha			U	-0.192	pCi/L				AXH4	11/29/17	11:42
	Uncert:			+/-0.0655							
	TPU:			+/-0.0655							
Beta			U	-0.198	pCi/L					11/28/17	13:44
	Uncert:			+/-0.0776							
	TPU:			+/-0.0776							
QC1203922641	437508002	MS									
Alpha	483	U	0.372	529	pCi/L		109	(75%-125%)	AXH4	11/29/17	16:48
	Uncert:		+/-0.611	+/-26.7							
	TPU:		+/-0.612	+/-60.1							
Beta	1890		1.86	1860	pCi/L		98.3	(75%-125%)		11/28/17	13:44
	Uncert:		+/-0.620	+/-35.1							
	TPU:		+/-0.640	+/-164							
QC1203922642	437508002	MSD									
Alpha	483	U	0.372	545	pCi/L	0.0692	113	(0-1)	AXH4	11/29/17	11:37
	Uncert:		+/-0.611	+/-26.9							
	TPU:		+/-0.612	+/-53.9							
Beta	1890		1.86	1930	pCi/L	0.095	102	(0-1)		11/28/17	13:56
	Uncert:		+/-0.620	+/-34.3							
	TPU:		+/-0.640	+/-164							
Rad Liquid Scintillation											
Batch	1719185										
QC1203920574	437314001	DUP									
Tritium		U	-33.9	U	-48.6	pCi/L	0.0933	(0-1)	BXM4	11/25/17	02:50
	Uncert:		+/-40.5		+/-38.4						
	TPU:		+/-40.5		+/-38.4						
QC1203920576	LCS										
Tritium	2180			2000	pCi/L		91.6	(80%-120%)	BXM4	11/25/17	04:21
	Uncert:			+/-181							
	TPU:			+/-268							
QC1203920573	MB										
Tritium			U	-6.14	pCi/L				BXM4	11/25/17	01:37
	Uncert:			+/-40.9							
	TPU:			+/-40.9							
QC1203920575	437314001	MS									
Tritium	4380	U	-33.9	4490	pCi/L		102	(75%-125%)	BXM4	11/25/17	04:03
	Uncert:		+/-40.5	+/-381							
	TPU:		+/-40.5	+/-584							

Notes:

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

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
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The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

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

** Indicates analyte is a surrogate/tracer compound.

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

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

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