

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:

WL: 2018-539

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

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

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

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

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

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

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

Hazard Assessment Completed By:	Date/Time
(Printed Name) Sherri Sherwood	10/20/17
(Signature)	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) Matt Englert	10-20-17
(Signature)	15:00

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147549

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-19-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	13:41		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-20 S2		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT):

D. Hughes, W. Pryce

RELINQUISHED BY (Printed Name) <i>Damon Hughes</i> (Signature) <i>[Signature]</i>	Date/Time 10-19-2017 15:00	RECEIVED BY <i>Sherwood</i> (Printed Name) <i>[Signature]</i> (Signature) <i>[Signature]</i>	Date/Time 10/19/17 15:00
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147559

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-19-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	10:55		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-41 S2		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:	1		SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT):

D. Hughes, W. Pope

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 10-19-2017 15:10	RECEIVED BY (Printed Name) (Signature)	Date/Time 10/19/17 15:10
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147553

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-19-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1310		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-23i S3		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): A. Vigil, D. Jaramillo

RELINQUISHED BY (Printed Name) Tanya Vander Vior (Signature) Tanya Vander Vior	Date/Time 10-19-17 1350	RECEIVED BY (Printed Name) S. Sherwood (Signature) S. Sherwood	Date/Time 10/19/17 1350
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAMO-18-147674

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-19-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	0951		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	TV 10-19-17 GSP DE	
LOCATION ID:	R-37 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		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 2 SP 10/19/17	HCL	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): A. Vigil, D. Jaramillo

RELINQUISHED BY (Printed Name) Tanya VanderVis (Signature) Tanya VanderVis	Date/Time 10-19-17 1040	RECEIVED BY MATT ENGERT (Printed Name) (Signature) M. Engert	Date/Time 10-19-17 1040
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147575

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-19-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	13:41		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-20 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

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

SAMPLE COMMENTS:

Sampled 50' from running diesel generator

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	13:41	HH:MM	Dissolved Oxygen	2.61	Flow (in gpm)	1.64
Oxidation-Reduction Potential	19.0		pH	7.85	Specific Conductance	142.0
Temperature	20.0		Turbidity	0.34		

COLLECTED BY (PRINT):

D. Hughes, W. Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11508**EVENT NAME:** Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1**SAMPLE ID:** CAPA-18-147575**WORK ORDER:**

RELINQUISHED BY (Printed Name) <i>Darren Hughes</i> (Signature) <i>[Signature]</i>	Date/Time <i>10-19-2017</i> <i>15:00</i>	RECEIVED BY (Printed Name) <i>S. Sherwood</i> (Signature) <i>[Signature]</i>	Date/Time <i>10/19/17</i> <i>1500</i>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147605

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-19-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	13:41		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-20 S2		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	2 145. 10/19/17	HCL	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): D. Hughes, W. P. Ryce

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 10-19-2017 15:00	RECEIVED BY (Printed Name) (Signature)	Date/Time 10/19/17 15:00
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147626

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-19-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	13:41		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-20 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FB	
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	2	HCL	Y	NA
1	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE	1	1

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): D. Hughes, W. Pryce

RELINQUISHED BY (Printed Name) <u>Damon Hughes</u> (Signature) <u>[Signature]</u>	Date/Time <u>10-19-2017</u> <u>15:00</u>	RECEIVED BY <u>S. Sherwood</u> (Printed Name) <u>[Signature]</u> (Signature) <u>[Signature]</u>	Date/Time <u>10/19/17</u> <u>1500</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147585

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	10-19-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	10:55		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-41 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-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		
X	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	X	X

SAMPLE COMMENTS:

Sampled 50' from running diesel generator

LOCATION COMMENTS:

None

FIELD PARAMETERS:

Sample Time	10:55	HH:MM	Dissolved Oxygen	6.16	Flow (in gpm)	2.78
Oxidation-Reduction Potential	146.5		pH	8.07	Specific Conductance	158.9
Temperature	21.7		Turbidity	0.76		

COLLECTED BY (PRINT): D. Hughes, W. Pope

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11508**EVENT NAME:** Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1**SAMPLE ID:** CAPA-18-147585**WORK ORDER:**

RELINQUISHED BY (Printed Name) <i>Darren Hughes</i> (Signature) <i>[Signature]</i>	Date/Time <i>10-19-2017</i> <i>15:10</i>	RECEIVED BY <i>M. Monta</i> (Printed Name) (Signature) <i>[Signature]</i>	Date/Time <i>10/19/17</i> <i>1510</i>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147610

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-19-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	10:55		MEDIA:	OK	
PRS ID:	NA		SAMPLE TECH CODE:	SC	
LOCATION ID:	R-41 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FTB	
TOP DEPTH:	1		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 DTH	HCL	Y	NA

SAMPLE COMMENTS:

10-19-17

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT):

D. Hughes, W. Pryce

RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time
Darren Hughes	10-19-2017 15:10	M. Montoya	10/19/17 15:10
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAMO-18-147651

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	10-19-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	0951		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-37 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-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 with running diesel generator ~30 ft. away

LOCATION COMMENTS: none

FIELD PARAMETERS:

Sample Time	0951	HH:MM	Dissolved Oxygen	6.58 mg/L	Flow (in gpm)	10.0
Oxidation-Reduction Potential	185.6mV		pH	7.93	Specific Conductance	135.1 μ S/cm
Temperature	17.9°C		Turbidity	2.5 NTU		

COLLECTED BY (PRINT): D. Jaramillo, A. Vigil

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11508**EVENT NAME:** Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1**SAMPLE ID:** CAMO-18-147651**WORK ORDER:**

RELINQUISHED BY (Printed Name) Tanya VanderVis (Signature) <i>Tanya VanderVis</i>	Date/Time 10-19-17 1040	RECEIVED BY MATT ENGLERT (Printed Name) (Signature) <i>M. Englert</i>	Date/Time 10-19-17 1040
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147579

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	10-19-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1310		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-23i S3		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-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 with running diesel generator ~30 ft away.

LOCATION COMMENTS: none

FIELD PARAMETERS:

Sample Time	1310	HH:MM	Dissolved Oxygen	6.50 mg/L	Flow (in gpm)	1.61
Oxidation-Reduction Potential	168.3mV		pH	8.26	Specific Conductance	196.6 $\mu S/cm$
Temperature	17.7°C		Turbidity	1.74 NTU		

COLLECTED BY (PRINT): A. Vigil, D. Jaramillo

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147579

WORK ORDER:

RELINQUISHED BY (Printed Name) Tanya Vander Vis (Signature) <i>Tanya Vander Vis</i>	Date/Time 10-19-17 1350	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>S. Sherwood</i>	Date/Time 10/19/17 1350
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147602

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-19-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1310		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-23i S3		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	2 1A2	HCL	Y	NA

SAMPLE COMMENTS:

10/19/17

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): A. Vigil, D. Jaramillo

RELINQUISHED BY (Printed Name) Tanya Vander Vis (Signature) Tanya Vander Vis	Date/Time 10-19-17 1350	RECEIVED BY (Printed Name) S. Sherrwood (Signature) S. Sherrwood	Date/Time 10/19/17 1350
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAMO-18-147636

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-19-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	0951		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-37 S2		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): A. Vigil, D. Jaramillo

RELINQUISHED BY (Printed Name) Tanya Vandervis (Signature) <i>Tanya Vandervis</i>	Date/Time 10-19-17 1040	RECEIVED BY MATT ENGUERT (Printed Name) <i>Matt Enguert</i> (Signature) <i>[Signature]</i>	Date/Time 10-19-17 1040
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

DATA VALIDATION REPORT

Chain Of Custody No. 2018-539

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
435718	EPA:120.1	4				
435718	EPA:150.1	4				
435718	EPA:160.1	4				
435718	EPA:170.0	8		4	1	
435718	EPA:245.2	8				
435718	EPA:300.0	4				
435718	EPA:310.1	4				
435718	EPA:335.4	4				
435718	EPA:350.1	4				
435718	EPA:351.2	4				
435718	EPA:353.2	4				
435718	EPA:365.4	4				
435718	EPA:900	4				
435718	EPA:901.1	4				
435718	EPA:905.0	4				
435718	HASL-300:AM-241	4				
435718	HASL-300:ISOPU	4				
435718	HASL-300:ISOU	4				
435718	SM:A2340B	4				
435718	SW-846:6010C	4				
435718	SW-846:6020	4				
435718	SW-846:6850	4				
435718	SW-846:8260B	4		4	1	
435718	SW-846:8270D	4			1	
435718	SW-846:9060	4				

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
435718	EPA:120.1	1713570	1713570	4										1			2				
435718	EPA:150.1	1714456	1714456	4										1			2				
435718	EPA:160.1	1713351	1713351	4					1					1			1				
435718	EPA:170.0	NA	NA	8		4	1														
435718	EPA:245.2	1717462	1717457	8					1	1				1			1				
435718	EPA:300.0	1711921	1711921	4					1					1			1				
435718	EPA:310.1	1714454	1714454	4						1				1			1				
435718	EPA:335.4	1711667	1711666	4					1	1				1			1				
435718	EPA:350.1	1713551	1713550	4					1	1				1			1				
435718	EPA:351.2	1712660	1712656	4					1	1				1			1				
435718	EPA:353.2	1713174	1713174	4					1					1			1				
435718	EPA:365.4	1713122	1713121	4					1	2				1			2				
435718	EPA:900	1714187	1714187	4					1	1	1			1			1				
435718	EPA:900	1717894	1717894	4					1	1	1			1			1				
435718	EPA:901.1	1711850	1711850	4					1					1			1				
435718	EPA:905.0	1714181	1714181	4					1	1				1			1				
435718	HASL-300:AM-241	1713388	1713388	4					1					1			1				
435718	HASL-300:ISOPU	1713389	1713389	4					1					1			1				
435718	HASL-300:ISOU	1713390	1713390	4					1					1			1				
435718	SM:A2340B	1718402	1718402	4																	
435718	SW-846:6010C	1711684	1711683	4					1	1				1			1				
435718	SW-846:6020	1711693	1711692	4					1	1				1			1				
435718	SW-846:6850	1713226	1713223	4					1	1	1			1							
435718	SW-846:8260B	1714469	1714469	4		4	1		1					2							
435718	SW-846:8270D	1712677	1712676	4			1		1	1	1			1							
435718	SW-846:9060	1711615	1711615	4					1					1			1				

2. Distribution Of Analytes In EDD.

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

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-147636	435718008	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-18-147637	1203906356	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147549	435718001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147553	435718005	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147559	435718011	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203906355	LCS	0	0	1	0
EPA:120.1	GENERAL CHEMISTRY	WST15-17-148253	1203906357	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-147636	435718008	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147549	1203908781	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147549	435718001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147553	435718005	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147559	435718011	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147569	1203908841	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203908780	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-18-147636	435718008	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147549	435718001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147553	435718005	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147559	435718011	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147636	1203905840	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203905837	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203905836	MB	1	0	0	0
EPA:170.0	VOC	CAMO-18-147636	435718008	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-147651	435718009	REG	1	0	0	0
EPA:170.0	VOC	CAMO-18-147674	435718010	FTB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147549	435718001	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147553	435718005	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147559	435718011	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147575	435718002	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147579	435718006	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147585	435718012	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147602	435718007	FTB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147605	435718003	FTB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147610	435718013	FTB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147626	435718004	FB	1	0	0	0
EPA:245.2	INORGANIC	CACV-18-148285	1203916076	DUP	1	0	0	0
EPA:245.2	INORGANIC	CACV-18-148285	1203916078	MS	0	0	1	0
EPA:245.2	INORGANIC	CAMO-18-147636	435718008	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-18-147651	435718009	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147549	435718001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147553	435718005	REG	1	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:245.2	INORGANIC	CAPA-18-147559	435718011	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147575	435718002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147579	435718006	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147585	435718012	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203916075	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203916074	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-147636	435718008	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147549	435718001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147553	435718005	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147559	435718011	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203902549	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203902548	MB	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	WST15-17-148253	1203902550	DUP	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-147636	435718008	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147549	1203908768	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147549	1203908770	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147549	435718001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147553	435718005	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147559	435718011	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203908765	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAMO-18-147651	435718009	REG	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147575	435718002	REG	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147579	435718006	REG	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147585	435718012	REG	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147586	1203901841	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147586	1203901843	MS	0	0	1	0
EPA:335.4	INORGANIC	LCS	1203901840	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203901839	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-147636	435718008	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147549	1203906321	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147549	1203906322	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147549	435718001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147553	435718005	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147559	435718011	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203906318	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203906317	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-147649	1203904070	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-147649	1203904071	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-147651	435718009	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147575	435718002	REG	1	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147579	435718006	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147585	435718012	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203904067	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203904066	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-18-147636	435718008	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147549	435718001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147553	435718005	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147559	435718011	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147560	1203905379	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203905377	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203905376	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-18-147636	435718008	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147549	435718001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147553	435718005	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147559	435718011	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147560	1203905251	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147560	1203905252	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147561	1203905253	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147561	1203905254	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203905250	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203905249	MB	1	0	0	0
EPA:900	RAD	CAMO-18-147649	1203917215	DUP	1	0	0	0
EPA:900	RAD	CAMO-18-147649	1203917216	MS	0	0	1	0
EPA:900	RAD	CAMO-18-147649	1203917217	MSD	0	0	1	0
EPA:900	RAD	CAMO-18-147651	435718009	REG	2	0	0	0
EPA:900	RAD	CAMO-18-147684	1203908000	DUP	1	0	0	0
EPA:900	RAD	CAMO-18-147684	1203908001	MS	0	0	1	0
EPA:900	RAD	CAMO-18-147684	1203908002	MSD	0	0	1	0
EPA:900	RAD	CAPA-18-147575	435718002	REG	2	0	0	0
EPA:900	RAD	CAPA-18-147579	435718006	REG	2	0	0	0
EPA:900	RAD	CAPA-18-147585	435718012	REG	2	0	0	0
EPA:900	RAD	LCS	1203908003	LCS	0	0	1	0
EPA:900	RAD	LCS	1203917218	LCS	0	0	1	0
EPA:900	RAD	MB	1203907999	MB	1	0	0	0
EPA:900	RAD	MB	1203917214	MB	1	0	0	0
EPA:901.1	RAD	CAMO-18-147651	435718009	REG	5	0	0	0
EPA:901.1	RAD	CAMO-18-147652	1203902341	DUP	5	0	0	0
EPA:901.1	RAD	CAPA-18-147575	435718002	REG	5	0	0	0
EPA:901.1	RAD	CAPA-18-147579	435718006	REG	5	0	0	0
EPA:901.1	RAD	CAPA-18-147585	435718012	REG	5	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:901.1	RAD	LCS	1203902342	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203902340	MB	5	0	0	0
EPA:905.0	RAD	CAMO-18-147651	435718009	REG	1	0	0	0
EPA:905.0	RAD	CAPA-18-147575	435718002	REG	1	0	0	0
EPA:905.0	RAD	CAPA-18-147579	435718006	REG	1	0	0	0
EPA:905.0	RAD	CAPA-18-147585	435718012	REG	1	0	0	0
EPA:905.0	RAD	CAPA-18-147591	1203907991	DUP	1	0	0	0
EPA:905.0	RAD	CAPA-18-147591	1203907992	MS	0	0	1	0
EPA:905.0	RAD	LCS	1203907993	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203907990	MB	1	0	0	0
HASL-300:AM-241	RAD	CAMO-18-147651	435718009	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147575	435718002	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147579	435718006	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147585	435718012	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147586	1203905947	DUP	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203905948	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203905946	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAMO-18-147651	435718009	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147575	435718002	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147578	1203905950	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147579	435718006	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147585	435718012	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203905951	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203905949	MB	2	0	0	0
HASL-300:ISOU	RAD	CAMO-18-147651	435718009	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147575	435718002	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147579	435718006	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147585	435718012	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147586	1203905953	DUP	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203905954	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203905952	MB	3	0	0	0
SM:A2340B	INORGANIC	CAMO-18-147636	435718008	REG	1	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147549	435718001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147553	435718005	REG	1	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147559	435718011	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-18-147636	435718008	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147549	1203901863	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147549	1203901864	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAPA-18-147549	435718001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147553	435718005	REG	17	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6010C	INORGANIC	CAPA-18-147559	435718011	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203901862	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203901861	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-18-147636	435718008	REG	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147549	1203901883	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147549	1203901884	MS	0	0	11	0
SW-846:6020	INORGANIC	CAPA-18-147549	435718001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147553	435718005	REG	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147559	435718011	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203901882	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203901881	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-18-147636	435718008	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147549	435718001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147553	435718005	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147559	435718011	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147560	1203905526	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147560	1203905527	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203905525	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203905524	MB	1	0	0	0
SW-846:8260B	VOC	CAMO-18-147651	435718009	REG	80	3	0	0
SW-846:8260B	VOC	CAMO-18-147674	435718010	FTB	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147575	435718002	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147579	435718006	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147585	435718012	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147602	435718007	FTB	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147605	435718003	FTB	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147610	435718013	FTB	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147626	435718004	FB	80	3	0	0
SW-846:8260B	VOC	LCS	1203908830	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203908833	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203908829	MB	80	3	0	0
SW-846:8270D	SVOC	CAMO-18-147651	435718009	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147575	435718002	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147579	435718006	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147585	435718012	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147626	435718004	FB	80	6	0	0
SW-846:8270D	SVOC	LCS	1203904117	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203904116	MB	80	6	0	0
SW-846:8270D	SVOC	WST15-17-148254	1203904118	MS	0	6	76	0
SW-846:8270D	SVOC	WST15-17-148254	1203904119	MSD	0	6	76	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-147651	435718009	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147575	435718002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147579	435718006	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147585	435718012	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147598	1203905562	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203905560	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203905559	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203901861	METHOD BLANK	SW-846:6010C	W	Sodium	185	J	ug/L	300
MB	1203901861	METHOD BLANK	SW-846:6010C	W	Tin	3.79	J	ug/L	10.0
MB	1203901861	METHOD BLANK	SW-846:6010C	W	Zinc	-4.22	J	ug/L	10.0
MB	1203905249	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.0361	J	mg/L	0.050
MB	1203906317	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0208	J	mg/L	0.050
CAPA-18-147605	435718003	TRIP BLANK	EPA:170.0	W	Temperature	1		Deg C	
CAPA-18-147626	435718004	FIELD BLANK	EPA:170.0	W	Temperature	1		Deg C	
CAPA-18-147602	435718007	TRIP BLANK	EPA:170.0	W	Temperature	1		Deg C	
CAPA-18-147610	435718013	TRIP BLANK	EPA:170.0	W	Temperature	1		Deg C	

DATA VALIDATION REPORT

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAPA-18-147549	1203906317	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0208	mg/L	0.266		0.050	Y	5	100	Y
CAPA-18-147553	1203906317	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0208	mg/L	0.0488	J	0.050	Y	5	100	Y
CAMO-18-147636	1203906317	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0208	mg/L	0.0225	J	0.050	Y	5	100	Y
CAPA-18-147559	1203906317	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0208	mg/L	0.0372	J	0.050	Y	5	100	Y
CAPA-18-147549	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.149		0.050	Y	5	100	Y
CAPA-18-147553	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.084		0.050	Y	5	100	Y
CAMO-18-147636	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.0894		0.050	Y	5	100	Y
CAPA-18-147559	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.0884		0.050	Y	5	100	Y
CAPA-18-147549	1203901861	METHOD BLANK	SW-846:6010C	Zinc	-4.22	ug/L	3.30	U	10.0	N			
CAPA-18-147553	1203901861	METHOD BLANK	SW-846:6010C	Zinc	-4.22	ug/L	3.30	U	10.0	N			
CAMO-18-147636	1203901861	METHOD BLANK	SW-846:6010C	Zinc	-4.22	ug/L	3.30	U	10.0	N			
CAPA-18-147559	1203901861	METHOD BLANK	SW-846:6010C	Zinc	-4.22	ug/L	3.30	U	10.0	N			

6. Any surrogate recoveries outside the control limits?

No.

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAPA-18-147549	1203906322		EPA:350.1	Ammonia as Nitrogen	1713550	10-27-2017	W	80.4		110	90	10		
CAPA-18-147549	1203906322		EPA:350.1	Ammonia as Nitrogen	1713550	10-27-2017	W	80.4		110	90	10		
CAMO-18-147649	1203904071		EPA:351.2	Total Kjeldahl Nitrogen	1712656	10-25-2017	W	83.9		110	90	10		

DATA VALIDATION REPORT

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
R-37 S2	2018-539	CAMO-18-147636	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	U	U	I4	N	0.0225	mg/L	0.0225	mg/L			W	10/19/2017		1713551	VAL	Y
R-37 S2	2018-539	CAMO-18-147636	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0894	mg/L	0.0894	mg/L			W	10/19/2017		1713122	VAL	Y
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	-0.00233	pCi/L	-0.00233	pCi/L	0.0408	0.00699	W	10/19/2017		1713388	VAL	Y
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	1.74	pCi/L	1.74	pCi/L	4.40	1.06	W	10/19/2017		1711850	VAL	Y
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	2.38	pCi/L	2.38	pCi/L	4.94	1.02	W	10/19/2017		1711850	VAL	Y
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.0471	pCi/L	0.0471	pCi/L	2.62	0.579	W	10/19/2017		1717894	VAL	Y
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	1.65	pCi/L	1.65	pCi/L	7.61	1.96	W	10/19/2017		1711850	VAL	Y
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.0128	pCi/L	-0.0128	pCi/L	0.0371	0.00741	W	10/19/2017		1713389	VAL	Y
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0257	pCi/L	-0.0257	pCi/L	0.0481	0.00907	W	10/19/2017		1713389	VAL	Y
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-8.24	pCi/L	-8.24	pCi/L	68.1	16.8	W	10/19/2017		1711850	VAL	Y
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-1.05	pCi/L	-1.05	pCi/L	3.25	0.981	W	10/19/2017		1711850	VAL	Y
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.297	pCi/L	-0.297	pCi/L	0.442	0.103	W	10/19/2017		1714181	VAL	Y

DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Paramter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-37 S2	2018-539	CAMO-18-147651	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0338	pCi/L	0.0338	pCi/L	0.0684	0.0135	W	10/19/2017		1713390	VAL	Y
R-20 S2	2018-539	CAPA-18-147549	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U+	I4a	Y	0.266	mg/L	0.266	mg/L			W	10/19/2017		1713551	VAL	Y
R-20 S2	2018-539	CAPA-18-147549	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.149	mg/L	0.149	mg/L			W	10/19/2017		1713122	VAL	Y
R-23i S3	2018-539	CAPA-18-147553	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N	0.0488	mg/L	0.0488	mg/L			W	10/19/2017		1713551	VAL	Y
R-23i S3	2018-539	CAPA-18-147553	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.084	mg/L	0.084	mg/L			W	10/19/2017		1713122	VAL	Y
R-41 S2	2018-539	CAPA-18-147559	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N	0.0372	mg/L	0.0372	mg/L			W	10/19/2017		1713551	VAL	Y
R-41 S2	2018-539	CAPA-18-147559	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0884	mg/L	0.0884	mg/L			W	10/19/2017		1713122	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00998	pCi/L	0.00998	pCi/L	0.0437	0.00934	W	10/19/2017		1713388	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-1.25	pCi/L	-1.25	pCi/L	6.02	1.75	W	10/19/2017		1711850	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.535	pCi/L	-0.535	pCi/L	6.07	1.55	W	10/19/2017		1711850	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.389	pCi/L	0.389	pCi/L	2.46	0.627	W	10/19/2017		1717894	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-4.66	pCi/L	-4.66	pCi/L	10.4	3.17	W	10/19/2017		1711850	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.00702	pCi/L	0.00702	pCi/L	0.0608	0.014	W	10/19/2017		1713389	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0105	pCi/L	-0.0105	pCi/L	0.0788	0.0189	W	10/19/2017		1713389	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	10.7	pCi/L	10.7	pCi/L	59.2	33.4	W	10/19/2017		1711850	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	2.03	pCi/L	2.03	pCi/L	6.78	1.47	W	10/19/2017		1711850	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.244	pCi/L	0.244	pCi/L	0.440	0.135	W	10/19/2017		1714181	VAL	Y
R-20 S2	2018-539	CAPA-18-147575	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0182	pCi/L	0.0182	pCi/L	0.0552	0.00857	W	10/19/2017		1713390	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00267	pCi/L	0.00267	pCi/L	0.0468	0.00597	W	10/19/2017		1713388	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.213	pCi/L	0.213	pCi/L	3.60	0.949	W	10/19/2017		1711850	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	2.15	pCi/L	2.15	pCi/L	4.87	1.03	W	10/19/2017		1711850	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	2.35	pCi/L	2.35	pCi/L	2.76	0.982	W	10/19/2017		1717894	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-0.169	pCi/L	-0.169	pCi/L	6.99	2.11	W	10/19/2017		1711850	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.00971	pCi/L	-0.00971	pCi/L	0.0421	0.00767	W	10/19/2017		1713389	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0146	pCi/L	-0.0146	pCi/L	0.0545	0.0084	W	10/19/2017		1713389	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	1.57	pCi/L	1.57	pCi/L	58.0	13.9	W	10/19/2017		1711850	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	1.17	pCi/L	1.17	pCi/L	4.25	0.939	W	10/19/2017		1711850	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.0224	pCi/L	-0.0224	pCi/L	0.451	0.119	W	10/19/2017		1714181	VAL	Y
R-23i S3	2018-539	CAPA-18-147579	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0179	pCi/L	0.0179	pCi/L	0.0653	0.0108	W	10/19/2017		1713390	VAL	Y
R-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.0107	pCi/L	0.0107	pCi/L	0.0468	0.00925	W	10/19/2017		1713388	VAL	Y
R-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.355	pCi/L	0.355	pCi/L	3.97	1.02	W	10/19/2017		1711850	VAL	Y
R-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.873	pCi/L	0.873	pCi/L	3.52	0.692	W	10/19/2017		1711850	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-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	1.12	pCi/L	1.12	pCi/L	2.72	0.801	W	10/19/2017		1717894	VAL	Y
R-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-2.15	pCi/L	-2.15	pCi/L	5.11	1.82	W	10/19/2017		1711850	VAL	Y
R-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.0076	pCi/L	0.0076	pCi/L	0.0522	0.00828	W	10/19/2017		1713389	VAL	Y
R-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.0145	pCi/L	0.0145	pCi/L	0.0675	0.0102	W	10/19/2017		1713389	VAL	Y
R-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-17.5	pCi/L	-17.5	pCi/L	54.1	14.3	W	10/19/2017		1711850	VAL	Y
R-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	0.945	pCi/L	0.945	pCi/L	3.95	0.839	W	10/19/2017		1711850	VAL	Y
R-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.0358	pCi/L	0.0358	pCi/L	0.438	0.119	W	10/19/2017		1714181	VAL	Y
R-41 S2	2018-539	CAPA-18-147585	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0368	pCi/L	0.0368	pCi/L	0.0746	0.0159	W	10/19/2017		1713390	VAL	Y

Reason Code

Description

I4	the sample result is =<5x the concentration of related analyte in the method blank.
I4a	The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was >5x
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualify. The analyte is detected in the sample.
R5	Analyte is not detected because the amount reported is less than the MDC.
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-18-147636	R-37 S2	REG	EPA:120.1	0	1
CAMO-18-147636	R-37 S2	REG	EPA:150.1	0	1
CAMO-18-147636	R-37 S2	REG	EPA:160.1	0	1
CAMO-18-147636	R-37 S2	REG	EPA:170.0	0	1
CAMO-18-147636	R-37 S2	REG	EPA:245.2	0	1
CAMO-18-147636	R-37 S2	REG	EPA:300.0	0	4
CAMO-18-147636	R-37 S2	REG	EPA:310.1	0	2
CAMO-18-147636	R-37 S2	REG	EPA:350.1	0	1
CAMO-18-147636	R-37 S2	REG	EPA:353.2	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-18-147636	R-37 S2	REG	EPA:365.4	0	1
CAMO-18-147636	R-37 S2	REG	SM:A2340B	0	1
CAMO-18-147636	R-37 S2	REG	SW-846:6010C	0	17
CAMO-18-147636	R-37 S2	REG	SW-846:6020	0	11
CAMO-18-147636	R-37 S2	REG	SW-846:6850	0	1
CAMO-18-147651	R-37 S2	REG	EPA:170.0	0	1
CAMO-18-147651	R-37 S2	REG	EPA:245.2	0	1
CAMO-18-147651	R-37 S2	REG	EPA:335.4	0	1
CAMO-18-147651	R-37 S2	REG	EPA:351.2	0	1
CAMO-18-147651	R-37 S2	REG	EPA:900	0	2
CAMO-18-147651	R-37 S2	REG	EPA:901.1	0	5
CAMO-18-147651	R-37 S2	REG	EPA:905.0	0	1
CAMO-18-147651	R-37 S2	REG	HASL-300:AM-241	0	1
CAMO-18-147651	R-37 S2	REG	HASL-300:ISOPU	0	2
CAMO-18-147651	R-37 S2	REG	HASL-300:ISOU	0	3
CAMO-18-147651	R-37 S2	REG	SW-846:8260B	0	80
CAMO-18-147651	R-37 S2	REG	SW-846:8270D	0	80
CAMO-18-147651	R-37 S2	REG	SW-846:9060	0	1
CAMO-18-147674	R-37 S2	FTB	EPA:170.0	0	1
CAMO-18-147674	R-37 S2	FTB	SW-846:8260B	0	80
CAPA-18-147549	R-20 S2	REG	EPA:120.1	0	1
CAPA-18-147549	R-20 S2	REG	EPA:150.1	0	1
CAPA-18-147549	R-20 S2	REG	EPA:160.1	0	1
CAPA-18-147549	R-20 S2	REG	EPA:170.0	0	1
CAPA-18-147549	R-20 S2	REG	EPA:245.2	0	1
CAPA-18-147549	R-20 S2	REG	EPA:300.0	0	4
CAPA-18-147549	R-20 S2	REG	EPA:310.1	0	2
CAPA-18-147549	R-20 S2	REG	EPA:350.1	0	1
CAPA-18-147549	R-20 S2	REG	EPA:353.2	0	1
CAPA-18-147549	R-20 S2	REG	EPA:365.4	0	1
CAPA-18-147549	R-20 S2	REG	SM:A2340B	0	1
CAPA-18-147549	R-20 S2	REG	SW-846:6010C	0	17
CAPA-18-147549	R-20 S2	REG	SW-846:6020	0	11
CAPA-18-147549	R-20 S2	REG	SW-846:6850	0	1
CAPA-18-147553	R-23i S3	REG	EPA:120.1	0	1
CAPA-18-147553	R-23i S3	REG	EPA:150.1	0	1
CAPA-18-147553	R-23i S3	REG	EPA:160.1	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147553	R-23i S3	REG	EPA:170.0	0	1
CAPA-18-147553	R-23i S3	REG	EPA:245.2	0	1
CAPA-18-147553	R-23i S3	REG	EPA:300.0	0	4
CAPA-18-147553	R-23i S3	REG	EPA:310.1	0	2
CAPA-18-147553	R-23i S3	REG	EPA:350.1	0	1
CAPA-18-147553	R-23i S3	REG	EPA:353.2	0	1
CAPA-18-147553	R-23i S3	REG	EPA:365.4	0	1
CAPA-18-147553	R-23i S3	REG	SM:A2340B	0	1
CAPA-18-147553	R-23i S3	REG	SW-846:6010C	0	17
CAPA-18-147553	R-23i S3	REG	SW-846:6020	0	11
CAPA-18-147553	R-23i S3	REG	SW-846:6850	0	1
CAPA-18-147559	R-41 S2	REG	EPA:120.1	0	1
CAPA-18-147559	R-41 S2	REG	EPA:150.1	0	1
CAPA-18-147559	R-41 S2	REG	EPA:160.1	0	1
CAPA-18-147559	R-41 S2	REG	EPA:170.0	0	1
CAPA-18-147559	R-41 S2	REG	EPA:245.2	0	1
CAPA-18-147559	R-41 S2	REG	EPA:300.0	0	4
CAPA-18-147559	R-41 S2	REG	EPA:310.1	0	2
CAPA-18-147559	R-41 S2	REG	EPA:350.1	0	1
CAPA-18-147559	R-41 S2	REG	EPA:353.2	0	1
CAPA-18-147559	R-41 S2	REG	EPA:365.4	0	1
CAPA-18-147559	R-41 S2	REG	SM:A2340B	0	1
CAPA-18-147559	R-41 S2	REG	SW-846:6010C	0	17
CAPA-18-147559	R-41 S2	REG	SW-846:6020	0	11
CAPA-18-147559	R-41 S2	REG	SW-846:6850	0	1
CAPA-18-147575	R-20 S2	REG	EPA:170.0	0	1
CAPA-18-147575	R-20 S2	REG	EPA:245.2	0	1
CAPA-18-147575	R-20 S2	REG	EPA:335.4	0	1
CAPA-18-147575	R-20 S2	REG	EPA:351.2	0	1
CAPA-18-147575	R-20 S2	REG	EPA:900	0	2
CAPA-18-147575	R-20 S2	REG	EPA:901.1	0	5
CAPA-18-147575	R-20 S2	REG	EPA:905.0	0	1
CAPA-18-147575	R-20 S2	REG	HASL-300:AM-241	0	1
CAPA-18-147575	R-20 S2	REG	HASL-300:ISOPU	0	2
CAPA-18-147575	R-20 S2	REG	HASL-300:ISOU	0	3
CAPA-18-147575	R-20 S2	REG	SW-846:8260B	0	80
CAPA-18-147575	R-20 S2	REG	SW-846:8270D	0	80

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147575	R-20 S2	REG	SW-846:9060	0	1
CAPA-18-147579	R-23i S3	REG	EPA:170.0	0	1
CAPA-18-147579	R-23i S3	REG	EPA:245.2	0	1
CAPA-18-147579	R-23i S3	REG	EPA:335.4	0	1
CAPA-18-147579	R-23i S3	REG	EPA:351.2	0	1
CAPA-18-147579	R-23i S3	REG	EPA:900	0	2
CAPA-18-147579	R-23i S3	REG	EPA:901.1	0	5
CAPA-18-147579	R-23i S3	REG	EPA:905.0	0	1
CAPA-18-147579	R-23i S3	REG	HASL-300:AM-241	0	1
CAPA-18-147579	R-23i S3	REG	HASL-300:ISOPU	0	2
CAPA-18-147579	R-23i S3	REG	HASL-300:ISOU	0	3
CAPA-18-147579	R-23i S3	REG	SW-846:8260B	0	80
CAPA-18-147579	R-23i S3	REG	SW-846:8270D	0	80
CAPA-18-147579	R-23i S3	REG	SW-846:9060	0	1
CAPA-18-147585	R-41 S2	REG	EPA:170.0	0	1
CAPA-18-147585	R-41 S2	REG	EPA:245.2	0	1
CAPA-18-147585	R-41 S2	REG	EPA:335.4	0	1
CAPA-18-147585	R-41 S2	REG	EPA:351.2	0	1
CAPA-18-147585	R-41 S2	REG	EPA:900	0	2
CAPA-18-147585	R-41 S2	REG	EPA:901.1	0	5
CAPA-18-147585	R-41 S2	REG	EPA:905.0	0	1
CAPA-18-147585	R-41 S2	REG	HASL-300:AM-241	0	1
CAPA-18-147585	R-41 S2	REG	HASL-300:ISOPU	0	2
CAPA-18-147585	R-41 S2	REG	HASL-300:ISOU	0	3
CAPA-18-147585	R-41 S2	REG	SW-846:8260B	0	80
CAPA-18-147585	R-41 S2	REG	SW-846:8270D	0	80
CAPA-18-147585	R-41 S2	REG	SW-846:9060	0	1
CAPA-18-147602	R-23i S3	FTB	EPA:170.0	0	1
CAPA-18-147602	R-23i S3	FTB	SW-846:8260B	0	80
CAPA-18-147605	R-20 S2	FTB	EPA:170.0	0	1
CAPA-18-147605	R-20 S2	FTB	SW-846:8260B	0	80
CAPA-18-147610	R-41 S2	FTB	EPA:170.0	0	1
CAPA-18-147610	R-41 S2	FTB	SW-846:8260B	0	80
CAPA-18-147626	R-20 S2	FB	EPA:170.0	0	1
CAPA-18-147626	R-20 S2	FB	SW-846:8260B	0	80
CAPA-18-147626	R-20 S2	FB	SW-846:8270D	0	80

November 13, 2017

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

Re: LANL- WQH Water Samples
Work Order: 435718
SDG: 2018-539

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on October 21, 2017, and analyzed for GC/MS Semivolatile, GC/MS Volatile, General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,



Jazzmin Bradley for
Valerie Davis
Project Manager

Chain of Custody: 2018-539
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 435718
SDG: 2018-539

Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	5
Data Review Qualifier Flag Definition Sheet.....	13
Volatile Analysis.....	16
Case Narrative.....	17
Sample Data Summary.....	22
Quality Control Summary.....	50
Quality Control Data.....	68
Semi-Volatile Analysis.....	90
Case Narrative.....	91
Sample Data Summary.....	97
Quality Control Summary.....	113
Quality Control Data.....	128
Perchlorates by LCMSMS Analysis.....	141
Case Narrative.....	142
Sample Data Summary.....	148
Quality Control Summary.....	153
Quality Control Data.....	156
Metals Analysis.....	162
Case Narrative.....	163

Sample Data Summary.....	169
Quality Control Summary.....	186
General Chem Analysis.....	200
Case Narrative.....	201
Sample Data Summary.....	232
Quality Control Summary.....	245
Radiological Analysis.....	252
Case Narrative.....	253
Sample Data Summary.....	269
Quality Control Summary.....	278

Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 435718
SDG # : 2018-539**

November 13, 2017

Laboratory Identification:

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

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on October 21, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperatures were checked, documented, and within specifications. Shipping container temperature was within specification (0 - 6C). There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
435718001	CAPA-18-147549
435718002	CAPA-18-147575
435718003	CAPA-18-147605
435718004	CAPA-18-147626
435718005	CAPA-18-147553
435718006	CAPA-18-147579
435718007	CAPA-18-147602
435718008	CAPA-18-147636
435718009	CAPA-18-147651
435718010	CAPA-18-147674
435718011	CAPA-18-147559
435718012	CAPA-18-147585
435718013	CAPA-18-147610

Case Narrative

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

Data Package

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

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

A handwritten signature in black ink, reading "Jazzmin Bradley". The signature is fluid and cursive, with the first name "Jazzmin" and last name "Bradley" clearly distinguishable.

Jazzmin Bradley for
Valerie Davis
Project Manager

List of current GEL Certifications as of 13 November 2017

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

Chain of Custody and Supporting Documentation

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

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

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

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

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

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

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

Hazard Assessment Completed By:	Date/Time
(Printed Name) Sherri Sherwood	10/20/17
(Signature)	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) MATT ENGLERT	10-20-17
(Signature)	15:00



Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: ESHL		SDG/AR/COC/Work Order: 435718	
Received By: STACY BOONE		Date Received: 21-OCT-17	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____	
Sample Receipt Criteria		Yes	NA
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Comments/Qualifiers (Required for Non-Conforming Items) Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Preservation Method: Wet Ice Ice Packs Dry ice None Other: _____ *all temperatures are recorded in Celsius TEMP: _____
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Temperature Device Serial #: 1R3-17 Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe) SEE ATTACHED FORM
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" 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"/>	If Yes, Are Encores or Soil Kits present? Yes _____ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No _____ N/A (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No _____ N/A Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" 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"/>	Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: _____ SEE ATTACHED FORM
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Comments (Use Continuation Form if needed):			
<div style="display: flex; justify-content: space-between;"> <div> 5908 1783 0221 - 4°C 5908 1783 0162 - 19°C 5908 1783 0195 - 4°C 5908 1783 0151 - 2°C 5908 1783 0184 - 3°C </div> <div> 5908 1783 0140 - 2°C 5908 1783 0200 - 2°C 5908 1783 0173 - 19°C 5908 1783 0232 - 4°C 5908 1783 0210 - 1°C </div> </div>			

PM (or PMA) review: Initials

Khiott

Date

10/23/17

Page

1 of 1

GL-CHL-SR-001 Rev 5

LABORATORIES LLC SAMPLE RECEIPT & REVIEW CONTINUATION FORM

Client: _____ Received By: _____ Date Received: _____ SDG/AR/COC/Work Order: 435718

WST-15-17-148254 (WSP-8270D-SV0A) QTY 1 ARRIVED BROKEN

WST-15-18-148149 (WSP-8081A-PEST) QTY 1 SEAL BROKEN

" " " (WSP-8270D-SV0A) QTY 1 SEAL BROKEN

WST-15-17-148254 (WSP-8082-PCB) QTY SEAL BROKEN

WST-15-17-148256 (WSP-8270D-SV0A) COC: 2 QTY RECEIVED: 1

WST-15-18-148149 (WSP-8270D-SV0A) COC: 2 QTY RECEIVED: 1

WST-15-18-148156 (WSP-8270D-SV0A) COC: 2 QTY RECEIVED: 3

→ HOLD COOLER

PM (or PMA) review: Initials

KHott

Date

10/23/17

Page

1 of 1

KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 200CT17
ACTWGT: 47.0 LB MAN
CAD: 0014176/CAFE2916

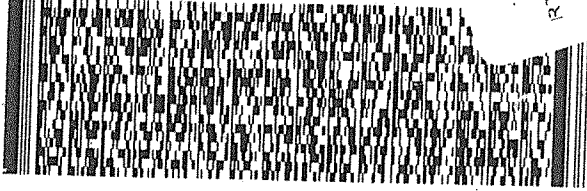
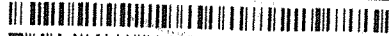
BILL SENDER
B
0221
10.21
5 12.00

TO VALERIE DAVIS
GENERAL ENGINEERING
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRSW06BB6AS0



KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 200CT17
ACTWGT: 47.0 LB MAN
CAD: 0014176/CAFE2916

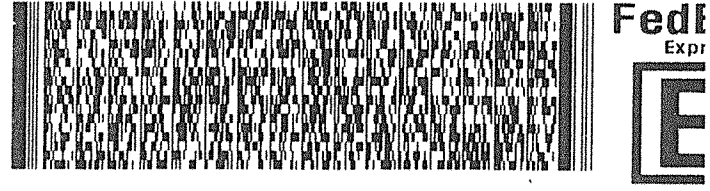
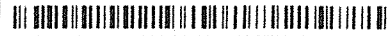
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TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRSW06BB6AS0



2 of 3
MPS# 5908 1783 0221
Mstr# 5908 1783 0210

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO RBWA

4c 29407
SC-US CHS

1 of 3
TRK# 5908 1783 0210
MASTER

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO RBWA

1c 29407
SC-US CH

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

LOS ALAMOS, NM 87545
UNITED STATES US

RT 707
ST F2
JCT17
LB MAN
/CAFE2916

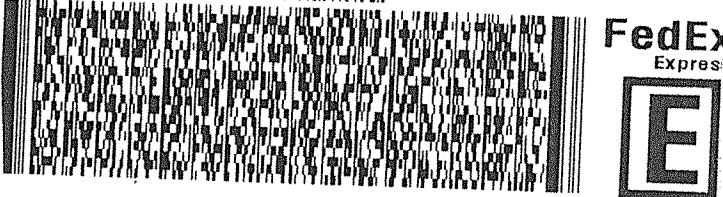
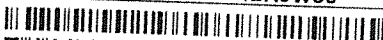
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BA6WS0



2 of 3
IPS# 5908 1783 0195
Mstr# 5908 1783 0184

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO RBWA

4c 29407
SC-US CHS

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 200CT17
ACTWGT: 54.0 LB MAN
CAD: 0014176/CAFE2916

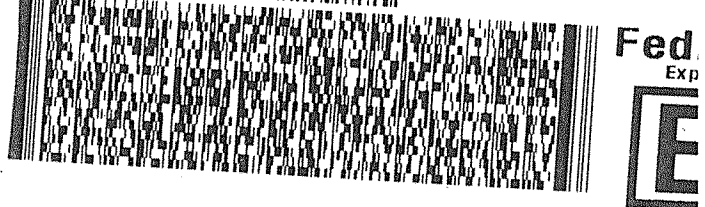
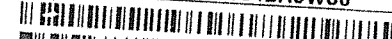
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TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BA6WS0



1 of 2
TRK# 5908 1783 0162
MASTER

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO RBWA

19c 29407
SC-US CH

KEITH GREENE
LOS ALAMOS NATL LAB.
TAGO BLDG 1237 DPU 03

LOS ALAMOS, NM 87545
UNITED STATES US

ACTWGT: 45.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

LOS ALAMOS NATL LAB.
TAGO BLDG 1237 DPU 03

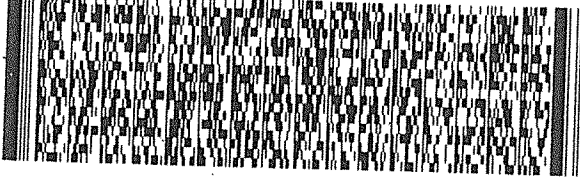
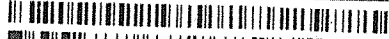
LOS ALAMOS, NM 87545
UNITED STATES US

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BA6WS0

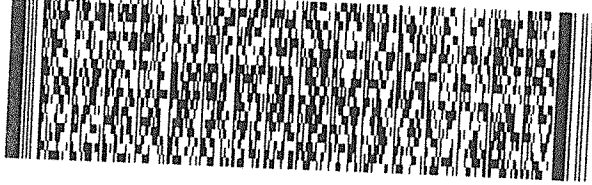
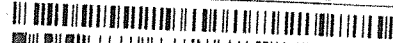


TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0AWE991316W200



1 of 3
TRK# 5908 1783 0184
0201
MASTER

XO RBWA

SATURDAY 12:00P
PRIORITY OVERNIGHT

3c 29407
SC-US CH

TRK# 5908 1783 0151
0201

XO RBWA

SATURDAY
PRIORITY OVERNIGHT

2c 29407
SC-US CH

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 200CT17
ACTWGT: 49.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 200CT17
ACTWGT: 56.0 LB MAN
CAD: 0014176/CAFE2916

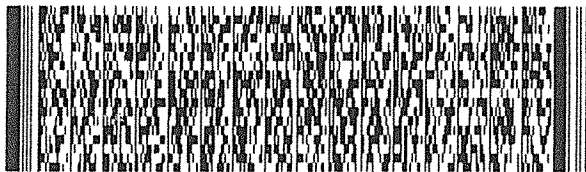
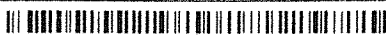
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 3L040AJWB136804000

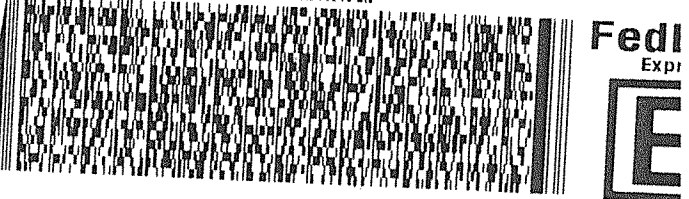
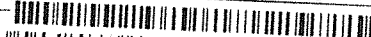


TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BA6WS0



TRK# 5908 1783 0140
0201

XO RBWA

SATURDAY 12:00P
PRIORITY OVERNIGHT

2c 29407
SC-US CH

3 of 3
MPS# 5908 1783 0200
0263
Mstr# 5908 1783 0184

XO RBWA

SATURDAY 12:00P
PRIORITY OVERNIGHT

2c 29407
SC-US CH

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

SHIP DATE: 20OCT17
ACTWGT: 30.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

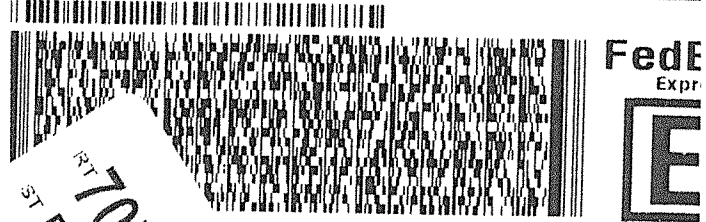
BILL: SENDER

0 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BA6WS0



IPS#
263

Mstr#

XO RBWA

SATURDAY 12:00
PRIORITY OVERNIGHT

0201

19c

2940

SC-US CH

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

SHIP DATE: 20OCT17
ACTWGT: 47.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

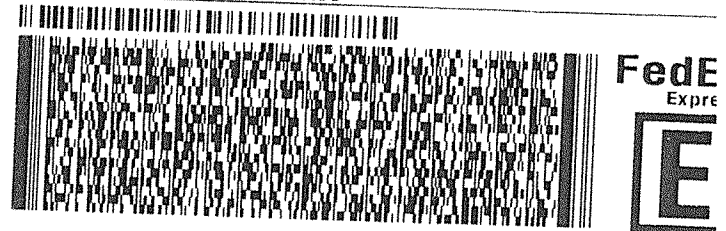
BILL: SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRSW06BB6AS0



3 of 3
MPS# 5908 1783 0232
0263

Mstr# 5908 1783 0210

XO RBWA

SATURDAY 12:00
PRIORITY OVERNIGHT

0201

4c

2940

SC-US CH

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 #: 2018-539
Work Order #: 435718**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch
Number: 1714469

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
435718002	CAPA-18-147575
435718003	CAPA-18-147605
435718004	CAPA-18-147626
435718006	CAPA-18-147579
435718007	CAPA-18-147602
435718009	CAPA-18-147651
435718010	CAPA-18-147674
435718012	CAPA-18-147585
435718013	CAPA-18-147610
1203908829	Method Blank (MB)
1203908830	Laboratory Control Sample (LCS)
1203908831	435631002(CAPA-18-147588) Post Spike (PS)
1203908832	435631002(CAPA-18-147588) Post Spike Duplicate (PSD)
1203908833	Laboratory Control Sample (LCS)
1203908834	435631002(CAPA-18-147588) Post Spike (PS)
1203908835	435631002(CAPA-18-147588) Post Spike Duplicate (PSD)

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

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

SOP Reference

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

Calibration Information

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the

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

Initial Calibration

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

Continuing Calibration Verification Requirements

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

Quality Control (QC) Information

Blank (MB) Statement

Target analytes were detected in the blank 1203908829 (MB) below the reporting limit.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 435631002 (CAPA-18-147588) was designated for spike analysis.

Matrix Spike/Matrix Spike Duplicate Recovery Statement

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

Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information

Holding Time Specifications

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

Sample Preservation and Integrity

All samples met the sample preservation and integrity requirements.

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Manual Integrations

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

manual integrations.

TIC Comment

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

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

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

Electronic Package Comment

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

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOAA.I	Agilent 7890/5975 GC/MS w/ OI Eclipse/Archon Autosampler	HP7890A/HP5975C	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-539 GEL Work Order: 435718

The Qualifiers in this report are defined as follows:

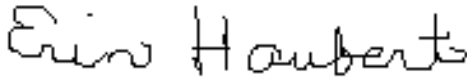
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a surrogate compound
- B The target analyte was detected in the associated blank.
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates that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

Review/Validation

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

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

Signature:



Name: Erin Haubert

Date: 15 NOV 2017

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539

Lab Sample ID: 435718002

Date Collected: 10/19/2017 13:41

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 14:49

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 14:49

Data File: 103117\AG215.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: 2018-539
Lab Sample ID: 435718002

Date Collected: 10/19/2017 13:41
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147575
Batch ID: 1714469
Run Date: 10/31/2017 14:49
Prep Date: 10/31/2017 14:49
Data File: 103117\AG215.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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	J	0.590	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	J	0.760	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: 2018-539
Lab Sample ID: 435718002

Date Collected: 10/19/2017 13:41
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147575

Client: ARSL004

Project: ESHL00114

Batch ID: 1714469

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 10/31/2017 14:49

Inst: VOAA.I

Dilution: 1

Prep Date: 10/31/2017 14:49

Analyst: JEB

Purge Vol: 5 mL

Data File: 103117\AG215.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	55.6	50.0	ug/L 111	(71%-134%)
Bromofluorobenzene	51.3	50.0	ug/L 103	(70%-131%)
Toluene-d8	50.9	50.0	ug/L 102	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.493	33	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539

Lab Sample ID: 435718003

Date Collected: 10/19/2017 13:41

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAPA-18-147605

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 15:13

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 15:13

Data File: 103117\AG216.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: 2018-539

Lab Sample ID: 435718003

Date Collected: 10/19/2017 13:41

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 15:13

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 15:13

Data File: 103117\AG216.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: 2018-539
Lab Sample ID: 435718003

Date Collected: 10/19/2017 13:41
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147605
Batch ID: 1714469
Run Date: 10/31/2017 15:13
Prep Date: 10/31/2017 15:13
Data File: 103117\AG216.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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	55.3	50.0	ug/L 111	(71%-134%)
Bromofluorobenzene	51.1	50.0	ug/L 102	(70%-131%)
Toluene-d8	51.6	50.0	ug/L 103	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.423	9.35	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539

Lab Sample ID: 435718004

Date Collected: 10/19/2017 13:41

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 15:36

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 15:36

Data File: 103117\AG217.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: 2018-539
Lab Sample ID: 435718004

Client ID: CAPA-18-147626
Batch ID: 1714469
Run Date: 10/31/2017 15:36
Prep Date: 10/31/2017 15:36
Data File: 103117\AG217.D

Date Collected: 10/19/2017 13:41
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: W

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

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-539

Lab Sample ID: 435718004

Date Collected: 10/19/2017 13:41

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAPA-18-147626

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 15:36

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 15:36

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	55.2	50.0	ug/L 110	(71%-134%)
Bromofluorobenzene	51.6	50.0	ug/L 103	(70%-131%)
Toluene-d8	51.3	50.0	ug/L 103	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.423	18.5	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539
Lab Sample ID: 435718006

Date Collected: 10/19/2017 13:10
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147579
Batch ID: 1714469
Run Date: 10/31/2017 16:00
Prep Date: 10/31/2017 16:00
Data File: 103117\AG218.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-539

Lab Sample ID: 435718006

Date Collected: 10/19/2017 13:10

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 16:00

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 16:00

Data File: 103117\AG218.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: 2018-539

Lab Sample ID: 435718006

Date Collected: 10/19/2017 13:10

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAPA-18-147579

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 16:00

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 16:00

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	54.8	50.0	ug/L 110	(71%-134%)
Bromofluorobenzene	50.6	50.0	ug/L 101	(70%-131%)
Toluene-d8	50.8	50.0	ug/L 102	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.483	31.3	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539

Lab Sample ID: 435718007

Date Collected: 10/19/2017 13:10

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 16:24

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 16:24

Data File: 103117\AG219.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: 2018-539
Lab Sample ID: 435718007

Client ID: CAPA-18-147602
Batch ID: 1714469
Run Date: 10/31/2017 16:24
Prep Date: 10/31/2017 16:24
Data File: 103117\AG219.D

Date Collected: 10/19/2017 13:10
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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**

Page 3 of 3

SDG Number: 2018-539
Lab Sample ID: 435718007

Date Collected: 10/19/2017 13:10

Matrix: W

Date Received: 10/21/2017 08:45

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 16:24

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 16:24

Data File: 103117\AG219.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.6	50.0	ug/L 107	(71%-134%)
Bromofluorobenzene	50.4	50.0	ug/L 101	(70%-131%)
Toluene-d8	50.0	50.0	ug/L 100	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.433	9.1	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539

Lab Sample ID: 435718009

Date Collected: 10/19/2017 09:51

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 16:47

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 16:47

Data File: 103117\AG220.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: 2018-539

Lab Sample ID: 435718009

Date Collected: 10/19/2017 09:51

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 16:47

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 16:47

Data File: 103117\AG220.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: 2018-539
Lab Sample ID: 435718009

Date Collected: 10/19/2017 09:51
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147651

Client: ARSL004

Project: ESHL00114

Batch ID: 1714469

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 10/31/2017 16:47

Inst: VOAA.I

Dilution: 1

Prep Date: 10/31/2017 16:47

Analyst: JEB

Purge Vol: 5 mL

Data File: 103117\AG220.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	55.0	50.0	ug/L 110	(71%-134%)
Bromofluorobenzene	51.5	50.0	ug/L 103	(70%-131%)
Toluene-d8	51.6	50.0	ug/L 103	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.473	26.8	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539
Lab Sample ID: 435718010

Date Collected: 10/19/2017 09:51
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147674
Batch ID: 1714469
Run Date: 10/31/2017 17:11
Prep Date: 10/31/2017 17:11
Data File: 103117\AG221.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-539
Lab Sample ID: 435718010

Date Collected: 10/19/2017 09:51
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147674
Batch ID: 1714469
Run Date: 10/31/2017 17:11
Prep Date: 10/31/2017 17:11
Data File: 103117\AG221.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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: 2018-539
Lab Sample ID: 435718010

Date Collected: 10/19/2017 09:51
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147674
Batch ID: 1714469
Run Date: 10/31/2017 17:11
Prep Date: 10/31/2017 17:11
Data File: 103117\AG221.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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	53.9	50.0	ug/L 108	(71%-134%)
Bromofluorobenzene	51.3	50.0	ug/L 103	(70%-131%)
Toluene-d8	51.3	50.0	ug/L 103	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.423	9.48	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539
Lab Sample ID: 435718012

Date Collected: 10/19/2017 10:55
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147585
Batch ID: 1714469
Run Date: 10/31/2017 17:35
Prep Date: 10/31/2017 17:35
Data File: 103117\AG222.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-539
Lab Sample ID: 435718012

Date Collected: 10/19/2017 10:55
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147585
Batch ID: 1714469
Run Date: 10/31/2017 17:35
Prep Date: 10/31/2017 17:35
Data File: 103117\AG222.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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: 2018-539
Lab Sample ID: 435718012

Date Collected: 10/19/2017 10:55
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147585

Client: ARSL004

Project: ESHL00114

Batch ID: 1714469

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 10/31/2017 17:35

Inst: VOAA.I

Dilution: 1

Prep Date: 10/31/2017 17:35

Analyst: JEB

Purge Vol: 5 mL

Data File: 103117\AG222.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.8	50.0	ug/L 108	(71%-134%)
Bromofluorobenzene	50.9	50.0	ug/L 102	(70%-131%)
Toluene-d8	50.8	50.0	ug/L 102	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.483	30.2	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539
Lab Sample ID: 435718013

Date Collected: 10/19/2017 10:55
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147610
Batch ID: 1714469
Run Date: 10/31/2017 17:58
Prep Date: 10/31/2017 17:58
Data File: 103117\AG223.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-539
Lab Sample ID: 435718013

Client ID: CAPA-18-147610
Batch ID: 1714469
Run Date: 10/31/2017 17:58
Prep Date: 10/31/2017 17:58
Data File: 103117\AG223.D

Date Collected: 10/19/2017 10:55
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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

Page 3 of 3

SDG Number: 2018-539
Lab Sample ID: 435718013

Date Collected: 10/19/2017 10:55

Matrix: W

Date Received: 10/21/2017 08:45

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Client ID: CAPA-18-147610

Inst: VOAA.I

Dilution: 1

Batch ID: 1714469

Run Date: 10/31/2017 17:58

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 17:58

Data File: 103117\AG223.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	54.6	50.0	ug/L 109	(71%-134%)
Bromofluorobenzene	51.9	50.0	ug/L 104	(70%-131%)
Toluene-d8	51.5	50.0	ug/L 103	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.423	18.7	ug/L	0	J

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-539**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203908830	LCS for batch 1714469	106	99	95
1203908833	LCS for batch 1714469	105	101	101
1203908829	MB for batch 1714469	98	101	97
435718002	CAPA-18-147575	111	102	103
435718003	CAPA-18-147605	111	103	102
435718004	CAPA-18-147626	110	103	103
435718006	CAPA-18-147579	110	102	101
435718007	CAPA-18-147602	107	100	101
435718009	CAPA-18-147651	110	103	103
435718010	CAPA-18-147674	108	103	103
435718012	CAPA-18-147585	108	102	102
435718013	CAPA-18-147610	109	103	104
1203908831	CAPA-18-147588PS	106	101	99
1203908832	CAPA-18-147588PSD	105	99	97
1203908834	CAPA-18-147588PS	107	99	102
1203908835	CAPA-18-147588PSD	108	100	104

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: 2018-539

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714469

Matrix: WATER

Lab Sample ID 1203908830

Instrument: VOAA.I

Analysis Date: 10/31/2017 10:00

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	101	101	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1200	96	61-125
67-64-1	LCS Acetone	250	0.0	240	96	48-157
74-88-4	LCS Iodomethane	250	0.0	258	103	72-128
75-15-0	LCS Carbon disulfide	250	0.0	256	102	69-138
108-05-4	LCS Vinyl acetate	250	0.0	291	116	67-125
78-93-3	LCS 2-Butanone	250	0.0	225	90	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	257	103	66-124
591-78-6	LCS 2-Hexanone	250	0.0	252	101	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	59.8	120	40-160
74-87-3	LCS Chloromethane	50.0	0.0	55.2	110	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	56.1	112	65-137
74-83-9	LCS Bromomethane	50.0	0.0	37.5	75	63-137
75-00-3	LCS Chloroethane	50.0	0.0	52.9	106	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	53.8	108	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	52.2	104	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	50.6	101	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	53.0	106	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	52.1	104	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	50.2	100	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	50.7	101	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-539

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714469

Matrix: WATER

Lab Sample ID 1203908830

Instrument: VOAA.I

Analysis Date: 10/31/2017 10:00

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	56.7	113	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	52.2	104	76-125
67-66-3	LCS Chloroform	50.0	0.0	50.2	100	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	54.1	108	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	50.1	100	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	58.1	116	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	51.3	103	74-122
71-43-2	LCS Benzene	50.0	0.0	48.0	96	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	51.5	103	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	48.7	97	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	51.0	102	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	54.8	110	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	53.5	107	78-131
108-88-3	LCS Toluene	50.0	0.0	48.2	96	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	55.6	111	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	48.2	96	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	46.8	94	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	49.3	99	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	50.4	101	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	52.2	104	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	49.0	98	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	49.3	99	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-539

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714469

Matrix: WATER

Lab Sample ID 1203908830

Instrument: VOAA.I

Analysis Date: 10/31/2017 10:00

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	51.2	102	74-126
100-42-5	LCS Styrene	50.0	0.0	55.1	110	72-130
75-25-2	LCS Bromoform	50.0	0.0	60.4	121	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	50.4	101	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	47.6	95	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	48.8	98	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	48.7	97	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	48.2	96	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	51.1	102	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	49.4	99	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	47.6	95	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	52.2	104	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	50.7	101	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	51.0	102	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	52.7	105	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	48.1	96	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	47.9	96	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	51.3	103	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	61.7	123	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	53.6	107	72-136
91-20-3	LCS Naphthalene	50.0	0.0	55.1	110	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	53.1	106	70-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-539

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714469

Matrix: WATER

Lab Sample ID 1203908830

Instrument: VOAA.I

Analysis Date: 10/31/2017 10:00

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	54.7	109	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	57.0	114	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	49.0	98	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5170	103	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-539

Sample Type: Post Spike

Client ID: CAPA-18-147588PS

Matrix: W

Lab Sample ID 1203908831

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:33

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	76.3	76	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1010	81	56-131
67-64-1	PS Acetone	250	0.00 U	99.1	40	25-155
74-88-4	PS Iodomethane	250	0.00 U	227	91	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	227	91	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	253	101	48-133
78-93-3	PS 2-Butanone	250	0.00 U	138	55	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	209	83	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	173	69	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	51.2	102	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	58.2	116	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	58.8	118	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	44.4	89	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	49.6	99	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	52.5	105	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	50.0	100	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	43.7	87	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	45.0	90	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	45.0	90	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	44.4	89	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	45.2	90	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	44.7	89	69-127

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-539

Sample Type: Post Spike

Client ID: CAPA-18-147588PS

Matrix: W

Lab Sample ID 1203908831

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:33

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	45.5	91	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	45.3	91	71-130
67-66-3	PS Chloroform	50.0	0.00 U	44.2	88	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	44.3	89	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	41.0	82	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	47.4	95	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	47.0	94	69-130
71-43-2	PS Benzene	50.0	0.00 U	41.4	83	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	43.0	86	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	43.3	87	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	46.4	93	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	48.0	96	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	44.0	88	70-134
108-88-3	PS Toluene	50.0	0.00 U	39.7	79	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	45.5	91	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	42.8	86	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	43.5	87	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	36.0	72	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	42.5	85	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	45.4	91	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	39.0	78	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	38.0	76	61-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 8

SDG Number: 2018-539

Sample Type: Post Spike

Client ID: CAPA-18-147588PS

Matrix: W

Lab Sample ID 1203908831

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:33

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	39.2	78	62-131
100-42-5	PS Styrene	50.0	0.00 U	42.8	86	59-135
75-25-2	PS Bromoform	50.0	0.00 U	48.5	97	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	37.1	74	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	42.9	86	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	43.9	88	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	38.1	76	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	34.5	69	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	37.0	74	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	37.2	74	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	35.0	70	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	36.4	73	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	36.5	73	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	34.9	70	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	34.4	69	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	34.8	70	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	34.3	69	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	31.4	63	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	46.7	93	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	26.7	53	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	43.7	87	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	35.8	72	52-135

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 8

SDG Number: 2018-539

Sample Type: Post Spike

Client ID: CAPA-18-147588PS

Matrix: W

Lab Sample ID 1203908831

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:33

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	33.9	68	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	46.2	92	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	36.9	74	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	4000	80	60-140

Volatile
Quality Control Summary
Spike Recovery Report

Page 5 of 8

SDG Number: 2018-539

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147588PSD

Matrix: W

Lab Sample ID 1203908832

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:57

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	80.1	80	59-132	5	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1100	88	56-131	9	0-20
67-64-1	PSD Acetone	250	0.00 U	108	43	25-155	9	0-20
74-88-4	PSD Iodomethane	250	0.00 U	236	95	66-133	4	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	235	94	61-141	3	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	264	106	48-133	4	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	151	60	25-143	9	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	225	90	61-127	8	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	189	76	33-138	9	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	54.3	109	33-164	6	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	58.2	116	53-139	0	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	58.6	117	58-140	0	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	43.3	87	59-146	3	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	50.2	100	65-129	1	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	53.2	106	65-141	1	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	53.1	106	69-127	6	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	46.1	92	59-130	5	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	47.4	95	62-123	5	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	48.6	97	69-132	8	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	47.0	94	65-127	6	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	47.6	95	67-127	5	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	46.9	94	69-127	5	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 6 of 8

SDG Number: 2018-539

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147588PSD

Matrix: W

Lab Sample ID 1203908832

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:57

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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 47.6	95	66-137	4	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 47.8	96	71-130	5	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 46.3	93	71-129	5	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 46.3	93	69-139	4	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 42.7	85	67-130	4	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 49.5	99	66-143	4	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 49.6	99	69-130	5	0-20
71-43-2	PSD Benzene	50.0	0.00	U 43.2	86	66-125	4	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 44.7	89	65-131	4	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 45.0	90	67-127	4	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 47.7	95	72-129	3	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 50.2	100	70-138	5	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 46.4	93	70-134	5	0-20
108-88-3	PSD Toluene	50.0	0.00	U 41.2	82	60-126	4	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 48.2	96	69-135	6	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 44.6	89	66-125	4	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 45.4	91	67-124	4	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 37.7	75	60-130	5	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 44.8	90	68-143	5	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 47.7	95	71-127	5	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 40.8	82	64-124	5	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 39.9	80	61-130	5	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 7 of 8

SDG Number: 2018-539

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147588PSD

Matrix: W

Lab Sample ID 1203908832

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:57

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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 41.1	82	62-131	5	0-20
100-42-5	PSD Styrene	50.0	0.00	U 44.7	89	59-135	4	0-20
75-25-2	PSD Bromoform	50.0	0.00	U 52.5	105	64-138	8	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00	U 38.8	78	55-133	4	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00	U 44.9	90	62-129	4	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00	U 46.0	92	70-124	5	0-20
108-86-1	PSD Bromobenzene	50.0	0.00	U 40.1	80	62-124	5	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00	U 36.2	72	50-133	5	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00	U 38.7	77	53-135	5	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00	U 38.9	78	56-128	4	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00	U 36.8	74	53-130	5	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00	U 38.0	76	55-135	4	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00	U 38.1	76	53-132	4	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00	U 36.4	73	50-138	4	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00	U 35.4	71	49-138	3	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00	U 36.3	73	56-126	4	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00	U 35.7	71	55-125	4	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00	U 31.6	63	43-142	1	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00	U 51.0	102	62-141	9	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00	U 25.2	50	40-147	6	0-20
91-20-3	PSD Naphthalene	50.0	0.00	U 45.9	92	62-134	5	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00	U 36.2	72	52-135	1	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 8 of 8

SDG Number: 2018-539

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147588PSD

Matrix: W

Lab Sample ID 1203908832

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:57

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

			Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
CAS No	Parmname									
120-82-1	PSD	1,2,4-Trichlorobenzene	50.0	0.00	U	34.0	68	50-133	0	0-20
630-20-6	PSD	1,1,1,2-Tetrachloroethane	50.0	0.00	U	48.5	97	71-133	5	0-20
95-50-1	PSD	1,2-Dichlorobenzene	50.0	0.00	U	38.5	77	60-125	4	0-20
71-36-3	PSD	n-Butyl alcohol	5000	0.00	U	4410	88	60-140	10	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-539

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714469

Matrix: WATER

Lab Sample ID 1203908833

Instrument: VOAA.I

Analysis Date: 10/31/2017 11:12

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	271	108	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	217	87	61-148
107-05-1	LCS	Allyl chloride	250	0.0	217	87	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	219	87	65-122
107-12-0	LCS	Propionitrile	250	0.0	220	88	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	236	95	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	249	99	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	234	94	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2400	96	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	44.5	89	66-147

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 2

SDG Number: 2018-539

Sample Type: Post Spike

Client ID: CAPA-18-147588PS

Matrix: W

Lab Sample ID 1203908834

Instrument: VOAA.I

Analysis Date: 10/31/2017 20:20

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	PS	Acrolein	250	0.00	U	273	109	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00	U	264	106	57-149
107-05-1	PS	Allyl chloride	250	0.00	U	263	105	54-128
107-13-1	PS	Acrylonitrile	250	0.00	U	265	106	59-129
107-12-0	PS	Propionitrile	250	0.00	U	257	103	58-131
126-98-7	PS	Methacrylonitrile	250	0.00	U	281	112	59-134
80-62-6	PS	Methyl methacrylate	250	0.00	U	283	113	62-135
97-63-2	PS	Ethyl methacrylate	250	0.00	U	265	106	60-136
78-83-1	PS	Isobutyl alcohol	2500	0.00	U	2600	104	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00	U	51.1	102	63-146

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 2

SDG Number: 2018-539

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147588PSD

Matrix: W

Lab Sample ID 1203908835

Instrument: VOAA.I

Analysis Date: 10/31/2017 20:44

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	250	100	49-141	9	0-20
76-13-1	PSD	Trichlorotrifluoroethane			250	0.00	U	251	101	57-149	5	0-20
107-05-1	PSD	Allyl chloride			250	0.00	U	255	102	54-128	3	0-20
107-13-1	PSD	Acrylonitrile			250	0.00	U	248	99	59-129	7	0-20
107-12-0	PSD	Propionitrile			250	0.00	U	239	95	58-131	7	0-20
126-98-7	PSD	Methacrylonitrile			250	0.00	U	267	107	59-134	5	0-20
80-62-6	PSD	Methyl methacrylate			250	0.00	U	273	109	62-135	3	0-20
97-63-2	PSD	Ethyl methacrylate			250	0.00	U	258	103	60-136	3	0-20
78-83-1	PSD	Isobutyl alcohol			2500	0.00	U	2360	95	60-143	9	0-20
126-99-8	PSD	2-Chloro-1,3-butadiene			50.0	0.00	U	49.0	98	63-146	4	0-20

Method Blank Summary

Page 1 of 1

SDG Number:	2018-539	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1714469	Instrument ID:	VOAA.I	Data File:	103117\AG207AR.D
Lab Sample ID:	1203908829	Prep Date:	10/31/2017 11:36	Analyzed:	10/31/17 11:36
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 1714469	1203908830	103117\AG203AR.D	10/31/17	1000
02 LCS for batch 1714469	1203908833	103117\AG206AR.D	10/31/17	1112
03 CAPA-18-147575	435718002	103117\AG215.D	10/31/17	1449
04 CAPA-18-147605	435718003	103117\AG216.D	10/31/17	1513
05 CAPA-18-147626	435718004	103117\AG217.D	10/31/17	1536
06 CAPA-18-147579	435718006	103117\AG218.D	10/31/17	1600
07 CAPA-18-147602	435718007	103117\AG219.D	10/31/17	1624
08 CAPA-18-147651	435718009	103117\AG220.D	10/31/17	1647
09 CAPA-18-147674	435718010	103117\AG221.D	10/31/17	1711
10 CAPA-18-147585	435718012	103117\AG222.D	10/31/17	1735
11 CAPA-18-147610	435718013	103117\AG223.D	10/31/17	1758
12 CAPA-18-147588PS	1203908831	103117\AG227.D	10/31/17	1933
13 CAPA-18-147588PSD	1203908832	103117\AG228.D	10/31/17	1957
14 CAPA-18-147588PS	1203908834	103117\AG229.D	10/31/17	2020
15 CAPA-18-147588PSD	1203908835	103117\AG230.D	10/31/17	2044

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-539
Lab Sample ID: 1203908829
Client Sample: QC for batch 1714469
Client ID: MB for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 11:36
Prep Date: 10/31/2017 11:36
Data File: 103117\AG207AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	J	0.340	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: 2018-539
Lab Sample ID: 1203908829
Client Sample: QC for batch 1714469
Client ID: MB for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 11:36
Prep Date: 10/31/2017 11:36
Data File: 103117\AG207AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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

Page 3 of 3

SDG Number:	2018-539	Matrix:	WATER
Lab Sample ID:	1203908829		
Client Sample:	QC for batch 1714469	Client:	ARSL004
Client ID:	MB for batch 1714469	Method:	SW-846:8260B
Batch ID:	1714469	Inst:	VOAA.I
Run Date:	10/31/2017 11:36	Analyst:	JEB
Prep Date:	10/31/2017 11:36		
Data File:	103117\AG207AR.D	Column:	DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.8	50.0	ug/L 98	(71%-134%)
Bromofluorobenzene	48.4	50.0	ug/L 97	(70%-131%)
Toluene-d8	50.5	50.0	ug/L 101	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.423	5.16	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539
Lab Sample ID: 1203908830
Client Sample: QC for batch 1714469
Client ID: LCS for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 10:00
Prep Date: 10/31/2017 10:00
Data File: 103117\AG203AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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		57.0	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		54.1	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.6	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		48.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		50.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		52.2	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		50.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	53.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		48.8	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		54.7	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		50.7	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		61.7	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		52.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		49.0	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		51.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		48.7	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		51.1	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		48.1	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		46.8	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		47.9	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		56.7	ug/L	0.300	1.00
78-93-3	2-Butanone		225	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		49.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		252	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		47.6	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		52.7	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		257	ug/L	1.50	5.00
67-64-1	Acetone		240	ug/L	1.50	10.0
75-05-8	Acetonitrile		1200	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		48.0	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		52.2	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		54.8	ug/L	0.300	1.00
75-25-2	Bromoform		60.4	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-539
Lab Sample ID: 1203908830
Client Sample: QC for batch 1714469
Client ID: LCS for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 10:00
Prep Date: 10/31/2017 10:00
Data File: 103117\AG203AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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		37.5	ug/L	0.300	1.00
75-15-0	Carbon disulfide		256	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		58.1	ug/L	0.300	1.00
108-90-7	Chlorobenzene		49.0	ug/L	0.300	1.00
75-00-3	Chloroethane		52.9	ug/L	0.300	1.00
67-66-3	Chloroform		50.2	ug/L	0.300	1.00
74-87-3	Chloromethane		55.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		50.4	ug/L	0.300	1.00
74-95-3	Dibromomethane		51.0	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		59.8	ug/L	0.300	1.00
60-29-7	Ethyl ether		53.8	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		49.3	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		53.6	ug/L	0.300	1.00
74-88-4	Iodomethane		258	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		50.4	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		50.6	ug/L	1.00	10.0
91-20-3	Naphthalene		55.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		55.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		49.3	ug/L	0.300	1.00
108-88-3	Toluene		48.2	ug/L	0.300	1.00
79-01-6	Trichloroethylene		51.5	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		291	ug/L	1.50	5.00
75-01-4	Vinyl chloride		56.1	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		50.7	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		53.5	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		101	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5170	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		51.3	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		48.2	ug/L	0.300	1.00
95-47-6	o-Xylene		51.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		51.0	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-539	Matrix:	WATER
Lab Sample ID:	1203908830		
Client Sample:	QC for batch 1714469	Client:	ARSL004
Client ID:	LCS for batch 1714469	Method:	SW-846:8260B
Batch ID:	1714469	Inst:	VOAA.I
Run Date:	10/31/2017 10:00	Analyst:	JEB
Prep Date:	10/31/2017 10:00		
Data File:	103117\AG203AR.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		53.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		52.2	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		52.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		55.6	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.2	50.0	ug/L	106	(71%-134%)
Bromofluorobenzene	47.7	50.0	ug/L	95	(70%-131%)
Toluene-d8	49.5	50.0	ug/L	99	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908831	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 19:33	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 19:33		
Data File: 103117\AG227.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		46.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		44.3	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		42.9	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		42.8	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		45.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		43.7	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		41.0	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	35.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		43.9	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		33.9	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		36.5	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		46.7	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		45.4	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		36.9	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		47.0	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		43.3	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		37.0	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		34.8	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		43.5	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		34.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		45.5	ug/L	0.300	1.00
78-93-3	2-Butanone		138	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		37.2	ug/L	0.300	1.00
591-78-6	2-Hexanone		173	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		35.0	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		34.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		209	ug/L	1.50	5.00
67-64-1	Acetone		99.1	ug/L	1.50	10.0
75-05-8	Acetonitrile		1010	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		41.4	ug/L	0.300	1.00
108-86-1	Bromobenzene		38.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		45.3	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		48.0	ug/L	0.300	1.00
75-25-2	Bromoform		48.5	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-539	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908831	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 19:33	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 19:33		
Data File: 103117\AG227.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		44.4	ug/L	0.300	1.00
75-15-0	Carbon disulfide		227	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		47.4	ug/L	0.300	1.00
108-90-7	Chlorobenzene		39.0	ug/L	0.300	1.00
75-00-3	Chloroethane		49.6	ug/L	0.300	1.00
67-66-3	Chloroform		44.2	ug/L	0.300	1.00
74-87-3	Chloromethane		58.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		42.5	ug/L	0.300	1.00
74-95-3	Dibromomethane		46.4	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		51.2	ug/L	0.300	1.00
60-29-7	Ethyl ether		50.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		38.0	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		26.7	ug/L	0.300	1.00
74-88-4	Iodomethane		227	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		37.1	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		45.0	ug/L	1.00	10.0
91-20-3	Naphthalene		43.7	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		42.8	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		36.0	ug/L	0.300	1.00
108-88-3	Toluene		39.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		43.0	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		52.5	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		253	ug/L	1.50	5.00
75-01-4	Vinyl chloride		58.8	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		44.7	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		44.0	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		76.3	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4000	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		31.4	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		34.5	ug/L	0.300	1.00
95-47-6	o-Xylene		39.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		34.9	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-539	Date Collected:	10/18/2017 12:11	Matrix:	W
Lab Sample ID:	1203908831	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714469	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147588PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714469	Inst:	VOAA.I	Dilution:	1
Run Date:	10/31/2017 19:33	Analyst:	JEB	Purge Vol:	5 mL
Prep Date:	10/31/2017 19:33				
Data File:	103117\AG227.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		45.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		36.4	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		44.4	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		45.5	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.1	50.0	ug/L	106	(71%-134%)
Bromofluorobenzene	49.7	50.0	ug/L	99	(70%-131%)
Toluene-d8	50.7	50.0	ug/L	101	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908832	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 19:57	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 19:57		
Data File: 103117\AG228.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		48.5	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		46.3	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		44.9	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		44.6	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		47.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		46.1	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		42.7	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	36.2	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		46.0	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		34.0	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		38.1	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		51.0	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		47.7	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		38.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		49.6	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		45.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		38.7	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		36.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		45.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		35.7	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		47.6	ug/L	0.300	1.00
78-93-3	2-Butanone		151	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		38.9	ug/L	0.300	1.00
591-78-6	2-Hexanone		189	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		36.8	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		35.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		225	ug/L	1.50	5.00
67-64-1	Acetone		108	ug/L	1.50	10.0
75-05-8	Acetonitrile		1100	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		43.2	ug/L	0.300	1.00
108-86-1	Bromobenzene		40.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		47.8	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		50.2	ug/L	0.300	1.00
75-25-2	Bromoform		52.5	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-539	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908832	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 19:57	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 19:57		
Data File: 103117\AG228.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		43.3	ug/L	0.300	1.00
75-15-0	Carbon disulfide		235	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		49.5	ug/L	0.300	1.00
108-90-7	Chlorobenzene		40.8	ug/L	0.300	1.00
75-00-3	Chloroethane		50.2	ug/L	0.300	1.00
67-66-3	Chloroform		46.3	ug/L	0.300	1.00
74-87-3	Chloromethane		58.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		47.7	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		54.3	ug/L	0.300	1.00
60-29-7	Ethyl ether		53.1	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		39.9	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		25.2	ug/L	0.300	1.00
74-88-4	Iodomethane		236	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		38.8	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		47.4	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		44.7	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		37.7	ug/L	0.300	1.00
108-88-3	Toluene		41.2	ug/L	0.300	1.00
79-01-6	Trichloroethylene		44.7	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		53.2	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		264	ug/L	1.50	5.00
75-01-4	Vinyl chloride		58.6	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		46.9	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		46.4	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		80.1	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4410	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		31.6	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		36.2	ug/L	0.300	1.00
95-47-6	o-Xylene		41.1	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		36.4	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

Page 3 of 3

SDG Number:	2018-539	Date Collected:	10/18/2017 12:11	Matrix:	W
Lab Sample ID:	1203908832	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714469	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147588PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714469	Inst:	VOAA.I	Dilution:	1
Run Date:	10/31/2017 19:57	Analyst:	JEB	Purge Vol:	5 mL
Prep Date:	10/31/2017 19:57				
Data File:	103117\AG228.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		48.6	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		38.0	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		47.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		48.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.4	50.0	ug/L	105	(71%-134%)
Bromofluorobenzene	48.5	50.0	ug/L	97	(70%-131%)
Toluene-d8	49.5	50.0	ug/L	99	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539
Lab Sample ID: 1203908833
Client Sample: QC for batch 1714469
Client ID: LCS for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 11:12
Prep Date: 10/31/2017 11:12
Data File: 103117\AG206AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		44.5	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		271	ug/L	1.50	5.00
107-13-1	Acrylonitrile		219	ug/L	1.50	5.00
107-05-1	Allyl chloride		217	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: 2018-539
Lab Sample ID: 1203908833
Client Sample: QC for batch 1714469
Client ID: LCS for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 11:12
Prep Date: 10/31/2017 11:12
Data File: 103117\AG206AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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		234	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2400	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		236	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		249	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		220	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		217	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: 2018-539
Lab Sample ID: 1203908833
Client Sample: QC for batch 1714469
Client ID: LCS for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 11:12
Prep Date: 10/31/2017 11:12
Data File: 103117\AG206AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: WATER

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.7	50.0	ug/L 105	(71%-134%)
Bromofluorobenzene	50.3	50.0	ug/L 101	(70%-131%)
Toluene-d8	50.5	50.0	ug/L 101	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908834	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 20:20	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 20:20		
Data File: 103117\AG229.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		51.1	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		273	ug/L	1.50	5.00
107-13-1	Acrylonitrile		265	ug/L	1.50	5.00
107-05-1	Allyl chloride		263	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: 2018-539	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908834	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 20:20	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 20:20		
Data File: 103117\AG229.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		265	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		2600	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		281	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		283	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		257	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		264	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:	2018-539	Date Collected:	10/18/2017 12:11	Matrix:	W
Lab Sample ID:	1203908834	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714469	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147588PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714469	Inst:	VOAA.I	Dilution:	1
Run Date:	10/31/2017 20:20	Analyst:	JEB	Purge Vol:	5 mL
Prep Date:	10/31/2017 20:20				
Data File:	103117\AG229.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.7	50.0	ug/L	107	(71%-134%)
Bromofluorobenzene	50.9	50.0	ug/L	102	(70%-131%)
Toluene-d8	49.3	50.0	ug/L	99	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-539	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908835	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 20:44	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 20:44		
Data File: 103117\AG230.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		49.0	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		250	ug/L	1.50	5.00
107-13-1	Acrylonitrile		248	ug/L	1.50	5.00
107-05-1	Allyl chloride		255	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: 2018-539	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908835	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 20:44	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 20:44		
Data File: 103117\AG230.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		258	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		267	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		273	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		239	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		251	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:	2018-539	Date Collected:	10/18/2017 12:11	Matrix:	W
Lab Sample ID:	1203908835	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714469	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147588PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714469	Inst:	VOAA.I	Dilution:	1
Run Date:	10/31/2017 20:44	Analyst:	JEB	Purge Vol:	5 mL
Prep Date:	10/31/2017 20:44				
Data File:	103117\AG230.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.9	50.0	ug/L	108	(71%-134%)
Bromofluorobenzene	51.8	50.0	ug/L	104	(70%-131%)
Toluene-d8	50.2	50.0	ug/L	100	(74%-124%)

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-539
Work Order #: 435718**

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:	1712677
Prep Batch Number:	1712676

Sample Analysis

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

Sample ID	Client ID
435718002	CAPA-18-147575
435718004	CAPA-18-147626
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585
1203904116	Method Blank (MB)
1203904117	Laboratory Control Sample (LCS)
1203904118	435722005(WST15-17-148254) Matrix Spike (MS)
1203904119	435722005(WST15-17-148254) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

SOP Reference

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

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

Calibration Information

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

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

Initial Calibration

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

CCV Requirements

All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8270D for samples 435718002 (CAPA-18-147575), 435718004 (CAPA-18-147626), 435718006 (CAPA-18-147579), 435718009 (CAPA-18-147651) and 435718012 (CAPA-18-147585) and the associated QC. However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8270D outlier acceptance criteria. If required, a CRDL was analyzed after the CCVs to demonstrate that there is adequate sensitivity to detect the failed compounds at the applicable lower quantitation limit.

Quality Control (QC) Information

Method Blank (MB) Statement

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

Surrogate Recoveries

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

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 435722005 (WST15-17-148254) was selected for analysis as the matrix spike and matrix spike duplicate.

Spike Recovery Statement

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

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information:

Holding Time Specifications

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

Preparation/Analytical Method Verification

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

Sample Dilutions

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

Sample Re-extraction/Re-analysis

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

Miscellaneous Information:

Manual Integrations

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

TIC Comment

Tentatively identified compounds (TIC) were requested for samples 435718004 (CAPA-18-147626), 435718006 (CAPA-18-147579), 435718009 (CAPA-18-147651) and 435718012 (CAPA-18-147585) 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
MSD1.I	Agilent 6890N/5973 GC/MS w/ 7683 Autosampler	HP6890/HP5973	DB-5MS	25m x 0.2mm, 0.33um (5% Polysilarylene-95% Polydimethylsiloxane)

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-539 GEL Work Order: 435718

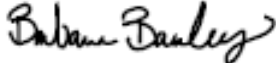
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Barbara Bailey

Date: 16 NOV 2017

Title: Data Validator

Sample Data Summary

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

SDG Number: 2018-539
Lab Sample ID: 435718002

Date Collected: 10/19/2017 13:41
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD1.I
Analyst: JLD1
Aliquot: 950 mL
Column: 25x.20x.33

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

Client ID: CAPA-18-147575
Batch ID: 1712677
Run Date: 10/27/2017 17:33
Prep Date: 10/26/2017 17:40
Data File: s102717a.B\s1j2722.D

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

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

SDG Number: 2018-539
Lab Sample ID: 435718002

Date Collected: 10/19/2017 13:41
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD1.I
Analyst: JLD1
Aliquot: 950 mL
Column: 25x.20x.33

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

Client ID: CAPA-18-147575
Batch ID: 1712677
Run Date: 10/27/2017 17:33
Prep Date: 10/26/2017 17:40
Data File: s102717a.B\s1j2722.D

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

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

Page 3 of 3

SDG Number: 2018-539
Lab Sample ID: 435718002

Date Collected: 10/19/2017 13:41
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147575

Client: ARSL004

Project: ESHL00114

Batch ID: 1712677

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Run Date: 10/27/2017 17:33

Inst: MSD1.I

Dilution: 1

Prep Date: 10/26/2017 17:40

Analyst: JLD1

Inj. Vol: 1 uL

Data File: s102717a.B\s1j2722.D

Aliquot: 950 mL

Final Volume: 1 mL

Column: 25x.20x.33

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	73.8	105	ug/L	70 (32%-124%)
2-Fluorobiphenyl	38.6	52.6	ug/L	73 (32%-112%)
2-Fluorophenol	43.9	105	ug/L	42 (15%-88%)
Nitrobenzene-d5	40.6	52.6	ug/L	77 (36%-115%)
Phenol-d5	30.1	105	ug/L	29 (15%-91%)
p-Terphenyl-d14	40.1	52.6	ug/L	76 (36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	11.529	4.55	ug/L	0	J
000080-05-7	Phenol, 4,4'-(1-methylethylidene)b	13.497	13.3	ug/L	98	NJ

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

SDG Number: 2018-539

Lab Sample ID: 435718004

Date Collected: 10/19/2017 13:41

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1712677

Inst: MSD1.I

Dilution: 1

Run Date: 10/27/2017 18:03

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/26/2017 17:40

Aliquot: 940 mL

Final Volume: 1 mL

Data File: s102717a.B\s1j2723.D

Column: 25x.20x.33

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.19	ug/L	3.19	10.6
120-82-1	1,2,4-Trichlorobenzene	U	3.19	ug/L	3.19	10.6
95-50-1	1,2-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
122-66-7	Azobenzene	U	3.19	ug/L	3.19	10.6
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
106-46-7	1,4-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
123-91-1	1,4-Dioxane	U	3.19	ug/L	3.19	10.6
90-12-0	1-Methylnaphthalene	U	0.319	ug/L	0.319	1.06
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.19	ug/L	3.19	10.6
95-95-4	2,4,5-Trichlorophenol	U	3.19	ug/L	3.19	10.6
88-06-2	2,4,6-Trichlorophenol	U	3.19	ug/L	3.19	10.6
120-83-2	2,4-Dichlorophenol	U	3.19	ug/L	3.19	10.6
105-67-9	2,4-Dimethylphenol	U	3.19	ug/L	3.19	10.6
51-28-5	2,4-Dinitrophenol	U	5.32	ug/L	5.32	21.3
121-14-2	2,4-Dinitrotoluene	U	3.19	ug/L	3.19	10.6
606-20-2	2,6-Dinitrotoluene	U	3.19	ug/L	3.19	10.6
91-58-7	2-Chloronaphthalene	U	0.436	ug/L	0.436	1.06
95-57-8	2-Chlorophenol	U	3.19	ug/L	3.19	10.6
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.19	ug/L	3.19	10.6
91-57-6	2-Methylnaphthalene	U	0.319	ug/L	0.319	1.06
88-75-5	2-Nitrophenol	U	3.19	ug/L	3.19	10.6
91-94-1	3,3'-Dichlorobenzidine	U	3.19	ug/L	3.19	10.6
101-55-3	4-Bromophenylphenylether	U	3.19	ug/L	3.19	10.6
59-50-7	Parachlorometa cresol	U	3.19	ug/L	3.19	10.6
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.51	ug/L	3.51	10.6
7005-72-3	4-Chlorophenylphenylether	U	3.19	ug/L	3.19	10.6
100-02-7	4-Nitrophenol	U	3.19	ug/L	3.19	10.6
83-32-9	Acenaphthene	U	0.319	ug/L	0.319	1.06
208-96-8	Acenaphthylene	U	0.319	ug/L	0.319	1.06
62-53-3	Aniline	U	4.47	ug/L	4.47	10.6
120-12-7	Anthracene	U	0.319	ug/L	0.319	1.06
1912-24-9	Atrazine	U	3.19	ug/L	3.19	10.6
92-87-5	Benzidine	U	4.15	ug/L	4.15	10.6
56-55-3	Benzo(a)anthracene	U	0.319	ug/L	0.319	1.06
50-32-8	Benzo(a)pyrene	U	0.319	ug/L	0.319	1.06
205-99-2	Benzo(b)fluoranthene	U	0.319	ug/L	0.319	1.06
191-24-2	Benzo(ghi)perylene	U	0.319	ug/L	0.319	1.06

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

SDG Number: 2018-539

Lab Sample ID: 435718004

Date Collected: 10/19/2017 13:41

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1712677

Inst: MSD1.I

Dilution: 1

Run Date: 10/27/2017 18:03

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/26/2017 17:40

Aliquot: 940 mL

Final Volume: 1 mL

Data File: s102717a.B\s1j2723.D

Column: 25x.20x.33

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.319	ug/L	0.319	1.06
65-85-0	Benzoic acid	U	6.38	ug/L	6.38	21.3
100-51-6	Benzyl alcohol	U	3.19	ug/L	3.19	10.6
85-68-7	Butylbenzylphthalate	U	3.19	ug/L	3.19	10.6
218-01-9	Chrysene	U	0.319	ug/L	0.319	1.06
84-74-2	Di-n-butylphthalate	U	3.19	ug/L	3.19	10.6
117-84-0	Di-n-octylphthalate	U	3.19	ug/L	3.19	10.6
53-70-3	Dibenzo(a,h)anthracene	U	0.319	ug/L	0.319	1.06
132-64-9	Dibenzofuran	U	3.19	ug/L	3.19	10.6
84-66-2	Diethylphthalate	U	3.19	ug/L	3.19	10.6
131-11-3	Dimethylphthalate	U	3.19	ug/L	3.19	10.6
88-85-7	Dinoseb	U	3.19	ug/L	3.19	10.6
122-39-4	Diphenylamine	U	3.19	ug/L	3.19	10.6
206-44-0	Fluoranthene	U	0.319	ug/L	0.319	1.06
86-73-7	Fluorene	U	0.319	ug/L	0.319	1.06
118-74-1	Hexachlorobenzene	U	3.19	ug/L	3.19	10.6
87-68-3	Hexachlorobutadiene	U	3.19	ug/L	3.19	10.6
77-47-4	Hexachlorocyclopentadiene	U	3.19	ug/L	3.19	10.6
67-72-1	Hexachloroethane	U	3.19	ug/L	3.19	10.6
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.319	ug/L	0.319	1.06
78-59-1	Isophorone	U	3.72	ug/L	3.72	10.6
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.19	ug/L	3.19	10.6
924-16-3	N-Nitrosodi-n-butylamine	U	3.19	ug/L	3.19	10.6
55-18-5	N-Nitrosodiethylamine	U	3.19	ug/L	3.19	10.6
621-64-7	N-Nitrosodi--n-propylamine	U	3.19	ug/L	3.19	10.6
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.19	ug/L	3.19	10.6
91-20-3	Naphthalene	U	0.319	ug/L	0.319	1.06
98-95-3	Nitrobenzene	U	3.19	ug/L	3.19	10.6
608-93-5	Pentachlorobenzene	U	3.19	ug/L	3.19	10.6
87-86-5	Pentachlorophenol	U	3.19	ug/L	3.19	10.6
85-01-8	Phenanthrene	U	0.319	ug/L	0.319	1.06
108-95-2	Phenol	U	3.19	ug/L	3.19	10.6
129-00-0	Pyrene	U	0.319	ug/L	0.319	1.06
110-86-1	Pyridine	U	3.19	ug/L	3.19	10.6
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.19	ug/L	3.19	10.6
111-91-1	bis(2-Chloroethoxy)methane	U	3.19	ug/L	3.19	10.6
111-44-4	bis(2-Chloroethyl) ether	U	3.19	ug/L	3.19	10.6
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.19	ug/L	3.19	10.6

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

Page 3 of 3

SDG Number: 2018-539

Lab Sample ID: 435718004

Date Collected: 10/19/2017 13:41

Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147626

Batch ID: 1712677

Run Date: 10/27/2017 18:03

Prep Date: 10/26/2017 17:40

Data File: s102717a.B\s1j2723.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD1.I

Analyst: JLD1

Aliquot: 940 mL

Column: 25x.20x.33

Project: ESHL00114

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.94	ug/L	3.94	10.6
99-09-2	3-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol	U	3.19	ug/L	3.19	10.6
88-74-4	2-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	69.0	106	ug/L	65	(32%-124%)
2-Fluorobiphenyl	40.7	53.2	ug/L	77	(32%-112%)
2-Fluorophenol	48.6	106	ug/L	46	(15%-88%)
Nitrobenzene-d5	42.5	53.2	ug/L	80	(36%-115%)
Phenol-d5	32.7	106	ug/L	31	(15%-91%)
p-Terphenyl-d14	40.3	53.2	ug/L	76	(36%-121%)

Tentatively Identified Compound Summary

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

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

Page 1 of 3

SDG Number: 2018-539
Lab Sample ID: 435718006

Date Collected: 10/19/2017 13:10
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD1.I
Analyst: JLD1
Aliquot: 940 mL
Column: 25x.20x.33

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

Client ID: CAPA-18-147579
Batch ID: 1712677
Run Date: 10/27/2017 18:34
Prep Date: 10/26/2017 17:40
Data File: s102717a.B\s1j2724.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.19	ug/L	3.19	10.6
120-82-1	1,2,4-Trichlorobenzene	U	3.19	ug/L	3.19	10.6
95-50-1	1,2-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
122-66-7	Azobenzene	U	3.19	ug/L	3.19	10.6
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
106-46-7	1,4-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
123-91-1	1,4-Dioxane	U	3.19	ug/L	3.19	10.6
90-12-0	1-Methylnaphthalene	U	0.319	ug/L	0.319	1.06
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.19	ug/L	3.19	10.6
95-95-4	2,4,5-Trichlorophenol	U	3.19	ug/L	3.19	10.6
88-06-2	2,4,6-Trichlorophenol	U	3.19	ug/L	3.19	10.6
120-83-2	2,4-Dichlorophenol	U	3.19	ug/L	3.19	10.6
105-67-9	2,4-Dimethylphenol	U	3.19	ug/L	3.19	10.6
51-28-5	2,4-Dinitrophenol	U	5.32	ug/L	5.32	21.3
121-14-2	2,4-Dinitrotoluene	U	3.19	ug/L	3.19	10.6
606-20-2	2,6-Dinitrotoluene	U	3.19	ug/L	3.19	10.6
91-58-7	2-Chloronaphthalene	U	0.436	ug/L	0.436	1.06
95-57-8	2-Chlorophenol	U	3.19	ug/L	3.19	10.6
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.19	ug/L	3.19	10.6
91-57-6	2-Methylnaphthalene	U	0.319	ug/L	0.319	1.06
88-75-5	2-Nitrophenol	U	3.19	ug/L	3.19	10.6
91-94-1	3,3'-Dichlorobenzidine	U	3.19	ug/L	3.19	10.6
101-55-3	4-Bromophenylphenylether	U	3.19	ug/L	3.19	10.6
59-50-7	Parachlorometa cresol	U	3.19	ug/L	3.19	10.6
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.51	ug/L	3.51	10.6
7005-72-3	4-Chlorophenylphenylether	U	3.19	ug/L	3.19	10.6
100-02-7	4-Nitrophenol	U	3.19	ug/L	3.19	10.6
83-32-9	Acenaphthene	U	0.319	ug/L	0.319	1.06
208-96-8	Acenaphthylene	U	0.319	ug/L	0.319	1.06
62-53-3	Aniline	U	4.47	ug/L	4.47	10.6
120-12-7	Anthracene	U	0.319	ug/L	0.319	1.06
1912-24-9	Atrazine	U	3.19	ug/L	3.19	10.6
92-87-5	Benzidine	U	4.15	ug/L	4.15	10.6
56-55-3	Benzo(a)anthracene	U	0.319	ug/L	0.319	1.06
50-32-8	Benzo(a)pyrene	U	0.319	ug/L	0.319	1.06
205-99-2	Benzo(b)fluoranthene	U	0.319	ug/L	0.319	1.06
191-24-2	Benzo(ghi)perylene	U	0.319	ug/L	0.319	1.06

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

SDG Number: 2018-539
Lab Sample ID: 435718006

Date Collected: 10/19/2017 13:10
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD1.I
Analyst: JLD1
Aliquot: 940 mL
Column: 25x.20x.33

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

Client ID: CAPA-18-147579
Batch ID: 1712677
Run Date: 10/27/2017 18:34
Prep Date: 10/26/2017 17:40
Data File: s102717a.B\s1j2724.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.319	ug/L	0.319	1.06
65-85-0	Benzoic acid	U	6.38	ug/L	6.38	21.3
100-51-6	Benzyl alcohol	U	3.19	ug/L	3.19	10.6
85-68-7	Butylbenzylphthalate	U	3.19	ug/L	3.19	10.6
218-01-9	Chrysene	U	0.319	ug/L	0.319	1.06
84-74-2	Di-n-butylphthalate	U	3.19	ug/L	3.19	10.6
117-84-0	Di-n-octylphthalate	U	3.19	ug/L	3.19	10.6
53-70-3	Dibenzo(a,h)anthracene	U	0.319	ug/L	0.319	1.06
132-64-9	Dibenzofuran	U	3.19	ug/L	3.19	10.6
84-66-2	Diethylphthalate	U	3.19	ug/L	3.19	10.6
131-11-3	Dimethylphthalate	U	3.19	ug/L	3.19	10.6
88-85-7	Dinoseb	U	3.19	ug/L	3.19	10.6
122-39-4	Diphenylamine	U	3.19	ug/L	3.19	10.6
206-44-0	Fluoranthene	U	0.319	ug/L	0.319	1.06
86-73-7	Fluorene	U	0.319	ug/L	0.319	1.06
118-74-1	Hexachlorobenzene	U	3.19	ug/L	3.19	10.6
87-68-3	Hexachlorobutadiene	U	3.19	ug/L	3.19	10.6
77-47-4	Hexachlorocyclopentadiene	U	3.19	ug/L	3.19	10.6
67-72-1	Hexachloroethane	U	3.19	ug/L	3.19	10.6
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.319	ug/L	0.319	1.06
78-59-1	Isophorone	U	3.72	ug/L	3.72	10.6
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.19	ug/L	3.19	10.6
924-16-3	N-Nitrosodi-n-butylamine	U	3.19	ug/L	3.19	10.6
55-18-5	N-Nitrosodiethylamine	U	3.19	ug/L	3.19	10.6
621-64-7	N-Nitrosodi--n-propylamine	U	3.19	ug/L	3.19	10.6
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.19	ug/L	3.19	10.6
91-20-3	Naphthalene	U	0.319	ug/L	0.319	1.06
98-95-3	Nitrobenzene	U	3.19	ug/L	3.19	10.6
608-93-5	Pentachlorobenzene	U	3.19	ug/L	3.19	10.6
87-86-5	Pentachlorophenol	U	3.19	ug/L	3.19	10.6
85-01-8	Phenanthrene	U	0.319	ug/L	0.319	1.06
108-95-2	Phenol	U	3.19	ug/L	3.19	10.6
129-00-0	Pyrene	U	0.319	ug/L	0.319	1.06
110-86-1	Pyridine	U	3.19	ug/L	3.19	10.6
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.19	ug/L	3.19	10.6
111-91-1	bis(2-Chloroethoxy)methane	U	3.19	ug/L	3.19	10.6
111-44-4	bis(2-Chloroethyl) ether	U	3.19	ug/L	3.19	10.6
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.19	ug/L	3.19	10.6

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

Page 3 of 3

SDG Number: 2018-539
Lab Sample ID: 435718006

Date Collected: 10/19/2017 13:10
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147579

Client: ARSL004

Project: ESHL00114

Batch ID: 1712677

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Run Date: 10/27/2017 18:34

Inst: MSD1.I

Dilution: 1

Prep Date: 10/26/2017 17:40

Analyst: JLD1

Inj. Vol: 1 uL

Data File: s102717a.B\s1j2724.D

Aliquot: 940 mL

Final Volume: 1 mL

Column: 25x.20x.33

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.94	ug/L	3.94	10.6
99-09-2	3-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol	U	3.19	ug/L	3.19	10.6
88-74-4	2-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	74.7	106	ug/L	70 (32%-124%)
2-Fluorobiphenyl	42.6	53.2	ug/L	80 (32%-112%)
2-Fluorophenol	52.4	106	ug/L	49 (15%-88%)
Nitrobenzene-d5	46.7	53.2	ug/L	88 (36%-115%)
Phenol-d5	34.9	106	ug/L	33 (15%-91%)
p-Terphenyl-d14	43.0	53.2	ug/L	81 (36%-121%)

Tentatively Identified Compound Summary

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

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

Page 1 of 3

SDG Number: 2018-539
Lab Sample ID: 435718009

Date Collected: 10/19/2017 09:51
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD1.I
Analyst: JLD1
Aliquot: 980 mL
Column: 25x.20x.33

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

Client ID: CAPA-18-147651
Batch ID: 1712677
Run Date: 10/27/2017 19:05
Prep Date: 10/26/2017 17:40
Data File: s102717a.B\s1j2725.D

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

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

SDG Number: 2018-539

Lab Sample ID: 435718009

Date Collected: 10/19/2017 09:51

Date Received: 10/21/2017 08:45

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1712677

Inst: MSD1.I

Dilution: 1

Run Date: 10/27/2017 19:05

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/26/2017 17:40

Aliquot: 980 mL

Final Volume: 1 mL

Data File: s102717a.B\s1j2725.D

Column: 25x.20x.33

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

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

Page 3 of 3

SDG Number: 2018-539
Lab Sample ID: 435718009

Date Collected: 10/19/2017 09:51
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147651

Client: ARSL004

Project: ESHL00114

Batch ID: 1712677

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Run Date: 10/27/2017 19:05

Inst: MSD1.I

Dilution: 1

Prep Date: 10/26/2017 17:40

Analyst: JLD1

Inj. Vol: 1 uL

Data File: s102717a.B\s1j2725.D

Aliquot: 980 mL

Final Volume: 1 mL

Column: 25x.20x.33

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	73.7	102	ug/L	72 (32%-124%)
2-Fluorobiphenyl	43.0	51.0	ug/L	84 (32%-112%)
2-Fluorophenol	49.1	102	ug/L	48 (15%-88%)
Nitrobenzene-d5	45.1	51.0	ug/L	88 (36%-115%)
Phenol-d5	32.4	102	ug/L	32 (15%-91%)
p-Terphenyl-d14	44.0	51.0	ug/L	86 (36%-121%)

Tentatively Identified Compound Summary

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

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

Page 1 of 3

SDG Number: 2018-539
Lab Sample ID: 435718012

Date Collected: 10/19/2017 10:55
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD1.I
Analyst: JLD1
Aliquot: 940 mL
Column: 25x.20x.33

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

Client ID: CAPA-18-147585
Batch ID: 1712677
Run Date: 10/27/2017 19:36
Prep Date: 10/26/2017 17:40
Data File: s102717a.B\s1j2726.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.19	ug/L	3.19	10.6
120-82-1	1,2,4-Trichlorobenzene	U	3.19	ug/L	3.19	10.6
95-50-1	1,2-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
122-66-7	Azobenzene	U	3.19	ug/L	3.19	10.6
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
106-46-7	1,4-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
123-91-1	1,4-Dioxane	U	3.19	ug/L	3.19	10.6
90-12-0	1-Methylnaphthalene	U	0.319	ug/L	0.319	1.06
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.19	ug/L	3.19	10.6
95-95-4	2,4,5-Trichlorophenol	U	3.19	ug/L	3.19	10.6
88-06-2	2,4,6-Trichlorophenol	U	3.19	ug/L	3.19	10.6
120-83-2	2,4-Dichlorophenol	U	3.19	ug/L	3.19	10.6
105-67-9	2,4-Dimethylphenol	U	3.19	ug/L	3.19	10.6
51-28-5	2,4-Dinitrophenol	U	5.32	ug/L	5.32	21.3
121-14-2	2,4-Dinitrotoluene	U	3.19	ug/L	3.19	10.6
606-20-2	2,6-Dinitrotoluene	U	3.19	ug/L	3.19	10.6
91-58-7	2-Chloronaphthalene	U	0.436	ug/L	0.436	1.06
95-57-8	2-Chlorophenol	U	3.19	ug/L	3.19	10.6
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.19	ug/L	3.19	10.6
91-57-6	2-Methylnaphthalene	U	0.319	ug/L	0.319	1.06
88-75-5	2-Nitrophenol	U	3.19	ug/L	3.19	10.6
91-94-1	3,3'-Dichlorobenzidine	U	3.19	ug/L	3.19	10.6
101-55-3	4-Bromophenylphenylether	U	3.19	ug/L	3.19	10.6
59-50-7	Parachlorometa cresol	U	3.19	ug/L	3.19	10.6
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.51	ug/L	3.51	10.6
7005-72-3	4-Chlorophenylphenylether	U	3.19	ug/L	3.19	10.6
100-02-7	4-Nitrophenol	U	3.19	ug/L	3.19	10.6
83-32-9	Acenaphthene	U	0.319	ug/L	0.319	1.06
208-96-8	Acenaphthylene	U	0.319	ug/L	0.319	1.06
62-53-3	Aniline	U	4.47	ug/L	4.47	10.6
120-12-7	Anthracene	U	0.319	ug/L	0.319	1.06
1912-24-9	Atrazine	U	3.19	ug/L	3.19	10.6
92-87-5	Benzidine	U	4.15	ug/L	4.15	10.6
56-55-3	Benzo(a)anthracene	U	0.319	ug/L	0.319	1.06
50-32-8	Benzo(a)pyrene	U	0.319	ug/L	0.319	1.06
205-99-2	Benzo(b)fluoranthene	U	0.319	ug/L	0.319	1.06
191-24-2	Benzo(ghi)perylene	U	0.319	ug/L	0.319	1.06

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

SDG Number: 2018-539
Lab Sample ID: 435718012

Date Collected: 10/19/2017 10:55
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD1.I
Analyst: JLD1
Aliquot: 940 mL
Column: 25x.20x.33

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

Client ID: CAPA-18-147585
Batch ID: 1712677
Run Date: 10/27/2017 19:36
Prep Date: 10/26/2017 17:40
Data File: s102717a.B\s1j2726.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.319	ug/L	0.319	1.06
65-85-0	Benzoic acid	U	6.38	ug/L	6.38	21.3
100-51-6	Benzyl alcohol	U	3.19	ug/L	3.19	10.6
85-68-7	Butylbenzylphthalate	U	3.19	ug/L	3.19	10.6
218-01-9	Chrysene	U	0.319	ug/L	0.319	1.06
84-74-2	Di-n-butylphthalate	U	3.19	ug/L	3.19	10.6
117-84-0	Di-n-octylphthalate	U	3.19	ug/L	3.19	10.6
53-70-3	Dibenzo(a,h)anthracene	U	0.319	ug/L	0.319	1.06
132-64-9	Dibenzofuran	U	3.19	ug/L	3.19	10.6
84-66-2	Diethylphthalate	U	3.19	ug/L	3.19	10.6
131-11-3	Dimethylphthalate	U	3.19	ug/L	3.19	10.6
88-85-7	Dinoseb	U	3.19	ug/L	3.19	10.6
122-39-4	Diphenylamine	U	3.19	ug/L	3.19	10.6
206-44-0	Fluoranthene	U	0.319	ug/L	0.319	1.06
86-73-7	Fluorene	U	0.319	ug/L	0.319	1.06
118-74-1	Hexachlorobenzene	U	3.19	ug/L	3.19	10.6
87-68-3	Hexachlorobutadiene	U	3.19	ug/L	3.19	10.6
77-47-4	Hexachlorocyclopentadiene	U	3.19	ug/L	3.19	10.6
67-72-1	Hexachloroethane	U	3.19	ug/L	3.19	10.6
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.319	ug/L	0.319	1.06
78-59-1	Isophorone	U	3.72	ug/L	3.72	10.6
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.19	ug/L	3.19	10.6
924-16-3	N-Nitrosodi-n-butylamine	U	3.19	ug/L	3.19	10.6
55-18-5	N-Nitrosodiethylamine	U	3.19	ug/L	3.19	10.6
621-64-7	N-Nitrosodi--n-propylamine	U	3.19	ug/L	3.19	10.6
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.19	ug/L	3.19	10.6
91-20-3	Naphthalene	U	0.319	ug/L	0.319	1.06
98-95-3	Nitrobenzene	U	3.19	ug/L	3.19	10.6
608-93-5	Pentachlorobenzene	U	3.19	ug/L	3.19	10.6
87-86-5	Pentachlorophenol	U	3.19	ug/L	3.19	10.6
85-01-8	Phenanthrene	U	0.319	ug/L	0.319	1.06
108-95-2	Phenol	U	3.19	ug/L	3.19	10.6
129-00-0	Pyrene	U	0.319	ug/L	0.319	1.06
110-86-1	Pyridine	U	3.19	ug/L	3.19	10.6
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.19	ug/L	3.19	10.6
111-91-1	bis(2-Chloroethoxy)methane	U	3.19	ug/L	3.19	10.6
111-44-4	bis(2-Chloroethyl) ether	U	3.19	ug/L	3.19	10.6
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.19	ug/L	3.19	10.6

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

Page 3 of 3

SDG Number: 2018-539
Lab Sample ID: 435718012

Date Collected: 10/19/2017 10:55
Date Received: 10/21/2017 08:45

Matrix: W

Client ID: CAPA-18-147585

Client: ARSL004

Project: ESHL00114

Batch ID: 1712677

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Run Date: 10/27/2017 19:36

Inst: MSD1.I

Dilution: 1

Prep Date: 10/26/2017 17:40

Analyst: JLD1

Inj. Vol: 1 uL

Data File: s102717a.B\s1j2726.D

Aliquot: 940 mL

Final Volume: 1 mL

Column: 25x.20x.33

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.94	ug/L	3.94	10.6
99-09-2	3-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol	U	3.19	ug/L	3.19	10.6
88-74-4	2-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	75.8	106	ug/L	71 (32%-124%)
2-Fluorobiphenyl	44.1	53.2	ug/L	83 (32%-112%)
2-Fluorophenol	52.9	106	ug/L	50 (15%-88%)
Nitrobenzene-d5	47.4	53.2	ug/L	89 (36%-115%)
Phenol-d5	34.8	106	ug/L	33 (15%-91%)
p-Terphenyl-d14	45.0	53.2	ug/L	85 (36%-121%)

Tentatively Identified Compound Summary

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

Quality Control Summary

Semi-Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-539**Matrix Type: LIQUID**

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203904116	MB for batch 1712676	60	40	104	93	79	97
1203904117	LCS for batch 1712676	60	39	94	84	81	96
1203904118	WST15-17-148254MS	44	31	83	75	75	80
1203904119	WST15-17-148254MSD	47	33	88	78	79	86
435718002	CAPA-18-147575	42	29	77	73	70	76
435718004	CAPA-18-147626	46	31	80	77	65	76
435718006	CAPA-18-147579	49	33	88	80	70	81
435718009	CAPA-18-147651	48	32	88	84	72	86
435718012	CAPA-18-147585	50	33	89	83	71	85

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: 2018-539

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712676

Matrix: WATER

Lab Sample ID 1203904117

Instrument: MSD1.I

Analysis Date: 10/27/2017 15:29

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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-nitrosomethylam	50.0	0.0	32.7	65	30-88
110-86-1	LCS Pyridine	50.0	0.0	29.5	59	27-89
62-53-3	LCS Aniline	50.0	0.0	44.0	88	49-112
108-95-2	LCS Phenol	50.0	0.0	21.0	42	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	50.7	101	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	42.2	84	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	37.0	74	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	36.9	74	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	38.2	76	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)et	50.0	0.0	61.6	123	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	42.7	85	44-102
95-48-7	LCS o-Cresol	50.0	0.0	42.4	85	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	41.6	83	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	46.1	92	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	35.2	70	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	50.0	100	53-115
78-59-1	LCS Isophorone	50.0	0.0	45.7	91	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	46.1	92	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	37.6	75	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	48.2	96	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	43.7	87	53-109
65-85-0	LCS Benzoic acid	100	0.0	46.7	47	21-74

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-539

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712676

Matrix: WATER

Lab Sample ID 1203904117

Instrument: MSD1.I

Analysis Date: 10/27/2017 15:29

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	48.3	97	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	32.0	64	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	46.3	93	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	40.3	81	42-103
91-20-3	LCS Naphthalene	50.0	0.0	40.7	81	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	41.8	84	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	28.9	58	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	43.7	87	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	42.0	84	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	39.1	78	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	51.4	103	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	52.2	104	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	47.5	95	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	47.0	94	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	45.4	91	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	44.8	90	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	45.0	90	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	46.4	93	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	44.0	88	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	44.8	90	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	45.6	91	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	17.0	34	15-137

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-539

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712676

Matrix: WATER

Lab Sample ID 1203904117

Instrument: MSD1.I

Analysis Date: 10/27/2017 15:29

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	LCS Fluorene	50.0	0.0	41.9	84	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	42.3	85	52-121
100-01-6	LCS 4-Nitroaniline <i>p-Nitroaniline</i>	50.0	0.0	43.0	86	44-137
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	51.6	103	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	40.9	82	55-113
122-66-7	LCS Azobenzene <i>1,2-Diphenylhydrazine</i>	50.0	0.0	51.2	102	53-115
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	45.5	91	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	43.4	87	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	50.7	101	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	43.7	87	55-110
120-12-7	LCS Anthracene	50.0	0.0	42.8	86	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	47.5	95	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	47.4	95	54-118
129-00-0	LCS Pyrene	50.0	0.0	47.9	96	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	48.8	98	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	42.0	84	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	46.3	93	57-112
218-01-9	LCS Chrysene	50.0	0.0	45.1	90	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	37.6	75	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	46.2	92	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	46.3	93	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	44.3	89	40-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-539

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712676

Matrix: WATER

Lab Sample ID 1203904117

Instrument: MSD1.I

Analysis Date: 10/27/2017 15:29

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	47.2	94	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	44.6	89	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	50.6	101	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	32.9	66	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	46.2	92	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	40.2	80	44-102
1912-24-9	LCS Atrazine	50.0	0.0	48.0	96	60-131
92-87-5	LCS Benzidine	100	0.0	46.7	47	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	48.0	96	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	37.8	76	39-99

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-539

Sample Type: Matrix Spike

Client ID: WST15-17-148254MS

Matrix: W

Lab Sample ID 1203904118

Instrument: MSD1.I

Analysis Date: 10/27/2017 16:31

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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-nitrosomethylam	100	0.00 U	57.3	57	25-106
110-86-1	MS Pyridine	100	0.00 U	59.3	59	24-93
62-53-3	MS Aniline	100	0.00 U	84.8	85	37-113
108-95-2	MS Phenol	100	0.00 U	33.0	33	23-82
111-44-4	MS bis(2-Chloroethyl) ether	100	0.00 U	89.5	89	39-114
95-57-8	MS 2-Chlorophenol	100	0.00 U	74.1	74	37-108
541-73-1	MS 1,3-Dichlorobenzene	100	0.00 U	62.3	62	27-97
106-46-7	MS 1,4-Dichlorobenzene	100	0.00 U	62.1	62	28-97
95-50-1	MS 1,2-Dichlorobenzene	100	0.00 U	64.8	65	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)et	100	0.00 U	108	108	32-127
100-51-6	MS Benzyl alcohol	100	0.00 U	75.5	75	37-116
95-48-7	MS o-Cresol	100	0.00 U	73.1	73	34-109
65794-96-9	MS m,p-Cresols	100	0.00 U	71.4	71	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	100	0.00 U	84.6	85	42-118
67-72-1	MS Hexachloroethane	100	0.00 U	60.1	60	29-94
98-95-3	MS Nitrobenzene	100	0.00 U	88.3	88	38-123
78-59-1	MS Isophorone	100	0.00 U	83.9	84	43-120
88-75-5	MS 2-Nitrophenol	100	0.00 U	82.9	83	39-115
105-67-9	MS 2,4-Dimethylphenol	100	0.00 U	69.0	69	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	100	0.00 U	89.2	89	42-118
120-83-2	MS 2,4-Dichlorophenol	100	0.00 U	79.0	79	40-111
65-85-0	MS Benzoic acid	200	0.00 U	85.3	43	17-95

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-539

Sample Type: Matrix Spike

Client ID: WST15-17-148254MS

Matrix: W

Lab Sample ID 1203904118

Instrument: MSD1.I

Analysis Date: 10/27/2017 16:31

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	100	0.00 U	93.9	94	44-138
87-68-3	MS Hexachlorobutadiene	100	0.00 U	54.6	55	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	100	0.00 U	86.5	87	41-122
91-57-6	MS 2-Methylnaphthalene	100	0.00 U	68.5	69	29-109
91-20-3	MS Naphthalene	100	0.00 U	69.7	70	31-108
90-12-0	MS 1-Methylnaphthalene	100	0.00 U	69.7	70	33-112
77-47-4	MS Hexachlorocyclopentadiene	100	0.00 U	50.0	50	26-79
88-06-2	MS 2,4,6-Trichlorophenol	100	0.00 U	80.3	80	39-124
95-95-4	MS 2,4,5-Trichlorophenol	100	0.00 U	80.7	81	42-120
91-58-7	MS 2-Chloronaphthalene	100	0.00 U	67.2	67	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	100	0.00 U	97.9	98	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	100	0.00 U	102	102	42-144
131-11-3	MS Dimethylphthalate	100	0.00 U	89.3	89	45-128
606-20-2	MS 2,6-Dinitrotoluene	100	0.00 U	87.4	87	46-124
121-14-2	MS 2,4-Dinitrotoluene	100	0.00 U	84.9	85	45-125
208-96-8	MS Acenaphthylene	100	0.00 U	80.2	80	35-120
83-32-9	MS Acenaphthene	100	0.00 U	80.1	80	35-117
51-28-5	MS 2,4-Dinitrophenol	100	0.00 U	93.1	93	27-122
132-64-9	MS Dibenzofuran	100	0.00 U	79.1	79	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	100	0.00 U	86.8	87	40-128
84-66-2	MS Diethylphthalate	100	0.00 U	85.1	85	43-127
100-02-7	MS 4-Nitrophenol	100	0.00 U	27.6	28	17-85

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 8

SDG Number: 2018-539

Sample Type: Matrix Spike

Client ID: WST15-17-148254MS

Matrix: W

Lab Sample ID 1203904118

Instrument: MSD1.I

Analysis Date: 10/27/2017 16:31

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS	Fluorene	100	0.00	U	78.8	79	39-117
7005-72-3	MS	4-Chlorophenylphenylether	100	0.00	U	78.3	78	39-121
100-01-6	MS	4-Nitroaniline <i>p-Nitroaniline</i>	100	0.00	U	82.0	82	30-133
534-52-1	MS	2-Methyl-4,6-dinitrophenol	100	0.00	U	96.4	96	32-126
122-39-4	MS	Diphenylamine	100	0.00	U	74.4	74	37-118
122-66-7	MS	Azobenzene <i>1,2-Diphenylhydrazine</i>	100	0.00	U	93.6	94	38-120
101-55-3	MS	4-Bromophenylphenylether	100	0.00	U	83.0	83	39-121
118-74-1	MS	Hexachlorobenzene	100	0.00	U	81.4	81	40-118
87-86-5	MS	Pentachlorophenol	100	0.00	U	95.1	95	35-121
85-01-8	MS	Phenanthrene	100	0.00	U	80.5	81	40-115
120-12-7	MS	Anthracene	100	0.00	U	79.1	79	38-120
84-74-2	MS	Di-n-butylphthalate	100	0.00	U	88.3	88	41-128
206-44-0	MS	Fluoranthene	100	0.00	U	88.8	89	41-119
129-00-0	MS	Pyrene	100	0.00	U	86.4	86	35-128
85-68-7	MS	Butylbenzylphthalate	100	0.00	U	87.6	88	40-129
117-81-7	MS	bis(2-Ethylhexyl)phthalate	100	0.00	U	76.4	76	38-131
56-55-3	MS	Benzo(a)anthracene	100	0.00	U	85.4	85	39-120
218-01-9	MS	Chrysene	100	0.00	U	82.1	82	41-124
117-84-0	MS	Di-n-octylphthalate	100	0.00	U	69.2	69	37-134
205-99-2	MS	Benzo(b)fluoranthene	100	0.00	U	87.6	88	31-122
207-08-9	MS	Benzo(k)fluoranthene	100	0.00	U	87.6	88	33-123
50-32-8	MS	Benzo(a)pyrene	100	0.00	U	83.4	83	32-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 8

SDG Number: 2018-539

Sample Type: Matrix Spike

Client ID: WST15-17-148254MS

Matrix: W

Lab Sample ID 1203904118

Instrument: MSD1.I

Analysis Date: 10/27/2017 16:31

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	100	0.00 U	82.9	83	27-121
53-70-3	MS Dibenzo(a,h)anthracene	100	0.00 U	77.7	78	30-125
191-24-2	MS Benzo(ghi)perylene	100	0.00 U	88.0	88	24-126
123-91-1	MS 1,4-Dioxane	100	0.00 U	58.6	59	24-110
930-55-2	MS N-Nitrosopyrrolidine	100	0.00 U	85.1	85	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	100	0.00 U	67.5	68	32-101
1912-24-9	MS Atrazine	100	0.00 U	86.9	87	42-129
92-87-5	MS Benzidine	200	0.00 U	76.6	38	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	100	0.00 U	85.3	85	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	100	0.00 U	64.1	64	26-102

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 5 of 8

SDG Number: 2018-539

Sample Type: Matrix Spike Duplicate

Client ID: WST15-17-148254MSD

Matrix: W

Lab Sample ID 1203904119

Instrument: MSD1.I

Analysis Date: 10/27/2017 17:02

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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-nitrosomethylam	100	0.00	U	60.8	61	25-106	6	0-30
110-86-1	MSD Pyridine	100	0.00	U	64.1	64	24-93	8	0-30
62-53-3	MSD Aniline	100	0.00	U	87.6	88	37-113	3	0-30
108-95-2	MSD Phenol	100	0.00	U	35.2	35	23-82	6	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	100	0.00	U	96.5	97	39-114	8	0-30
95-57-8	MSD 2-Chlorophenol	100	0.00	U	79.4	79	37-108	7	0-30
541-73-1	MSD 1,3-Dichlorobenzene	100	0.00	U	67.5	68	27-97	8	0-30
106-46-7	MSD 1,4-Dichlorobenzene	100	0.00	U	66.0	66	28-97	6	0-30
95-50-1	MSD 1,2-Dichlorobenzene	100	0.00	U	69.8	70	28-99	7	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)et	100	0.00	U	117	117	32-127	8	0-30
100-51-6	MSD Benzyl alcohol	100	0.00	U	80.0	80	37-116	6	0-30
95-48-7	MSD o-Cresol	100	0.00	U	76.8	77	34-109	5	0-30
65794-96-9	MSD m,p-Cresols	100	0.00	U	76.8	77	36-120	7	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	100	0.00	U	89.0	89	42-118	5	0-30
67-72-1	MSD Hexachloroethane	100	0.00	U	65.5	65	29-94	8	0-30
98-95-3	MSD Nitrobenzene	100	0.00	U	93.1	93	38-123	5	0-30
78-59-1	MSD Isophorone	100	0.00	U	88.7	89	43-120	6	0-30
88-75-5	MSD 2-Nitrophenol	100	0.00	U	89.4	89	39-115	7	0-30
105-67-9	MSD 2,4-Dimethylphenol	100	0.00	U	73.2	73	39-107	6	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	100	0.00	U	93.0	93	42-118	4	0-30
120-83-2	MSD 2,4-Dichlorophenol	100	0.00	U	83.8	84	40-111	6	0-30
65-85-0	MSD Benzoic acid	200	0.00	U	89.0	45	17-95	4	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 6 of 8

SDG Number: 2018-539

Sample Type: Matrix Spike Duplicate

Client ID: WST15-17-148254MSD

Matrix: W

Lab Sample ID 1203904119

Instrument: MSD1.I

Analysis Date: 10/27/2017 17:02

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	100	0.00 U	96.7	97	44-138	3	0-30
87-68-3	MSD Hexachlorobutadiene	100	0.00 U	57.3	57	26-98	5	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	100	0.00 U	90.9	91	41-122	5	0-30
91-57-6	MSD 2-Methylnaphthalene	100	0.00 U	71.9	72	29-109	5	0-30
91-20-3	MSD Naphthalene	100	0.00 U	73.2	73	31-108	5	0-30
90-12-0	MSD 1-Methylnaphthalene	100	0.00 U	72.9	73	33-112	5	0-30
77-47-4	MSD Hexachlorocyclopentadiene	100	0.00 U	54.0	54	26-79	8	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	100	0.00 U	84.7	85	39-124	5	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	100	0.00 U	87.3	87	42-120	8	0-30
91-58-7	MSD 2-Chloronaphthalene	100	0.00 U	71.0	71	29-113	5	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	100	0.00 U	104	104	41-121	6	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	100	0.00 U	107	107	42-144	4	0-30
131-11-3	MSD Dimethylphthalate	100	0.00 U	92.6	93	45-128	4	0-30
606-20-2	MSD 2,6-Dinitrotoluene	100	0.00 U	91.9	92	46-124	5	0-30
121-14-2	MSD 2,4-Dinitrotoluene	100	0.00 U	91.1	91	45-125	7	0-30
208-96-8	MSD Acenaphthylene	100	0.00 U	83.2	83	35-120	4	0-30
83-32-9	MSD Acenaphthene	100	0.00 U	84.9	85	35-117	6	0-30
51-28-5	MSD 2,4-Dinitrophenol	100	0.00 U	97.3	97	27-122	4	0-30
132-64-9	MSD Dibenzofuran	100	0.00 U	83.4	83	38-113	5	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	100	0.00 U	90.4	90	40-128	4	0-30
84-66-2	MSD Diethylphthalate	100	0.00 U	90.2	90	43-127	6	0-30
100-02-7	MSD 4-Nitrophenol	100	0.00 U	29.4	29	17-85	6	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 7 of 8

SDG Number: 2018-539

Sample Type: Matrix Spike Duplicate

Client ID: WST15-17-148254MSD

Matrix: W

Lab Sample ID 1203904119

Instrument: MSD1.I

Analysis Date: 10/27/2017 17:02

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	100	0.00 U	81.0	81	39-117	3	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	100	0.00 U	82.8	83	39-121	6	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	100	0.00 U	85.8	86	30-133	5	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	100	0.00 U	104	104	32-126	7	0-30
122-39-4	MSD Diphenylamine	100	0.00 U	79.7	80	37-118	7	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	100	0.00 U	99.5	100	38-120	6	0-30
101-55-3	MSD 4-Bromophenylphenylether	100	0.00 U	89.1	89	39-121	7	0-30
118-74-1	MSD Hexachlorobenzene	100	0.00 U	88.1	88	40-118	8	0-30
87-86-5	MSD Pentachlorophenol	100	0.00 U	102	102	35-121	7	0-30
85-01-8	MSD Phenanthrene	100	0.00 U	86.5	87	40-115	7	0-30
120-12-7	MSD Anthracene	100	0.00 U	84.8	85	38-120	7	0-30
84-74-2	MSD Di-n-butylphthalate	100	0.00 U	95.5	95	41-128	8	0-30
206-44-0	MSD Fluoranthene	100	0.00 U	95.6	96	41-119	7	0-30
129-00-0	MSD Pyrene	100	0.00 U	92.8	93	35-128	7	0-30
85-68-7	MSD Butylbenzylphthalate	100	0.00 U	97.1	97	40-129	10	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	100	0.00 U	83.5	84	38-131	9	0-30
56-55-3	MSD Benzo(a)anthracene	100	0.00 U	92.7	93	39-120	8	0-30
218-01-9	MSD Chrysene	100	0.00 U	89.0	89	41-124	8	0-30
117-84-0	MSD Di-n-octylphthalate	100	0.00 U	77.9	78	37-134	12	0-30
205-99-2	MSD Benzo(b)fluoranthene	100	0.00 U	94.1	94	31-122	7	0-30
207-08-9	MSD Benzo(k)fluoranthene	100	0.00 U	91.3	91	33-123	4	0-30
50-32-8	MSD Benzo(a)pyrene	100	0.00 U	89.0	89	32-118	6	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 8 of 8

SDG Number: 2018-539

Sample Type: Matrix Spike Duplicate

Client ID: WST15-17-148254MSD

Matrix: W

Lab Sample ID 1203904119

Instrument: MSD1.I

Analysis Date: 10/27/2017 17:02

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	100	0.00	U 90.0	90	27-121	8	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	100	0.00	U 84.6	85	30-125	9	0-30
191-24-2	MSD Benzo(ghi)perylene	100	0.00	U 93.5	93	24-126	6	0-30
123-91-1	MSD 1,4-Dioxane	100	0.00	U 62.7	63	24-110	7	0-30
930-55-2	MSD N-Nitrosopyrrolidine	100	0.00	U 88.9	89	47-119	4	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	100	0.00	U 72.3	72	32-101	7	0-30
1912-24-9	MSD Atrazine	100	0.00	U 94.3	94	42-129	8	0-30
92-87-5	MSD Benzidine	200	0.00	U 98.9	49	15-130	25	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	100	0.00	U 95.5	96	34-124	11	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	100	0.00	U 67.9	68	26-102	6	0-30

Method Blank Summary

Page 1 of 1

SDG Number:	2018-539	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1712676	Instrument ID:	MSD1.I	Data File:	s102717a.B\s1j2717.D
Lab Sample ID:	1203904116	Prep Date:	10/26/2017 17:40	Analyzed:	10/27/17 14:58
Column:	25x.20x.33				

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 1712676	1203904117	s102717a.B\s1j2718.D	10/27/17	1529
02 WST15-17-148254MS	1203904118	s102717a.B\s1j2720.D	10/27/17	1631
03 WST15-17-148254MSD	1203904119	s102717a.B\s1j2721.D	10/27/17	1702
04 CAPA-18-147575	435718002	s102717a.B\s1j2722.D	10/27/17	1733
05 CAPA-18-147626	435718004	s102717a.B\s1j2723.D	10/27/17	1803
06 CAPA-18-147579	435718006	s102717a.B\s1j2724.D	10/27/17	1834
07 CAPA-18-147651	435718009	s102717a.B\s1j2725.D	10/27/17	1905
08 CAPA-18-147585	435718012	s102717a.B\s1j2726.D	10/27/17	1936

Quality Control Data

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

Page 1 of 3

SDG Number: 2018-539

Lab Sample ID: 1203904116

Client Sample: QC for batch 1712676

Client ID: MB for batch 1712676

Batch ID: 1712677

Run Date: 10/27/2017 14:58

Prep Date: 10/26/2017 17:40

Data File: s102717a.B\s1j2717.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD1.I
Analyst: JLD1
Aliquot: 1000 mL
Column: 25x.20x.33

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

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

Page 2 of 3

SDG Number: 2018-539

Lab Sample ID: 1203904116

Client Sample: QC for batch 1712676

Client ID: MB for batch 1712676

Batch ID: 1712677

Run Date: 10/27/2017 14:58

Prep Date: 10/26/2017 17:40

Data File: s102717a.B\s1j2717.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD1.I
Analyst: JLD1
Aliquot: 1000 mL
Column: 25x.20x.33

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

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

Page 3 of 3

SDG Number: 2018-539	Matrix: WATER	
Lab Sample ID: 1203904116		
Client Sample: QC for batch 1712676	Client: ARSL004	Project: QC
Client ID: MB for batch 1712676	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1712677	Inst: MSD1.I	Dilution: 1
Run Date: 10/27/2017 14:58	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/26/2017 17:40	Aliquot: 1000 mL	Final Volume: 1 mL
Data File: s102717a.B\s1j2717.D	Column: 25x.20x.33	

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	79.2	100	ug/L	79	(32%-124%)
2-Fluorobiphenyl	46.6	50.0	ug/L	93	(32%-112%)
2-Fluorophenol	59.6	100	ug/L	60	(15%-88%)
Nitrobenzene-d5	51.9	50.0	ug/L	104	(36%-115%)
Phenol-d5	39.8	100	ug/L	40	(15%-91%)
p-Terphenyl-d14	48.5	50.0	ug/L	97	(36%-121%)

Tentatively Identified Compound Summary

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

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

Page 1 of 3

SDG Number: 2018-539

Lab Sample ID: 1203904117

Client Sample: QC for batch 1712676

Client ID: LCS for batch 1712676

Batch ID: 1712677

Run Date: 10/27/2017 15:29

Prep Date: 10/26/2017 17:40

Data File: s102717a.B\s1j2718.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD1.I

Analyst: JLD1

Aliquot: 1000 mL

Column: 25x.20x.33

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		40.2	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		37.8	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		38.2	ug/L	3.00	10.0
122-66-7	Azobenzene		51.2	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		37.0	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		36.9	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		32.9	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		41.8	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		44.8	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		42.0	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		43.7	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		43.7	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		37.6	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		46.4	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		45.4	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		47.0	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		39.1	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		42.2	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		51.6	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		40.3	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		46.1	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		48.0	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		45.5	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		46.3	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		48.3	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		42.3	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		17.0	ug/L	3.00	10.0
83-32-9	Acenaphthene		45.0	ug/L	0.300	1.00
208-96-8	Acenaphthylene		44.8	ug/L	0.300	1.00
62-53-3	Aniline		44.0	ug/L	4.20	10.0
120-12-7	Anthracene		42.8	ug/L	0.300	1.00
1912-24-9	Atrazine		48.0	ug/L	3.00	10.0
92-87-5	Benzidine		46.7	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		46.3	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		44.3	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		46.2	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		50.6	ug/L	0.300	1.00

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

SDG Number: 2018-539

Matrix: WATER

Lab Sample ID: 1203904117

Client Sample: QC for batch 1712676

Client: ARSL004

Project: QC

Client ID: LCS for batch 1712676

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1712677

Inst: MSD1.I

Dilution: 1

Run Date: 10/27/2017 15:29

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/26/2017 17:40

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: s102717a.B\s1j2718.D

Column: 25x.20x.33

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		46.3	ug/L	0.300	1.00
65-85-0	Benzoic acid		46.7	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		42.7	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		48.8	ug/L	3.00	10.0
218-01-9	Chrysene		45.1	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		47.5	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		37.6	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		44.6	ug/L	0.300	1.00
132-64-9	Dibenzofuran		44.0	ug/L	3.00	10.0
84-66-2	Diethylphthalate		45.6	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		47.5	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		40.9	ug/L	3.00	10.0
206-44-0	Fluoranthene		47.4	ug/L	0.300	1.00
86-73-7	Fluorene		41.9	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		43.4	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		32.0	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		28.9	ug/L	3.00	10.0
67-72-1	Hexachloroethane		35.2	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		47.2	ug/L	0.300	1.00
78-59-1	Isophorone		45.7	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		32.7	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		46.1	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		46.2	ug/L	3.00	10.0
91-20-3	Naphthalene		40.7	ug/L	0.300	1.00
98-95-3	Nitrobenzene		50.0	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		50.7	ug/L	3.00	10.0
85-01-8	Phenanthrene		43.7	ug/L	0.300	1.00
108-95-2	Phenol		21.0	ug/L	3.00	10.0
129-00-0	Pyrene		47.9	ug/L	0.300	1.00
110-86-1	Pyridine		29.5	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		61.6	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		48.2	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		50.7	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		42.0	ug/L	3.00	10.0

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

Page 3 of 3

SDG Number: 2018-539	Matrix: WATER
Lab Sample ID: 1203904117	
Client Sample: QC for batch 1712676	Client: ARSL004
Client ID: LCS for batch 1712676	Method: SW846 3510C/8270D
Batch ID: 1712677	Inst: MSD1.I
Run Date: 10/27/2017 15:29	Analyst: JLD1
Prep Date: 10/26/2017 17:40	Aliquot: 1000 mL
Data File: s102717a.B\s1j2718.D	Column: 25x.20x.33
	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		41.6	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		52.2	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		42.4	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		51.4	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		43.0	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	81.4	100	ug/L	81	(32%-124%)
2-Fluorobiphenyl	42.0	50.0	ug/L	84	(32%-112%)
2-Fluorophenol	59.9	100	ug/L	60	(15%-88%)
Nitrobenzene-d5	47.0	50.0	ug/L	94	(36%-115%)
Phenol-d5	39.4	100	ug/L	39	(15%-91%)
p-Terphenyl-d14	47.8	50.0	ug/L	96	(36%-121%)

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

Page 1 of 3

SDG Number: 2018-539
Lab Sample ID: 1203904118
Client Sample: QC for batch 1712676
Client ID: WST15-17-148254MS
Batch ID: 1712677
Run Date: 10/27/2017 16:31
Prep Date: 10/26/2017 17:40
Data File: s102717a.B\s1j2720.D

Date Collected: 10/19/2017 09:20
Date Received: 10/21/2017 08:45
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD1.I
Analyst: JLD1
Aliquot: 500 mL
Column: 25x.20x.33

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		67.5	ug/L	6.00	20.0
120-82-1	1,2,4-Trichlorobenzene		64.1	ug/L	6.00	20.0
95-50-1	1,2-Dichlorobenzene		64.8	ug/L	6.00	20.0
122-66-7	Azobenzene		93.6	ug/L	6.00	20.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		62.3	ug/L	6.00	20.0
106-46-7	1,4-Dichlorobenzene		62.1	ug/L	6.00	20.0
123-91-1	1,4-Dioxane		58.6	ug/L	6.00	20.0
90-12-0	1-Methylnaphthalene		69.7	ug/L	0.600	2.00
58-90-2	2,3,4,6-Tetrachlorophenol		86.8	ug/L	6.00	20.0
95-95-4	2,4,5-Trichlorophenol		80.7	ug/L	6.00	20.0
88-06-2	2,4,6-Trichlorophenol		80.3	ug/L	6.00	20.0
120-83-2	2,4-Dichlorophenol		79.0	ug/L	6.00	20.0
105-67-9	2,4-Dimethylphenol		69.0	ug/L	6.00	20.0
51-28-5	2,4-Dinitrophenol		93.1	ug/L	10.0	40.0
121-14-2	2,4-Dinitrotoluene		84.9	ug/L	6.00	20.0
606-20-2	2,6-Dinitrotoluene		87.4	ug/L	6.00	20.0
91-58-7	2-Chloronaphthalene		67.2	ug/L	0.820	2.00
95-57-8	2-Chlorophenol		74.1	ug/L	6.00	20.0
534-52-1	2-Methyl-4,6-dinitrophenol		96.4	ug/L	6.00	20.0
91-57-6	2-Methylnaphthalene		68.5	ug/L	0.600	2.00
88-75-5	2-Nitrophenol		82.9	ug/L	6.00	20.0
91-94-1	3,3'-Dichlorobenzidine		85.3	ug/L	6.00	20.0
101-55-3	4-Bromophenylphenylether		83.0	ug/L	6.00	20.0
59-50-7	Parachlorometa cresol		86.5	ug/L	6.00	20.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		93.9	ug/L	6.60	20.0
7005-72-3	4-Chlorophenylphenylether		78.3	ug/L	6.00	20.0
100-02-7	4-Nitrophenol		27.6	ug/L	6.00	20.0
83-32-9	Acenaphthene		80.1	ug/L	0.600	2.00
208-96-8	Acenaphthylene		80.2	ug/L	0.600	2.00
62-53-3	Aniline		84.8	ug/L	8.40	20.0
120-12-7	Anthracene		79.1	ug/L	0.600	2.00
1912-24-9	Atrazine		86.9	ug/L	6.00	20.0
92-87-5	Benzidine		76.6	ug/L	7.80	20.0
56-55-3	Benzo(a)anthracene		85.4	ug/L	0.600	2.00
50-32-8	Benzo(a)pyrene		83.4	ug/L	0.600	2.00
205-99-2	Benzo(b)fluoranthene		87.6	ug/L	0.600	2.00
191-24-2	Benzo(ghi)perylene		88.0	ug/L	0.600	2.00

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

SDG Number: 2018-539	Date Collected: 10/19/2017 09:20	Matrix: W
Lab Sample ID: 1203904118	Date Received: 10/21/2017 08:45	
Client Sample: QC for batch 1712676	Client: ARSL004	Project: QC
Client ID: WST15-17-148254MS	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1712677	Inst: MSD1.I	Dilution: 1
Run Date: 10/27/2017 16:31	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/26/2017 17:40	Aliquot: 500 mL	Final Volume: 1 mL
Data File: s102717a.B\s1j2720.D	Column: 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		87.6	ug/L	0.600	2.00
65-85-0	Benzoic acid		85.3	ug/L	12.0	40.0
100-51-6	Benzyl alcohol		75.5	ug/L	6.00	20.0
85-68-7	Butylbenzylphthalate		87.6	ug/L	6.00	20.0
218-01-9	Chrysene		82.1	ug/L	0.600	2.00
84-74-2	Di-n-butylphthalate		88.3	ug/L	6.00	20.0
117-84-0	Di-n-octylphthalate		69.2	ug/L	6.00	20.0
53-70-3	Dibenzo(a,h)anthracene		77.7	ug/L	0.600	2.00
132-64-9	Dibenzofuran		79.1	ug/L	6.00	20.0
84-66-2	Diethylphthalate		85.1	ug/L	6.00	20.0
131-11-3	Dimethylphthalate		89.3	ug/L	6.00	20.0
88-85-7	Dinoseb	U	6.00	ug/L	6.00	20.0
122-39-4	Diphenylamine		74.4	ug/L	6.00	20.0
206-44-0	Fluoranthene		88.8	ug/L	0.600	2.00
86-73-7	Fluorene		78.8	ug/L	0.600	2.00
118-74-1	Hexachlorobenzene		81.4	ug/L	6.00	20.0
87-68-3	Hexachlorobutadiene		54.6	ug/L	6.00	20.0
77-47-4	Hexachlorocyclopentadiene		50.0	ug/L	6.00	20.0
67-72-1	Hexachloroethane		60.1	ug/L	6.00	20.0
193-39-5	Indeno(1,2,3-cd)pyrene		82.9	ug/L	0.600	2.00
78-59-1	Isophorone		83.9	ug/L	7.00	20.0
62-75-9	N-Methyl-N-nitrosomethylamine		57.3	ug/L	6.00	20.0
924-16-3	N-Nitrosodi-n-butylamine	U	6.00	ug/L	6.00	20.0
55-18-5	N-Nitrosodiethylamine	U	6.00	ug/L	6.00	20.0
621-64-7	N-Nitrosodi--n-propylamine		84.6	ug/L	6.00	20.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		85.1	ug/L	6.00	20.0
91-20-3	Naphthalene		69.7	ug/L	0.600	2.00
98-95-3	Nitrobenzene		88.3	ug/L	6.00	20.0
608-93-5	Pentachlorobenzene	U	6.00	ug/L	6.00	20.0
87-86-5	Pentachlorophenol		95.1	ug/L	6.00	20.0
85-01-8	Phenanthrene		80.5	ug/L	0.600	2.00
108-95-2	Phenol		33.0	ug/L	6.00	20.0
129-00-0	Pyrene		86.4	ug/L	0.600	2.00
110-86-1	Pyridine		59.3	ug/L	6.00	20.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		108	ug/L	6.00	20.0
111-91-1	bis(2-Chloroethoxy)methane		89.2	ug/L	6.00	20.0
111-44-4	bis(2-Chloroethyl) ether		89.5	ug/L	6.00	20.0
117-81-7	bis(2-Ethylhexyl)phthalate		76.4	ug/L	6.00	20.0

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

Page 3 of 3

SDG Number: 2018-539	Date Collected: 10/19/2017 09:20	Matrix: W
Lab Sample ID: 1203904118	Date Received: 10/21/2017 08:45	
Client Sample: QC for batch 1712676	Client: ARSL004	Project: QC
Client ID: WST15-17-148254MS	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1712677	Inst: MSD1.I	Dilution: 1
Run Date: 10/27/2017 16:31	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/26/2017 17:40	Aliquot: 500 mL	Final Volume: 1 mL
Data File: s102717a.B\s1j2720.D	Column: 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		71.4	ug/L	7.40	20.0
99-09-2	3-Nitroaniline		102	ug/L	6.00	20.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		73.1	ug/L	6.00	20.0
88-74-4	2-Nitroaniline		97.9	ug/L	6.00	20.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		82.0	ug/L	6.00	20.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	150	200	ug/L	75	(32%-124%)
2-Fluorobiphenyl	75.5	100	ug/L	75	(32%-112%)
2-Fluorophenol	88.2	200	ug/L	44	(15%-88%)
Nitrobenzene-d5	82.7	100	ug/L	83	(36%-115%)
Phenol-d5	61.6	200	ug/L	31	(15%-91%)
p-Terphenyl-d14	79.8	100	ug/L	80	(36%-121%)

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

Page 1 of 3

SDG Number: 2018-539	Date Collected: 10/19/2017 09:20	Matrix: W
Lab Sample ID: 1203904119	Date Received: 10/21/2017 08:45	
Client Sample: QC for batch 1712676	Client: ARSL004	Project: QC
Client ID: WST15-17-148254MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1712677	Inst: MSD1.I	Dilution: 1
Run Date: 10/27/2017 17:02	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/26/2017 17:40	Aliquot: 500 mL	Final Volume: 1 mL
Data File: s102717a.B\s1j2721.D	Column: 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		72.3	ug/L	6.00	20.0
120-82-1	1,2,4-Trichlorobenzene		67.9	ug/L	6.00	20.0
95-50-1	1,2-Dichlorobenzene		69.8	ug/L	6.00	20.0
122-66-7	Azobenzene		99.5	ug/L	6.00	20.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		67.5	ug/L	6.00	20.0
106-46-7	1,4-Dichlorobenzene		66.0	ug/L	6.00	20.0
123-91-1	1,4-Dioxane		62.7	ug/L	6.00	20.0
90-12-0	1-Methylnaphthalene		72.9	ug/L	0.600	2.00
58-90-2	2,3,4,6-Tetrachlorophenol		90.4	ug/L	6.00	20.0
95-95-4	2,4,5-Trichlorophenol		87.3	ug/L	6.00	20.0
88-06-2	2,4,6-Trichlorophenol		84.7	ug/L	6.00	20.0
120-83-2	2,4-Dichlorophenol		83.8	ug/L	6.00	20.0
105-67-9	2,4-Dimethylphenol		73.2	ug/L	6.00	20.0
51-28-5	2,4-Dinitrophenol		97.3	ug/L	10.0	40.0
121-14-2	2,4-Dinitrotoluene		91.1	ug/L	6.00	20.0
606-20-2	2,6-Dinitrotoluene		91.9	ug/L	6.00	20.0
91-58-7	2-Chloronaphthalene		71.0	ug/L	0.820	2.00
95-57-8	2-Chlorophenol		79.4	ug/L	6.00	20.0
534-52-1	2-Methyl-4,6-dinitrophenol		104	ug/L	6.00	20.0
91-57-6	2-Methylnaphthalene		71.9	ug/L	0.600	2.00
88-75-5	2-Nitrophenol		89.4	ug/L	6.00	20.0
91-94-1	3,3'-Dichlorobenzidine		95.5	ug/L	6.00	20.0
101-55-3	4-Bromophenylphenylether		89.1	ug/L	6.00	20.0
59-50-7	Parachlorometa cresol		90.9	ug/L	6.00	20.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		96.7	ug/L	6.60	20.0
7005-72-3	4-Chlorophenylphenylether		82.8	ug/L	6.00	20.0
100-02-7	4-Nitrophenol		29.4	ug/L	6.00	20.0
83-32-9	Acenaphthene		84.9	ug/L	0.600	2.00
208-96-8	Acenaphthylene		83.2	ug/L	0.600	2.00
62-53-3	Aniline		87.6	ug/L	8.40	20.0
120-12-7	Anthracene		84.8	ug/L	0.600	2.00
1912-24-9	Atrazine		94.3	ug/L	6.00	20.0
92-87-5	Benzidine		98.9	ug/L	7.80	20.0
56-55-3	Benzo(a)anthracene		92.7	ug/L	0.600	2.00
50-32-8	Benzo(a)pyrene		89.0	ug/L	0.600	2.00
205-99-2	Benzo(b)fluoranthene		94.1	ug/L	0.600	2.00
191-24-2	Benzo(ghi)perylene		93.5	ug/L	0.600	2.00

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

SDG Number:	2018-539	Date Collected:	10/19/2017 09:20	Matrix:	W
Lab Sample ID:	1203904119	Date Received:	10/21/2017 08:45		
Client Sample:	QC for batch 1712676	Client:	ARSL004	Project:	QC
Client ID:	WST15-17-148254MSD	Method:	SW846 3510C/8270D	SOP Ref:	GL-OA-E-009
Batch ID:	1712677	Inst:	MSD1.I	Dilution:	1
Run Date:	10/27/2017 17:02	Analyst:	JLD1	Inj. Vol:	1 uL
Prep Date:	10/26/2017 17:40	Aliquot:	500 mL	Final Volume:	1 mL
Data File:	s102717a.B\s1j2721.D	Column:	25x.20x.33		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		91.3	ug/L	0.600	2.00
65-85-0	Benzoic acid		89.0	ug/L	12.0	40.0
100-51-6	Benzyl alcohol		80.0	ug/L	6.00	20.0
85-68-7	Butylbenzylphthalate		97.1	ug/L	6.00	20.0
218-01-9	Chrysene		89.0	ug/L	0.600	2.00
84-74-2	Di-n-butylphthalate		95.5	ug/L	6.00	20.0
117-84-0	Di-n-octylphthalate		77.9	ug/L	6.00	20.0
53-70-3	Dibenzo(a,h)anthracene		84.6	ug/L	0.600	2.00
132-64-9	Dibenzofuran		83.4	ug/L	6.00	20.0
84-66-2	Diethylphthalate		90.2	ug/L	6.00	20.0
131-11-3	Dimethylphthalate		92.6	ug/L	6.00	20.0
88-85-7	Dinoseb	U	6.00	ug/L	6.00	20.0
122-39-4	Diphenylamine		79.7	ug/L	6.00	20.0
206-44-0	Fluoranthene		95.6	ug/L	0.600	2.00
86-73-7	Fluorene		81.0	ug/L	0.600	2.00
118-74-1	Hexachlorobenzene		88.1	ug/L	6.00	20.0
87-68-3	Hexachlorobutadiene		57.3	ug/L	6.00	20.0
77-47-4	Hexachlorocyclopentadiene		54.0	ug/L	6.00	20.0
67-72-1	Hexachloroethane		65.5	ug/L	6.00	20.0
193-39-5	Indeno(1,2,3-cd)pyrene		90.0	ug/L	0.600	2.00
78-59-1	Isophorone		88.7	ug/L	7.00	20.0
62-75-9	N-Methyl-N-nitrosomethylamine		60.8	ug/L	6.00	20.0
924-16-3	N-Nitrosodi-n-butylamine	U	6.00	ug/L	6.00	20.0
55-18-5	N-Nitrosodiethylamine	U	6.00	ug/L	6.00	20.0
621-64-7	N-Nitrosodi--n-propylamine		89.0	ug/L	6.00	20.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		88.9	ug/L	6.00	20.0
91-20-3	Naphthalene		73.2	ug/L	0.600	2.00
98-95-3	Nitrobenzene		93.1	ug/L	6.00	20.0
608-93-5	Pentachlorobenzene	U	6.00	ug/L	6.00	20.0
87-86-5	Pentachlorophenol		102	ug/L	6.00	20.0
85-01-8	Phenanthrene		86.5	ug/L	0.600	2.00
108-95-2	Phenol		35.2	ug/L	6.00	20.0
129-00-0	Pyrene		92.8	ug/L	0.600	2.00
110-86-1	Pyridine		64.1	ug/L	6.00	20.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		117	ug/L	6.00	20.0
111-91-1	bis(2-Chloroethoxy)methane		93.0	ug/L	6.00	20.0
111-44-4	bis(2-Chloroethyl) ether		96.5	ug/L	6.00	20.0
117-81-7	bis(2-Ethylhexyl)phthalate		83.5	ug/L	6.00	20.0

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

Page 3 of 3

SDG Number: 2018-539	Date Collected: 10/19/2017 09:20	Matrix: W
Lab Sample ID: 1203904119	Date Received: 10/21/2017 08:45	
Client Sample: QC for batch 1712676	Client: ARSL004	Project: QC
Client ID: WST15-17-148254MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1712677	Inst: MSD1.I	Dilution: 1
Run Date: 10/27/2017 17:02	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/26/2017 17:40	Aliquot: 500 mL	Final Volume: 1 mL
Data File: s102717a.B\s1j2721.D	Column: 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		76.8	ug/L	7.40	20.0
99-09-2	3-Nitroaniline		107	ug/L	6.00	20.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		76.8	ug/L	6.00	20.0
88-74-4	2-Nitroaniline		104	ug/L	6.00	20.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		85.8	ug/L	6.00	20.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	157	200	ug/L	79	(32%-124%)
2-Fluorobiphenyl	78.1	100	ug/L	78	(32%-112%)
2-Fluorophenol	94.2	200	ug/L	47	(15%-88%)
Nitrobenzene-d5	87.8	100	ug/L	88	(36%-115%)
Phenol-d5	65.4	200	ug/L	33	(15%-91%)
p-Terphenyl-d14	85.5	100	ug/L	86	(36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-539
Work Order #: 435718**

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: 1713226

Prep Batch Number: 1713223

Sample Analysis

Sample ID	Client ID
435718001	435718001 (CAPA-18-147549)
435718005	435718005 (CAPA-18-147553)
435718008	435718008 (CAPA-18-147636)
435718011	435718011 (CAPA-18-147559)
1203905528	Interference Check Sample (ICS)
1203905524	Method Blank (MB)
1203905525	Laboratory Control Sample (LCS)
1203905526	435630001(CAPA-18-147560) Matrix Spike (MS)
1203905527	435630001(CAPA-18-147560) 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 435630001 (CAPA-18-147560) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard Area Acceptance

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

Retention Time

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

Technical Information

Holding Time Specifications

All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Manual Integrations

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

Method Comments

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

Additional Comments

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

Perchlorate Isotope Ratio

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

System Configuration

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

Electronic Packaging Comment

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

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

Chromatographic Columns

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

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

Dionex: IonPac AG-16 2 x 50 mm.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-539 GEL Work Order: 435718

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 06 NOV 2017

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147549Date Received: 21-OCT-17GEL Job No (SDG): 2018-539GEL Sample ID: 435718001Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.215	ug/L		1	26-OCT-17 20:28	per1026027a
	Perchlorate Isotope Ratio			2.95			1	26-OCT-17 20:28	per1026027a
14797-73-0	Perchlorate-101	.05	.2	0.220	ug/L		1	26-OCT-17 20:28	per1026027a
	Perchlorate-O(18)			0.476	ug/L		1	26-OCT-17 20:28	per1026027a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147553Date Received: 21-OCT-17GEL Job No (SDG): 2018-539GEL Sample ID: 435718005Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.293	ug/L		1	26-OCT-17 20:38	per1026028a
	Perchlorate Isotope Ratio			3.27			1	26-OCT-17 20:38	per1026028a
14797-73-0	Perchlorate-101	.05	.2	0.270	ug/L		1	26-OCT-17 20:38	per1026028a
	Perchlorate-O(18)			0.494	ug/L		1	26-OCT-17 20:38	per1026028a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147636Date Received: 21-OCT-17GEL Job No (SDG): 2018-539GEL Sample ID: 435718008Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.414	ug/L		1	26-OCT-17 20:49	per1026029a
	Perchlorate Isotope Ratio			3.15			1	26-OCT-17 20:49	per1026029a
14797-73-0	Perchlorate-101	.05	.2	0.396	ug/L		1	26-OCT-17 20:49	per1026029a
	Perchlorate-O(18)			0.437	ug/L		1	26-OCT-17 20:49	per1026029a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147559Date Received: 21-OCT-17GEL Job No (SDG): 2018-539GEL Sample ID: 435718011Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.413	ug/L		1	26-OCT-17 20:59	per1026030a
	Perchlorate Isotope Ratio			3.05			1	26-OCT-17 20:59	per1026030a
14797-73-0	Perchlorate-101	.05	.2	0.408	ug/L		1	26-OCT-17 20:59	per1026030a
	Perchlorate-O(18)			0.498	ug/L		1	26-OCT-17 20:59	per1026030a

^ 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): 2018-539

Extract Batch Code: 1713223

Date Filtered: 26-OCT-17

Matrix: WATER

Sample ID: 1203905525

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.203	ug/L	102		85 - 115
Perchlorate Isotope Ratio		2.94				-
Perchlorate-101	0.200	.209	ug/L	104		85 - 115
Perchlorate-O(18)		.523	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): 2018-539

Extract Batch Code: 1713223

Date Extracted: 26-OCT-17

GEL MS/PS ID: 1203905526

Client ID: CAPA-18-147560

GEL MSD/PSD ID: 1203905527

QC Type: MS

Compound^	Spike Added	Sample Conc	Units	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Recovery Limit
Perchlorate	0.200	0.340	ug/L	0.532	96	.506	83	5	30	75 - 125
Perchlorate Isotope Ratio	0	2.93		3.04		2.86		6		-
Perchlorate-101	0.200	0.350	ug/L	0.528	89	.535	93	1	30	75 - 125
Perchlorate-O(18)	0	0.491	ug/L	0.509		.471		8		-

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

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 26-OCT-17GEL Job No (SDG): 2018-539GEL Sample ID: 1203905524Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.050	ug/L	U	1	26-OCT-17 18:23	per1026015a
	Perchlorate Isotope Ratio						1	26-OCT-17 18:23	per1026015a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	26-OCT-17 18:23	per1026015a
	Perchlorate-O(18)			0.504	ug/L		1	26-OCT-17 18:23	per1026015a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 26-OCT-17GEL Job No (SDG): 2018-539GEL Sample ID: 1203905525Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.203	ug/L		1	26-OCT-17 18:33	per1026016a
	Perchlorate Isotope Ratio			2.94			1	26-OCT-17 18:33	per1026016a
14797-73-0	Perchlorate-101	.05	.2	0.209	ug/L		1	26-OCT-17 18:33	per1026016a
	Perchlorate-O(18)			0.523	ug/L		1	26-OCT-17 18:33	per1026016a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-539GEL Sample ID: 1203905528Date Filtered: 26-OCT-17Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.241	ug/L		1	26-OCT-17 18:43	per1026017a
	Perchlorate Isotope Ratio			3.22			1	26-OCT-17 18:43	per1026017a
14797-73-0	Perchlorate-101	.05	.2	0.226	ug/L		1	26-OCT-17 18:43	per1026017a
	Perchlorate-O(18)			0.524	ug/L		1	26-OCT-17 18:43	per1026017a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147560MSDate Received: 20-OCT-17GEL Job No (SDG): 2018-539GEL Sample ID: 1203905526Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.532	ug/L		1	26-OCT-17 19:04	per1026019a
	Perchlorate Isotope Ratio			3.04			1	26-OCT-17 19:04	per1026019a
14797-73-0	Perchlorate-101	.05	.2	0.528	ug/L		1	26-OCT-17 19:04	per1026019a
	Perchlorate-O(18)			0.509	ug/L		1	26-OCT-17 19:04	per1026019a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147560MSDDate Received: 20-OCT-17GEL Job No (SDG): 2018-539GEL Sample ID: 1203905527Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.506	ug/L		1	26-OCT-17 19:15	per1026020a
	Perchlorate Isotope Ratio			2.86			1	26-OCT-17 19:15	per1026020a
14797-73-0	Perchlorate-101	.05	.2	0.535	ug/L		1	26-OCT-17 19:15	per1026020a
	Perchlorate-O(18)			0.471	ug/L		1	26-OCT-17 19:15	per1026020a

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

*Concentration =

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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-539
Work Order #: 435718

Sample ID	Client ID
435718001	CAPA-18-147549
435718002	CAPA-18-147575
435718005	CAPA-18-147553
435718006	CAPA-18-147579
435718008	CAPA-18-147636
435718009	CAPA-18-147651
435718011	CAPA-18-147559
435718012	CAPA-18-147585
1203901861	Method Blank (MB) ICP
1203901862	Laboratory Control Sample (LCS)
1203901865	435718001(CAPA-18-147549L) Serial Dilution (SD)
1203901863	435718001(CAPA-18-147549D) Sample Duplicate (DUP)
1203901864	435718001(CAPA-18-147549S) Matrix Spike (MS)
1203901881	Method Blank (MB) ICP-MS
1203901882	Laboratory Control Sample (LCS)
1203901885	435718001(CAPA-18-147549L) Serial Dilution (SD)
1203901883	435718001(CAPA-18-147549D) Sample Duplicate (DUP)
1203901884	435718001(CAPA-18-147549S) Matrix Spike (MS)
1203916074	Method Blank (MB) CVAA
1203916075	Laboratory Control Sample (LCS)
1203916080	435720002(NonSDGL) Serial Dilution (SD)
1203916076	435720002(NonSDGD) Sample Duplicate (DUP)
1203916078	435720002(NonSDGS) Matrix Spike (MS)

Sample Analysis

Samples 435718001,002,005,006,008,009,011 and 012 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1711684, 1711693, 1717462 and 1718402
Prep Batch :	1711683, 1711692 and 1717457
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 calcium, sodium and zinc. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 435718001 (CAPA-18-147549), 435718005 (CAPA-18-147553), 435718008 (CAPA-18-147636) and 435718011 (CAPA-18-147559)-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: 435718001 (CAPA-18-147549)-ICP and ICP-MS and 435720002 (NonSDG)-CVAA.

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

Serial Dilution % Difference Statement

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

Analyte	Sample	Value
Barium	1203901865 (CAPA-18-147549SDILT)	16 *(0%-10%)
Sodium	1203901865 (CAPA-18-147549SDILT)	14.4 *(0%-10%)
Strontium	1203901865 (CAPA-18-147549SDILT)	13.1 *(0%-10%)

Technical Information**Holding Time Specifications**

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information**Electronic Packaging Comment**

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and

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

Additional Comments

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

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-539 GEL Work Order: 435718

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:



Name: Nik-Cole Elmore

Date: 16 NOV 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435718001**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147549**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/10/17 10:37	111017W1-5	1717462

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 435718001

BASIS: As Received

DATE COLLECTED 19-OCT-17

CLIENT ID: CAPA-18-147549

LEVEL: Low

DATE RECEIVED 21-OCT-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	11/06/17 21:45	110617-1	1711684
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/27/17 18:15	171027-4	1711693
7440-38-2	Arsenic	2.05	ug/L	J	2	5	5	1	MS	BAJ	10/26/17 23:02	171026-3	1711693
7440-39-3	Barium	214	ug/L	E	1	5	5	1	P	HSC	11/06/17 21:45	110617-1	1711684
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/06/17 21:45	110617-1	1711684
7440-42-8	Boron	18.6	ug/L	J	15	50	50	1	P	HSC	11/06/17 21:45	110617-1	1711684
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/26/17 23:02	171026-3	1711693
7440-70-2	Calcium	13300	ug/L		50	200	200	1	P	HSC	11/08/17 17:34	110817-2	1711684
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/26/17 23:02	171026-3	1711693
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/06/17 21:45	110617-1	1711684
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/06/17 21:45	110617-1	1711684
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/06/17 21:45	110617-1	1711684
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/26/17 23:02	171026-3	1711693
7439-95-4	Magnesium	2720	ug/L		110	300	300	1	P	HSC	11/06/17 21:45	110617-1	1711684
7439-96-5	Manganese	73.7	ug/L		2	10	10	1	P	HSC	11/06/17 21:45	110617-1	1711684
7439-98-7	Molybdenum	1.58	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/26/17 23:02	171026-3	1711693
7440-02-0	Nickel	0.845	ug/L	J	0.6	2	2	1	MS	BAJ	10/26/17 23:02	171026-3	1711693
7440-09-7	Potassium	2230	ug/L		50	150	150	1	P	HSC	11/08/17 17:34	110817-2	1711684
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/26/17 23:02	171026-3	1711693
7631-86-9	Silica	71400	ug/L		53	213	213	1	P	HSC	11/08/17 17:34	110817-2	1711684
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/26/17 23:02	171026-3	1711693
7440-23-5	Sodium	10200	ug/L	E	100	300	300	1	P	HSC	11/08/17 17:34	110817-2	1711684
7440-24-6	Strontium	188	ug/L	E	1	5	5	1	P	HSC	11/06/17 21:45	110617-1	1711684
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/26/17 23:02	171026-3	1711693
7440-31-5	Tin	2.79	ug/L	J	2.5	10	10	1	P	HSC	11/06/17 21:45	110617-1	1711684
7440-61-1	Uranium	0.383	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/26/17 23:02	171026-3	1711693
7440-62-2	Vanadium	4.5	ug/L	J	1	5	5	1	P	HSC	11/06/17 21:45	110617-1	1711684
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/08/17 17:34	110817-2	1711684

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 435718001**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147549**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	44.4	mg/L		0.453	1.24	1.24	1		TXT1	11/13/17 11:23		1718402

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1711684	1711683	SW846 3005A	50	mL	50	mL	10/23/17	JXM8
1711693	1711692	SW846 3005A	50	mL	50	mL	10/23/17	JXM8
1717462	1717457	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435718002**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147575**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/10/17 10:39	111017W1-5	1717462

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717462	1717457	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435718005**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147553**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/10/17 10:41	111017W1-5	1717462

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 435718005

BASIS: As Received

DATE COLLECTED 19-OCT-17

CLIENT ID: CAPA-18-147553

LEVEL: Low

DATE RECEIVED 21-OCT-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	11/06/17 21:58	110617-1	1711684
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/27/17 18:21	171027-4	1711693
7440-38-2	Arsenic	2.8	ug/L	J	2	5	5	1	MS	BAJ	10/26/17 23:19	171026-3	1711693
7440-39-3	Barium	6.93	ug/L	E	1	5	5	1	P	HSC	11/06/17 21:58	110617-1	1711684
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/06/17 21:58	110617-1	1711684
7440-42-8	Boron	15.6	ug/L	J	15	50	50	1	P	HSC	11/06/17 21:58	110617-1	1711684
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/26/17 23:19	171026-3	1711693
7440-70-2	Calcium	20200	ug/L		50	200	200	1	P	HSC	11/08/17 17:47	110817-2	1711684
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/26/17 23:19	171026-3	1711693
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/06/17 21:58	110617-1	1711684
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/06/17 21:58	110617-1	1711684
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/06/17 21:58	110617-1	1711684
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/26/17 23:19	171026-3	1711693
7439-95-4	Magnesium	5630	ug/L		110	300	300	1	P	HSC	11/06/17 21:58	110617-1	1711684
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/06/17 21:58	110617-1	1711684
7439-98-7	Molybdenum	1.43	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/26/17 23:19	171026-3	1711693
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/26/17 23:19	171026-3	1711693
7440-09-7	Potassium	2490	ug/L		50	150	150	1	P	HSC	11/08/17 17:47	110817-2	1711684
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/26/17 23:19	171026-3	1711693
7631-86-9	Silica	41900	ug/L		53	213	213	1	P	HSC	11/08/17 17:47	110817-2	1711684
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/26/17 23:19	171026-3	1711693
7440-23-5	Sodium	9010	ug/L	E	100	300	300	1	P	HSC	11/08/17 17:47	110817-2	1711684
7440-24-6	Strontium	80.2	ug/L	E	1	5	5	1	P	HSC	11/06/17 21:58	110617-1	1711684
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/26/17 23:19	171026-3	1711693
7440-31-5	Tin	4.59	ug/L	J	2.5	10	10	1	P	HSC	11/06/17 21:58	110617-1	1711684
7440-61-1	Uranium	0.470	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/26/17 23:19	171026-3	1711693
7440-62-2	Vanadium	4.76	ug/L	J	1	5	5	1	P	HSC	11/06/17 21:58	110617-1	1711684
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/08/17 17:47	110817-2	1711684

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 435718005**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147553**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	73.5	mg/L		0.453	1.24	1.24	1		TXT1	11/13/17 11:23		1718402

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1711684	1711683	SW846 3005A	50	mL	50	mL	10/23/17	JXM8
1711693	1711692	SW846 3005A	50	mL	50	mL	10/23/17	JXM8
1717462	1717457	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435718006**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147579**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/10/17 10:42	111017W1-5	1717462

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717462	1717457	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435718008**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147636**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/10/17 10:44	111017W1-5	1717462

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 435718008

BASIS: As Received

DATE COLLECTED 19-OCT-17

CLIENT ID: CAPA-18-147636

LEVEL: Low

DATE RECEIVED 21-OCT-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	11/06/17 22:07	110617-1	1711684
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/27/17 18:27	171027-4	1711693
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/26/17 23:33	171026-3	1711693
7440-39-3	Barium	29.9	ug/L	E	1	5	5	1	P	HSC	11/06/17 22:07	110617-1	1711684
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/06/17 22:07	110617-1	1711684
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/06/17 22:07	110617-1	1711684
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/26/17 23:33	171026-3	1711693
7440-70-2	Calcium	11900	ug/L		50	200	200	1	P	HSC	11/08/17 17:56	110817-2	1711684
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/26/17 23:33	171026-3	1711693
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/06/17 22:07	110617-1	1711684
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/06/17 22:07	110617-1	1711684
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/06/17 22:07	110617-1	1711684
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/26/17 23:33	171026-3	1711693
7439-95-4	Magnesium	2860	ug/L		110	300	300	1	P	HSC	11/06/17 22:07	110617-1	1711684
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/06/17 22:07	110617-1	1711684
7439-98-7	Molybdenum	1.35	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/26/17 23:33	171026-3	1711693
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/26/17 23:33	171026-3	1711693
7440-09-7	Potassium	1620	ug/L		50	150	150	1	P	HSC	11/08/17 17:56	110817-2	1711684
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/26/17 23:33	171026-3	1711693
7631-86-9	Silica	67300	ug/L		53	213	213	1	P	HSC	11/08/17 17:56	110817-2	1711684
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/26/17 23:33	171026-3	1711693
7440-23-5	Sodium	10100	ug/L	E	100	300	300	1	P	HSC	11/08/17 17:56	110817-2	1711684
7440-24-6	Strontium	45.4	ug/L	E	1	5	5	1	P	HSC	11/06/17 22:07	110617-1	1711684
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/26/17 23:33	171026-3	1711693
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	11/06/17 22:07	110617-1	1711684
7440-61-1	Uranium	0.379	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/26/17 23:33	171026-3	1711693
7440-62-2	Vanadium	5.3	ug/L		1	5	5	1	P	HSC	11/06/17 22:07	110617-1	1711684
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/08/17 17:56	110817-2	1711684

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 435718008**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147636**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	41.4	mg/L		0.453	1.24	1.24	1		TXT1	11/13/17 11:23		1718402

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1711684	1711683	SW846 3005A	50	mL	50	mL	10/23/17	JXM8
1711693	1711692	SW846 3005A	50	mL	50	mL	10/23/17	JXM8
1717462	1717457	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435718009**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147651**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/10/17 10:51	111017W1-5	1717462

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717462	1717457	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435718011**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147559**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/10/17 10:53	111017W1-5	1717462

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 435718011

BASIS: As Received

DATE COLLECTED 19-OCT-17

CLIENT ID: CAPA-18-147559

LEVEL: Low

DATE RECEIVED 21-OCT-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	11/06/17 22:10	110617-1	1711684
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/27/17 18:28	171027-4	1711693
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/26/17 23:36	171026-3	1711693
7440-39-3	Barium	20.6	ug/L	E	1	5	5	1	P	HSC	11/06/17 22:10	110617-1	1711684
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/06/17 22:10	110617-1	1711684
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/06/17 22:10	110617-1	1711684
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/26/17 23:36	171026-3	1711693
7440-70-2	Calcium	14400	ug/L		50	200	200	1	P	HSC	11/08/17 17:59	110817-2	1711684
7440-47-3	Chromium	3.21	ug/L	J	3	10	10	1	MS	BAJ	10/26/17 23:36	171026-3	1711693
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/06/17 22:10	110617-1	1711684
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/06/17 22:10	110617-1	1711684
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/06/17 22:10	110617-1	1711684
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/26/17 23:36	171026-3	1711693
7439-95-4	Magnesium	3830	ug/L		110	300	300	1	P	HSC	11/06/17 22:10	110617-1	1711684
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/06/17 22:10	110617-1	1711684
7439-98-7	Molybdenum	1.67	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/26/17 23:36	171026-3	1711693
7440-02-0	Nickel	1.45	ug/L	J	0.6	2	2	1	MS	BAJ	10/26/17 23:36	171026-3	1711693
7440-09-7	Potassium	1780	ug/L		50	150	150	1	P	HSC	11/08/17 17:59	110817-2	1711684
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/26/17 23:36	171026-3	1711693
7631-86-9	Silica	62300	ug/L		53	213	213	1	P	HSC	11/08/17 17:59	110817-2	1711684
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/26/17 23:36	171026-3	1711693
7440-23-5	Sodium	10600	ug/L	E	100	300	300	1	P	HSC	11/08/17 17:59	110817-2	1711684
7440-24-6	Strontium	62.7	ug/L	E	1	5	5	1	P	HSC	11/06/17 22:10	110617-1	1711684
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/26/17 23:36	171026-3	1711693
7440-31-5	Tin	3.34	ug/L	J	2.5	10	10	1	P	HSC	11/06/17 22:10	110617-1	1711684
7440-61-1	Uranium	0.352	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/26/17 23:36	171026-3	1711693
7440-62-2	Vanadium	6.13	ug/L		1	5	5	1	P	HSC	11/06/17 22:10	110617-1	1711684
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/08/17 17:59	110817-2	1711684

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 435718011**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147559**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	51.7	mg/L		0.453	1.24	1.24	1		TXT1	11/13/17 11:23		1718402

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1711684	1711683	SW846 3005A	50	mL	50	mL	10/23/17	JXM8
1711693	1711692	SW846 3005A	50	mL	50	mL	10/23/17	JXM8
1717462	1717457	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-539**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435718012**BASIS:** As Received**DATE COLLECTED** 19-OCT-17**CLIENT ID:** CAPA-18-147585**LEVEL:** Low**DATE RECEIVED** 21-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/10/17 10:54	111017W1-5	1717462

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717462	1717457	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2018-539
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>
1203901861	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	3.79	ug/L	+/-10	J	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Aluminum	68	ug/L	+/-200	U	P	68	200
	Zinc	-4.22	ug/L	+/-10	J	P	3.3	10
	Barium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Iron	30	ug/L	+/-100	U	P	30	100
	Sodium	185	ug/L	+/-300	J	P	100	300
	Silica	53	ug/L	+/-213	U	P	53	213
	Potassium	50	ug/L	+/-150	U	P	50	150
	Manganese	2	ug/L	+/-10	U	P	2	10
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Copper	3	ug/L	+/-10	U	P	3	10
	Calcium	50	ug/L	+/-200	U	P	50	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
1203901881	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203916074	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. 2018-539

Client ID: CAPA-18-147549S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 435718001

Spike ID: 1203901864

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	4740		68	U	5000	94.9		P
Barium	ug/L	75-125	685		214		500	94.3		P
Beryllium	ug/L	75-125	478		1	U	500	95.6		P
Boron	ug/L	75-125	510		18.6	J	500	98.3		P
Calcium	ug/L	75-125	18300		13300		5000	99.4		P
Cobalt	ug/L	75-125	483		1	U	500	96.7		P
Copper	ug/L	75-125	489		3	U	500	97.8		P
Iron	ug/L	75-125	4620		30	U	5000	92		P
Magnesium	ug/L	75-125	7570		2720		5000	96.9		P
Manganese	ug/L	75-125	546		73.7		500	94.4		P
Potassium	ug/L	75-125	7170		2230		5000	98.7		P
Silica	ug/L		80500		71400		10700	85	N/A	P
Sodium	ug/L	75-125	14600		10200		5000	88.1		P
Strontium	ug/L	75-125	634		188		500	89.2		P
Tin	ug/L	75-125	481		2.79	J	500	95.6		P
Vanadium	ug/L	75-125	482		4.5	J	500	95.5		P
Zinc	ug/L	75-125	459		3.3	U	500	91.7		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-539

Client ID: CAPA-18-147549S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 435718001

Spike ID: 1203901884

<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>
Arsenic	ug/L	75-125	48.8		2.05	J	50	93.6		MS
Cadmium	ug/L	75-125	46.5		0.3	U	50	93.1		MS
Chromium	ug/L	75-125	48.9		3	U	50	95.8		MS
Lead	ug/L	75-125	46.7		0.5	U	50	93.4		MS
Molybdenum	ug/L	75-125	51		1.58		50	98.8		MS
Nickel	ug/L	75-125	46.5		0.845	J	50	91.2		MS
Selenium	ug/L	75-125	47.3		2	U	50	94.5		MS
Silver	ug/L	75-125	48.1		0.3	U	50	96.1		MS
Thallium	ug/L	75-125	44.4		0.6	U	50	88.8		MS
Uranium	ug/L	75-125	46.5		0.383		50	92.3		MS
Antimony	ug/L	75-125	44.7		1	U	50	88.9		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-539

Client ID: CACV-18-148285S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 435720002

Spike ID: 1203916078

<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	2.14		0.067	U	2	107		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-539

Lab Code: GEL

Contract: ESHL00114

Client ID: CAPA-18-147549D

Matrix: WATER

Level: Low

Sample ID: 435718001

Duplicate ID: 1203901863

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%	214		218		1.94		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	18.6 J		16.8 J		10.3		P
Calcium	ug/L	+/-20%	13300		13500		1.78		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%	2720		2700		.708		P
Manganese	ug/L	+/-20%	73.7		74.9		1.57		P
Potassium	ug/L	+/-20%	2230		2240		.617		P
Silica	ug/L	+/-20%	71400		72400		1.44		P
Sodium	ug/L	+/-20%	10200		10100		.788		P
Strontium	ug/L	+/-20%	188		194		2.99		P
Tin	ug/L	+/-10	2.79 J		3.83 J		31.3		P
Vanadium	ug/L	+/-5	4.5 J		4.72 J		4.67		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-539

Lab Code: GEL

Contract: ESHL00114

Client ID: CAPA-18-147549D

Matrix: WATER

Level: Low

Sample ID: 435718001

Duplicate ID: 1203901883

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		2.05 J		2 U		200		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.58		1.49		5.95		MS
Nickel	ug/L	+/- 2	0.845 J		0.791 J		6.6		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	0.383		0.375		2.11		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
–6–
Duplicate Sample Summary

SDG No.: 2018–539**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CACV–18–148285D**Matrix:** WATER**Level:** Low**Sample ID:** 435720002**Duplicate ID:** 1203916076**Percent Solids for Dup:** N/A

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

***Analytical Methods:**

AV EPA 245.1/245.2

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2018-539

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>
1203901862								
	Aluminum	ug/L	5000	4920		98.4	80-120	P
	Barium	ug/L	500	493		98.6	80-120	P
	Beryllium	ug/L	500	488		97.5	80-120	P
	Boron	ug/L	500	501		100	80-120	P
	Calcium	ug/L	5000	4900		98.1	80-120	P
	Cobalt	ug/L	500	503		101	80-120	P
	Copper	ug/L	500	493		98.6	80-120	P
	Iron	ug/L	5000	4760		95.2	80-120	P
	Magnesium	ug/L	5000	5130		103	80-120	P
	Manganese	ug/L	500	493		98.7	80-120	P
	Potassium	ug/L	5000	5000		99.9	80-120	P
	Silica	ug/L	10700	9790		91.4	80-120	P
	Sodium	ug/L	5000	4710		94.2	80-120	P
	Strontium	ug/L	500	466		93.1	80-120	P
	Tin	ug/L	500	490		98.1	80-120	P
	Vanadium	ug/L	500	490		98.1	80-120	P
	Zinc	ug/L	500	461		92.1	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2018-539

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>
1203901882								
	Antimony	ug/L	50	45.4		90.9	80-120	MS
	Arsenic	ug/L	50	51		102	80-120	MS
	Cadmium	ug/L	50	49.8		99.6	80-120	MS
	Chromium	ug/L	50	47.4		94.8	80-120	MS
	Lead	ug/L	50	48.5		97	80-120	MS
	Molybdenum	ug/L	50	50.5		101	80-120	MS
	Nickel	ug/L	50	48		95.9	80-120	MS
	Selenium	ug/L	50	50.4		101	80-120	MS
	Silver	ug/L	50	49.9		99.7	80-120	MS
	Thallium	ug/L	50	47.5		94.9	80-120	MS
	Uranium	ug/L	50	47.6		95.1	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2018-539

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>
1203916075	Mercury	ug/L	2	2.1		105	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-539

Client ID: CAPA-18-147549L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 435718001

Serial Dilution ID: 1203901865

<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	214		180		15.991	E	10	P
Beryllium	1	U	5	U				P
Boron	18.6	J	75	U	8.126			P
Calcium	13300		13000		2.181		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	2720		2310		15.121			P
Manganese	73.7		64.1		12.987			P
Potassium	2230		2010		9.789			P
Silica	71400		69400		2.79		10	P
Sodium	10200		11700		14.377	E	10	P
Strontium	188		163		13.075	E	10	P
Tin	2.79	J	12.5	U	325.081			P
Vanadium	4.5	J	5	J	11.106			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-539

Client ID: CAPA-18-147549L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 435718001

Serial Dilution ID: 1203901885

<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	2.05	J	10	U	14.634			MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.58		1.44	J	8.947			MS
Nickel	.845	J	3	U	223.669			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.383		.41	J	7.05			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-539 **Client ID:** CACV-18-148285L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 435720002 **Serial Dilution ID:** 1203916080

<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 #: 2018-539
Work Order #: 435718**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1711615

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
435718002	CAPA-18-147575
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585
1203905559	Method Blank (MB)
1203905560	Laboratory Control Sample (LCS)
1203905562	436027004(CAPA-18-147598) Sample Duplicate (DUP)
1203905564	436027004(CAPA-18-147598) 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 436027004 (CAPA-18-147598) 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:	1711667	Method:	WSP-CN(T)
Prep Batch :	1711666	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
435718002	CAPA-18-147575
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585
1203901839	Method Blank (MB)
1203901840	Laboratory Control Sample (LCS)
1203901841	435630002(CAPA-18-147586) Sample Duplicate (DUP)
1203901843	435630002(CAPA-18-147586) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435630002 (CAPA-18-147586) 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

Sample1203901840 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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scanned and inserted into the electronic package.

Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1711921

Method: WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
435718001	CAPA-18-147549
435718005	CAPA-18-147553
435718008	CAPA-18-147636
435718011	CAPA-18-147559
1203902548	Method Blank (MB)
1203902549	Laboratory Control Sample (LCS)
1203902550	435722001(WST15-17-148253) Sample Duplicate (DUP)
1203902551	435722001(WST15-17-148253) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435722001 (WST15-17-148253) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Manual Integrations**

Samples 1203902550 (WST15-17-148253DUP), 435718001 (CAPA-18-147549), 435718005 (CAPA-18-147553), 435718008 (CAPA-18-147636) and 435718011 (CAPA-18-147559) 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: 1713551 **Method:** NH3
Prep Batch : 1713550 **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
435718001	CAPA-18-147549
435718005	CAPA-18-147553
435718008	CAPA-18-147636
435718011	CAPA-18-147559
1203906317	Method Blank (MB)
1203906318	Laboratory Control Sample (LCS)
1203906321	435718001(CAPA-18-147549) Sample Duplicate (DUP)
1203906322	435718001(CAPA-18-147549) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1203906317 (MB)	Nitrogen, Ammonia	0.0208 between (0.017 - 0.05)

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435718001 (CAPA-18-147549) was selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Ammonia	1203906322 (CAPA-18-147549MS)	80.4* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1712660	Method:	TKN
Prep Batch :	1712656	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
435718002	CAPA-18-147575
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585
1203904066	Method Blank (MB)
1203904067	Laboratory Control Sample (LCS)
1203904070	435429002(CAMO-18-147649) Sample Duplicate (DUP)
1203904071	435429002(CAMO-18-147649) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435429002 (CAMO-18-147649) was selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203904071 (CAMO-18-147649MS)	83.9* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

Sample435718012 (CAPA-18-147585) was re-analyzed due to CCV failure. The reanalysis data with passing

instrument QC was reported. Samples 1203904070 (CAMO-18-147649DUP) and 1203904071 (CAMO-18-147649MS) were re-analyzed due to CCB failure. The reanalysis data with passing instrument QC was reported. Samples 435718009 (CAPA-18-147651) and 435718012 (CAPA-18-147585) 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: 1713174

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
435718001	CAPA-18-147549
435718005	CAPA-18-147553
435718008	CAPA-18-147636
435718011	CAPA-18-147559
1203905376	Method Blank (MB)
1203905377	Laboratory Control Sample (LCS)
1203905379	435630001(CAPA-18-147560) Sample Duplicate (DUP)
1203905383	435630001(CAPA-18-147560) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435630001 (CAPA-18-147560) 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 1203905379 (CAPA-18-147560DUP), 1203905383 (CAPA-18-147560PS), 435718005 (CAPA-18-147553) and 435718008 (CAPA-18-147636) in this sample group were diluted due to matrix interference. 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	435718	
	005	008
Nitrogen, Nitrate/Nitrite	5X	5X

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1713122	Method:	PO4
Prep Batch :	1713121	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
435718001	CAPA-18-147549
435718005	CAPA-18-147553
435718008	CAPA-18-147636
435718011	CAPA-18-147559
1203905249	Method Blank (MB)
1203905250	Laboratory Control Sample (LCS)
1203905251	435630001(CAPA-18-147560) Sample Duplicate (DUP)
1203905253	435630004(CAPA-18-147561) Sample Duplicate (DUP)
1203905252	435630001(CAPA-18-147560) Matrix Spike (MS)
1203905254	435630004(CAPA-18-147561) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 435630001 (CAPA-18-147560) and 435630004 (CAPA-18-147561) were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

Sample1203905249 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1713351

Method: TDS

Sample Analysis

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

Sample ID	Client ID
435718001	CAPA-18-147549
435718005	CAPA-18-147553
435718008	CAPA-18-147636
435718011	CAPA-18-147559
1203905836	Method Blank (MB)
1203905837	Laboratory Control Sample (LCS)
1203905840	435718008(CAPA-18-147636) 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 435718008 (CAPA-18-147636) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1713570

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
435718001	CAPA-18-147549
435718005	CAPA-18-147553
435718008	CAPA-18-147636
435718011	CAPA-18-147559
1203906355	Laboratory Control Sample (LCS)
1203906356	435410001(CAMO-18-147637) Sample Duplicate (DUP)
1203906357	435722001(WST15-17-148253) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH

Analytical Batch: 1714456 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
435718001	CAPA-18-147549
435718005	CAPA-18-147553
435718008	CAPA-18-147636
435718011	CAPA-18-147559
1203908780	Laboratory Control Sample (LCS)
1203908781	435718001(CAPA-18-147549) Sample Duplicate (DUP)
1203908841	436156001(CAPA-18-147569) 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 435718001 (CAPA-18-147549) and 436156001 (CAPA-18-147569) 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
1203908781 (CAPA-18-147549DUP)	pH	Received 21-OCT-17, out of holding 19-OCT-17
1203908841 (CAPA-18-147569DUP)	pH	Received 25-OCT-17, out of holding 23-OCT-17
435718001 (CAPA-18-147549)	pH	Received 21-OCT-17, out of holding 19-OCT-17
435718005 (CAPA-18-147553)	pH	Received 21-OCT-17, out of holding 19-OCT-17
435718008 (CAPA-18-147636)	pH	Received 21-OCT-17, out of holding 19-OCT-17
435718011 (CAPA-18-147559)	pH	Received 21-OCT-17, out of holding 19-OCT-17

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1714454 **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
435718001	CAPA-18-147549
435718005	CAPA-18-147553
435718008	CAPA-18-147636
435718011	CAPA-18-147559
1203908765	Laboratory Control Sample (LCS)
1203908768	435718001(CAPA-18-147549) Sample Duplicate (DUP)
1203908770	435718001(CAPA-18-147549) 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 435718001 (CAPA-18-147549) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

GEL LABORATORIES LLC

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Qualifier Definition Report for

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

Client SDG: 2018-539 GEL Work Order: 435718


The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 10 NOV 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147549
Sample ID: 435718001
Matrix: W
Collect Date: 19-OCT-17 13:41
Receive Date: 21-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	JXH5	10/24/17	0012	1711921	1
Chloride		1.84	0.067	0.200	mg/L		1					
Fluoride		0.235	0.033	0.100	mg/L		1					
Sulfate		1.65	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.266	0.017	0.050	mg/L	1.00	1	KLP1	10/27/17	1008	1713551	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.214	0.017	0.050	mg/L		1	KLP1	10/26/17	1331	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.149	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1415	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		150	3.40	14.3	mg/L			KLP1	10/26/17	1439	1713351	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		70.3	1.45	4.00	mg/L			RXB5	11/02/17	1712	1714454	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		156	1.00	1.00	umhos/cm		1	VH1	11/07/17	1543	1713570	7
PH "As Received"												
pH at Temp 14.8C	H	8.02	0.010	0.100	SU		1	RXB5	11/02/17	1710	1714456	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	10/27/17	0730	1713550
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	10/26/17	1300	1713121

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147549
Sample ID: 435718001

Project: ESHL00114
Client ID: ARSL004

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

Notes:

Column headers are defined as follows:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147575
Sample ID: 435718002
Matrix: W
Collect Date: 19-OCT-17 13:41
Receive Date: 21-OCT-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		2.59	0.330	1.00	mg/L		1	TSM	11/01/17	2327	1711615	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	10/23/17	1216	1711667	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	10/25/17	1338	1712660	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/23/17	1106	1711666
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	10/25/17	1200	1712656

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: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147553
Sample ID: 435718005
Matrix: W
Collect Date: 19-OCT-17 13:10
Receive Date: 21-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	J	0.0687	0.067	0.200	mg/L		1	JXH5	10/24/17	0041	1711921	1
Chloride		8.64	0.067	0.200	mg/L		1					
Fluoride		0.173	0.033	0.100	mg/L		1					
Sulfate		7.96	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0488	0.017	0.050	mg/L	1.00	1	KLP1	10/27/17	1011	1713551	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		1.08	0.085	0.250	mg/L		5	KLP1	10/26/17	1333	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.084	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1416	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		141	3.40	14.3	mg/L			KLP1	10/26/17	1439	1713351	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		77.8	1.45	4.00	mg/L			RXB5	11/02/17	1716	1714454	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		219	1.00	1.00	umhos/cm		1	VH1	11/07/17	1548	1713570	7
PH "As Received"												
pH at Temp 15.2C	H	8.31	0.010	0.100	SU		1	RXB5	11/02/17	1715	1714456	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	10/27/17	0730	1713550
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	10/26/17	1300	1713121

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Certificate of Analysis

Report Date: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147553
Sample ID: 435718005

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: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147579
Sample ID: 435718006
Matrix: W
Collect Date: 19-OCT-17 13:10
Receive Date: 21-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.541	0.330	1.00	mg/L		1	TSM	11/02/17	0014	1711615	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total		19.3	1.67	5.00	ug/L	1.00	1	AXH3	10/23/17	1217	1711667	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	10/25/17	1339	1712660	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/23/17	1106	1711666
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	10/25/17	1200	1712656

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: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147636
Sample ID: 435718008
Matrix: W
Collect Date: 19-OCT-17 09:51
Receive Date: 21-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	JXH5	10/24/17	0110	1711921	1
Chloride		2.49	0.067	0.200	mg/L		1					
Fluoride		0.240	0.033	0.100	mg/L		1					
Sulfate		3.18	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0225	0.017	0.050	mg/L	1.00	1	KLP1	10/27/17	1012	1713551	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.630	0.085	0.250	mg/L		5	KLP1	10/26/17	1334	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.0894	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1417	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		146	3.40	14.3	mg/L			KLP1	10/26/17	1439	1713351	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		62.9	1.45	4.00	mg/L			RXB5	11/02/17	1719	1714454	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		149	1.00	1.00	umhos/cm		1	VH1	11/07/17	1548	1713570	7
PH "As Received"												
pH at Temp 15.9C	H	8.03	0.010	0.100	SU		1	RXB5	11/02/17	1718	1714456	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	10/27/17	0730	1713550
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	10/26/17	1300	1713121

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Report Date: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147636
Sample ID: 435718008

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: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147651
Sample ID: 435718009
Matrix: W
Collect Date: 19-OCT-17 09:51
Receive Date: 21-OCT-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	11/02/17	0101	1711615	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	10/23/17	1218	1711667	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	10/25/17	1353	1712660	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/23/17	1106	1711666
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	10/25/17	1200	1712656

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: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147559
Sample ID: 435718011
Matrix: W
Collect Date: 19-OCT-17 10:55
Receive Date: 21-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	JXH5	10/24/17	0139	1711921	1
Chloride		3.26	0.067	0.200	mg/L		1					
Fluoride		0.296	0.033	0.100	mg/L		1					
Sulfate		4.62	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0372	0.017	0.050	mg/L	1.00	1	KLP1	10/27/17	1012	1713551	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.758	0.017	0.050	mg/L		1	KLP1	10/26/17	1335	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.0884	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1418	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		139	3.40	14.3	mg/L			KLP1	10/26/17	1439	1713351	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		69.5	1.45	4.00	mg/L			RXB5	11/02/17	1721	1714454	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		170	1.00	1.00	umhos/cm		1	VH1	11/07/17	1550	1713570	7
PH "As Received"												
pH at Temp 15.4C	H	8.22	0.010	0.100	SU		1	RXB5	11/02/17	1720	1714456	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	10/27/17	0730	1713550
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	10/26/17	1300	1713121

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Certificate of Analysis

Report Date: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147559
Sample ID: 435718011

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: November 10, 2017

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

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

Client SDG: 2018-539

Client Sample ID: CAPA-18-147585
Sample ID: 435718012
Matrix: W
Collect Date: 19-OCT-17 10:55
Receive Date: 21-OCT-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	11/02/17	0148	1711615	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	10/23/17	1223	1711667	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	10/25/17	1524	1712660	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/23/17	1106	1711666
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	10/25/17	1200	1712656

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

Quality Control Summary

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QC Summary

Report Date: November 10, 2017

Page 1 of 6

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

Contact: Ms. Nita Patel

Workorder: 435718

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1711615										
QC1203905562	436027004	DUP									
Total Organic Carbon Average		J	0.426	J	0.368	mg/L	14.6	^	(+/-1.00)	TSM	11/02/17 04:31
QC1203905560	LCS										
Total Organic Carbon Average	10.0				10.3	mg/L			103	(80%-120%)	11/01/17 13:28
QC1203905559	MB										
Total Organic Carbon Average			U		ND	mg/L					11/01/17 13:16
QC1203905564	436027004	PS									
Total Organic Carbon Average	10.0	J	0.426		11.2	mg/L			108	(75%-125%)	11/02/17 05:18
Flow Injection Analysis											
Batch	1711667										
QC1203901841	435630002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A			AXH3	10/23/17 12:02
QC1203901840	LCS										
Cyanide, Total	50.0				50.1	ug/L			100	(90%-110%)	10/23/17 11:54
QC1203901839	MB										
Cyanide, Total			U		ND	ug/L					10/23/17 11:45
QC1203901843	435630002	MS									
Cyanide, Total	100	U	ND		106	ug/L			106	(90%-110%)	10/23/17 12:03
Ion Chromatography											
Batch	1711921										
QC1203902550	435722001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A			JXH5	10/24/17 03:34

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QC Summary

Workorder: 435718

Page 2 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1711921										
Chloride		2.32		2.33	mg/L	0.671		(0%-20%)	JXH5	10/24/17	03:34
Fluoride		0.293		0.288	mg/L	1.86	^	(+/-0.100)			
Sulfate		2.12		2.08	mg/L	1.6		(0%-20%)			
QC1203902549 LCS											
Bromide	1.25			1.22	mg/L		97.9	(80%-120%)		10/23/17	23:43
Chloride	5.00			5.01	mg/L		100	(80%-120%)			
Fluoride	2.50			2.59	mg/L		104	(80%-120%)			
Sulfate	10.0			10.1	mg/L		101	(80%-120%)			
QC1203902548 MB											
Bromide			U	ND	mg/L					10/23/17	23:14
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203902551 435722001 PS											
Bromide	1.25	U	ND	1.25	mg/L		96.8	(75%-125%)		10/24/17	05:01
Chloride	5.00		2.32	7.50	mg/L		104	(75%-125%)			
Fluoride	2.50		0.293	2.94	mg/L		106	(75%-125%)			
Sulfate	10.0		2.12	12.1	mg/L		99.9	(75%-125%)			

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QC Summary

Workorder: 435718

Page 3 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1712660										
QC1203904070	435429002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	10/25/17	13:23
QC1203904067	LCS										
Nitrogen, Total Kjeldahl	1.00				1.00	mg/L		100 (90%-110%)		10/25/17	12:56
QC1203904066	MB										
Nitrogen, Total Kjeldahl			U		ND	mg/L				10/25/17	12:55
QC1203904071	435429002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND		0.839	mg/L		83.9* (90%-110%)		10/25/17	13:24
Batch	1713122										
QC1203905251	435630001	DUP									
Phosphorus, Total as P			0.0714		0.0658	mg/L	8.16 ^	(+/-0.050)	KLP1	10/26/17	14:04
QC1203905253	435630004	DUP									
Phosphorus, Total as P			0.0827		0.0877	mg/L	5.87 ^	(+/-0.050)		10/26/17	14:07
QC1203905250	LCS										
Phosphorus, Total as P	1.00				1.12	mg/L		112 (80%-124%)		10/26/17	14:03
QC1203905249	MB										
Phosphorus, Total as P			J		0.0361	mg/L				10/26/17	14:18
QC1203905252	435630001	MS									
Phosphorus, Total as P	1.00		0.0714		1.05	mg/L		97.9 (63%-139%)		10/26/17	14:05
QC1203905254	435630004	MS									
Phosphorus, Total as P	1.00		0.0827		1.16	mg/L		108 (63%-139%)		10/26/17	14:07
Batch	1713174										
QC1203905379	435630001	DUP									
Nitrogen, Nitrate/Nitrite			0.670		0.655	mg/L	2.26 ^	(+/-0.250)	KLP1	10/26/17	13:26

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QC Summary

Workorder: 435718

Page 4 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1713174										
QC1203905377	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.01	mg/L		101	(90%-110%)	KLP1	10/26/17	13:13
QC1203905376	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					10/26/17	13:11
QC1203905383	435630001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.134		1.16	mg/L		103	(90%-110%)		10/26/17	13:27
Batch	1713551										
QC1203906321	435718001	DUP									
Nitrogen, Ammonia		0.266		0.269	mg/L	1.12		(0%-20%)	KLP1	10/27/17	10:09
QC1203906318	LCS										
Nitrogen, Ammonia	1.00			1.00	mg/L		100	(90%-110%)		10/27/17	09:47
QC1203906317	MB										
Nitrogen, Ammonia			J	0.0208	mg/L					10/27/17	09:46
QC1203906322	435718001	MS									
Nitrogen, Ammonia	1.00	0.266		1.07	mg/L		80.4 *	(90%-110%)		10/27/17	10:10
Solids Analysis											
Batch	1713351										
QC1203905840	435718008	DUP									
Total Dissolved Solids		146		141	mg/L	2.99		(0%-5%)	KLP1	10/26/17	14:39
QC1203905837	LCS										
Total Dissolved Solids	300			307	mg/L		102	(95%-105%)		10/26/17	14:39
QC1203905836	MB										
Total Dissolved Solids			U	ND	mg/L					10/26/17	14:39

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QC Summary

Workorder: 435718

Page 5 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1713570										
QC1203906356	435410001	DUP									
Conductivity		151		152	umhos/cm	0.397		(0%-10%)	VH1	11/07/17	15:28
QC1203906357	435722001	DUP									
Conductivity		167		166	umhos/cm	0.3		(0%-10%)		11/07/17	15:54
QC1203906355	LCS										
Conductivity	1410			1410	umhos/cm		99.4	(95%-105%)		11/07/17	15:19
Batch	1714454										
QC1203908768	435718001	DUP									
Alkalinity, Total as CaCO3		70.3		69.9	mg/L	0.57		(0%-20%)	RXB5	11/02/17	17:12
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203908765	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		11/02/17	16:55
QC1203908770	435718001	MS									
Alkalinity, Total as CaCO3	100	70.3		172	mg/L		102	(80%-120%)		11/02/17	17:14
Batch	1714456										
QC1203908781	435718001	DUP									
pH	H	8.02	H	8.03	SU	0.125		(0%-5%)	RXB5	11/02/17	17:11
QC1203908841	436156001	DUP									
pH	H	8.19	H	8.20	SU	0.122		(0%-5%)		11/02/17	17:48
QC1203908780	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		11/02/17	17:09

Notes:

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

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QC Summary

Workorder: 435718

Page 6 of 6

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

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

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

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

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

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

Radiological Analysis

Case Narrative

**Radiochemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-539
Work Order #: 435718**

Method/Analysis Information

Product: Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1713388

Sample ID	Client ID
435718002	CAPA-18-147575
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585
1203905946	Method Blank (MB)
1203905948	Laboratory Control Sample (LCS)
1203905947	435630002(CAPA-18-147586) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in October 2017.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203905946 (MB) and 1203905948 (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: 435630002 (CAPA-18-147586). The QC was from ARSL work order 435630.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

Sample 1203905946 (MB) was recounted due to a peak shift. The recount is reported. Sample 435718009 (CAPA-18-147651) was recounted due to detector error. The recount is reported.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: ISOPU
Analytical Method: HASL-300:ISOPU
Analytical Batch Number: 1713389

Sample ID	Client ID
435718002	CAPA-18-147575
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585
1203905949	Method Blank (MB)
1203905951	Laboratory Control Sample (LCS)
1203905950	436322006(CAPA-18-147578) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in October 2017.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203905949 (MB) and 1203905951 (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: 436322006 (CAPA-18-147578). The QC was from ARSL work order 436322.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

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

Sample	Analyte	Value
1203905950 (CAPA-18-147578DUP)	Plutonium-239/240	Result 0.00248 < MDA 0.0557 > RDL 0.05 pCi/L
435718002 (CAPA-18-147575)	Plutonium-238	Result 0.00702 < MDA 0.0608 > RDL 0.05 pCi/L
	Plutonium-239/240	Result -0.0105 < MDA 0.0788 > RDL 0.05 pCi/L
435718006 (CAPA-18-147579)	Plutonium-239/240	Result -0.0146 < MDA 0.0545 > RDL 0.05 pCi/L
435718012 (CAPA-18-147585)	Plutonium-239/240	Result 0.0145 < MDA 0.0675 > RDL 0.05 pCi/L

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

Sample 1203905950 (CAPA-18-147578DUP) was recounted due to detector error. The recount is reported.

Sample 435718012 (CAPA-18-147585) was recounted due to results more negative than the three sigma TPU.

The second count is reported.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	IsoU
Analytical Method:	HASL-300:ISOU
Analytical Batch Number:	1713390

Sample ID	Client ID
435718002	CAPA-18-147575
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585
1203905952	Method Blank (MB)
1203905954	Laboratory Control Sample (LCS)
1203905953	435630002(CAPA-18-147586) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibrations were performed in November 2017 and October 2017.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:**Blank Information**

Aliquots for samples 1203905952 (MB) and 1203905954 (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
1203905952 (MB)	Uranium-233/234	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
1203905952 (MB)	Uranium-233/234	Blank result > DL

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 435630002 (CAPA-18-147586). The QC was from ARSL work order 435630.

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: **GammaSpec**

Analytical Method: EPA:901.1

Analytical Batch Number: 1711850

Sample ID	Client ID
435718002	CAPA-18-147575
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585
1203902340	Method Blank (MB)
1203902342	Laboratory Control Sample (LCS)
1203902341	435410002(CAMO-18-147652) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibrations were performed in February 2017, July 2017, June 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: 435410002 (CAMO-18-147652). The QC was from ARSL work order 435410.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GFPC, Sr90, liquid

Analytical Method: EPA:905.0

Analytical Batch Number: 1714181

Sample ID	Client ID
435718002	CAPA-18-147575
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585
1203907990	Method Blank (MB)
1203907993	Laboratory Control Sample (LCS)
1203907991	435560005(CAPA-18-147591) Sample Duplicate (DUP)
1203907992	435560005(CAPA-18-147591) Matrix Spike (MS)

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

SOP Reference

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

Calibration Information:

Calibration Information

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

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

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

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

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

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

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:**Sample-Specific MDA/MDC**

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

Additional Comments

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

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

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

Sample ID	Client ID
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435718002	CAPA-18-147575
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585
1203907999	Method Blank (MB)
1203908003	Laboratory Control Sample (LCS)
1203908000	435566006(CAMO-18-147684) Sample Duplicate (DUP)
1203908001	435566006(CAMO-18-147684) Matrix Spike (MS)
1203908002	435566006(CAMO-18-147684) Matrix Spike Duplicate (MSD)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 REV# 19.

Calibration Information:

Calibration Information

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

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

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

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

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

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between MS and MSD

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

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:

Holding Time

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

Negative > 3 sigma TPU

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

None of the samples have been flamed.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Sample-Specific MDA/MDC

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

Additional Comments

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

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

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

Sample ID	Client ID
435718002	CAPA-18-147575
435718006	CAPA-18-147579
435718009	CAPA-18-147651
435718012	CAPA-18-147585

1203917214	Method Blank (MB)
1203917218	Laboratory Control Sample (LCS)
1203917215	435429002(CAMO-18-147649) Sample Duplicate (DUP)
1203917216	435429002(CAMO-18-147649) Matrix Spike (MS)
1203917217	435429002(CAMO-18-147649) Matrix Spike Duplicate (MSD)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 REV# 19.

Calibration Information:

Calibration Information

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

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

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

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

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

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

Blank Decision Level

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

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

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

435429.

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between MS and MSD

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

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

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

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

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

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

Additional Comments

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

Qualifier Information

Manual qualifiers were not required.

Certification Statement

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

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: 2018-539 GEL Work Order: 435718

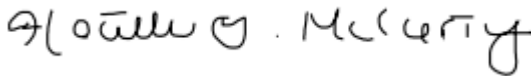
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Heather McCarty

Date: 16 NOV 2017

Title: Analyst II

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: November 16, 2017

Client Sample ID: CAPA-18-147575
Sample ID: 435718002
Matrix: W
Collect Date: 19-OCT-17
Receive Date: 21-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

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

Alphaspec Am241 Liquid "As Received"

Americium-241	U	0.00998	+/-0.00934	0.0437	0.0185	+/-0.00935	0.050	pCi/L			JXR5	11/05/17	1218	1713388	1
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ISOPU "As Received"

Plutonium-238	U	0.00702	+/-0.014	0.0608	0.0257	+/-0.014	0.050	pCi/L			JXR5	11/08/17	1455	1713389	2
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Plutonium-239/240	U	-0.0105	+/-0.0189	0.0788	0.0347	+/-0.0189	0.050	pCi/L							
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IsoU "As Received"

Uranium-234		0.240	+/-0.026	0.0519	0.0226	+/-0.0284	1.00	pCi/L			JXR5	11/05/17	1532	1713390	3
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Uranium-235/236	U	0.0182	+/-0.00857	0.0552	0.0235	+/-0.00862	1.00	pCi/L							
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Uranium-238		0.123	+/-0.0187	0.0502	0.0218	+/-0.0196	0.500	pCi/L							
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Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	-1.25	+/-1.75	6.02	2.66	+/-1.78	8.00	pCi/L			MXR1	11/07/17	0941	1711850	4
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Cobalt-60	U	-0.535	+/-1.55	6.07	2.49	+/-1.56	8.00	pCi/L							
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Neptunium-237	U	-4.66	+/-3.17	10.4	4.81	+/-3.36		pCi/L							
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Potassium-40	U	10.7	+/-33.4	59.2	24.1	+/-33.4		pCi/L							
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Sodium-22	U	2.03	+/-1.47	6.78	2.86	+/-1.55		pCi/L							
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Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	0.244	+/-0.135	0.440	0.197	+/-0.136	0.500	pCi/L			LXB3	11/09/17	1111	1714181	5
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WSP-GrossA/B "As Received"

Beta		3.64	+/-0.755	2.26	1.07	+/-0.813	3.00	pCi/L			AXH4	11/08/17	1207	1714187	6
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Alpha	U	0.389	+/-0.627	2.46	0.816	+/-0.629	3.00	pCi/L			AXH4	11/11/17	1411	1717894	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"	1713388	94.7	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1713389	53.8	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1713390	89.6	(50%-105%)

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147575

Sample ID: 435718002

Project: ESHL00114

Client ID: ARSL004

Report Date: November 16, 2017

Parameter	Qualifier	Result Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Strontium Carrier		GFPC, Sr90, liquid "As Received"						1714181	94.3	(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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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: CAPA-18-147579

Sample ID: 435718006

Matrix: W

Collect Date: 19-OCT-17

Receive Date: 21-OCT-17

Collector: Client

Report Date: November 16, 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	0.00267	+/-0.00597	0.0468	0.0198	+/-0.00597	0.050	pCi/L			JXR5	11/05/17	1218	1713388	1
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ISOPU "As Received"

Plutonium-238	U	-0.00971	+/-0.00767	0.0421	0.0177	+/-0.00768	0.050	pCi/L			JXR5	11/08/17	1455	1713389	2
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Plutonium-239/240	U	-0.0146	+/-0.0084	0.0545	0.024	+/-0.0084	0.050	pCi/L							
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IsoU "As Received"

Uranium-234		0.380	+/-0.0337	0.0614	0.0268	+/-0.0387	1.00	pCi/L			JXR5	11/05/17	1532	1713390	3
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Uranium-235/236	U	0.0179	+/-0.0108	0.0653	0.0278	+/-0.0108	1.00	pCi/L							
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Uranium-238		0.212	+/-0.0264	0.0594	0.0258	+/-0.0285	0.500	pCi/L							
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Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	0.213	+/-0.949	3.60	1.57	+/-0.951	8.00	pCi/L			MXR1	11/07/17	0941	1711850	4
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Cobalt-60	U	2.15	+/-1.03	4.87	2.09	+/-1.15	8.00	pCi/L							
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Neptunium-237	U	-0.169	+/-2.11	6.99	3.18	+/-2.11		pCi/L							
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Potassium-40	U	1.57	+/-13.9	58.0	25.6	+/-13.9		pCi/L							
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Sodium-22	U	1.17	+/-0.939	4.25	1.79	+/-0.978		pCi/L							
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Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	-0.0224	+/-0.119	0.451	0.198	+/-0.119	0.500	pCi/L			LXB3	11/09/17	1111	1714181	5
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WSP-GrossA/B "As Received"

Beta		4.98	+/-0.756	2.08	0.971	+/-0.862	3.00	pCi/L			AXH4	11/08/17	1209	1714187	6
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Alpha	U	2.35	+/-0.982	2.76	1.00	+/-1.00	3.00	pCi/L			AXH4	11/11/17	1411	1717894	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"	1713388	84.7	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1713389	70.4	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1713390	73.7	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1714181	85.4	(50%-105%)

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Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147579

Sample ID: 435718006

Project: ESHL00114

Client ID: ARSL004

Report Date: November 16, 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: CAPA-18-147651

Sample ID: 435718009

Matrix: W

Collect Date: 19-OCT-17

Receive Date: 21-OCT-17

Collector: Client

Report Date: November 16, 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	-0.00233	+/-0.00699	0.0408	0.0173	+/-0.00699	0.050	pCi/L			JXR5	11/06/17	1742	1713388	1
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ISOPU "As Received"

Plutonium-238	U	-0.0128	+/-0.00741	0.0371	0.0156	+/-0.00741	0.050	pCi/L			JXR5	11/08/17	1455	1713389	2
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Plutonium-239/240	U	-0.0257	+/-0.00907	0.0481	0.0211	+/-0.00907	0.050	pCi/L							
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IsoU "As Received"

Uranium-234		0.313	+/-0.0329	0.0643	0.028	+/-0.0365	1.00	pCi/L			JXR5	11/05/17	1532	1713390	3
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Uranium-235/236	U	0.0338	+/-0.0135	0.0684	0.0291	+/-0.0136	1.00	pCi/L							
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Uranium-238		0.155	+/-0.0241	0.0622	0.027	+/-0.0254	0.500	pCi/L							
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Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	1.74	+/-1.06	4.40	1.97	+/-1.14	8.00	pCi/L			MXR1	11/07/17	0942	1711850	4
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Cobalt-60	U	2.38	+/-1.02	4.94	2.12	+/-1.16	8.00	pCi/L							
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Neptunium-237	U	1.65	+/-1.96	7.61	3.49	+/-1.99		pCi/L							
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Potassium-40	U	-8.24	+/-16.8	68.1	30.6	+/-16.9		pCi/L							
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Sodium-22	U	-1.05	+/-0.981	3.25	1.29	+/-1.01		pCi/L							
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Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	-0.297	+/-0.103	0.442	0.200	+/-0.103	0.500	pCi/L			LXB3	11/09/17	1111	1714181	5
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WSP-GrossA/B "As Received"

Beta		3.55	+/-0.679	1.96	0.920	+/-0.743	3.00	pCi/L			AXH4	11/08/17	1209	1714187	6
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Alpha	U	0.0471	+/-0.579	2.62	0.934	+/-0.579	3.00	pCi/L			AXH4	11/11/17	1413	1717894	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"	1713388	99	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1713389	87.3	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1713390	71.7	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1714181	95.5	(50%-105%)

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Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147651

Sample ID: 435718009

Project: ESHL00114

Client ID: ARSL004

Report Date: November 16, 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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Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147585

Sample ID: 435718012

Matrix: W

Collect Date: 19-OCT-17

Receive Date: 21-OCT-17

Collector: Client

Report Date: November 16, 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	0.0107	+/-0.00925	0.0468	0.0198	+/-0.00927	0.050	pCi/L			JXR5	11/05/17	1218	1713388	1
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ISOPU "As Received"

Plutonium-238	U	0.0076	+/-0.00828	0.0522	0.0218	+/-0.00829	0.050	pCi/L			JXR5	11/09/17	1847	1713389	2
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Plutonium-239/240	U	0.0145	+/-0.0102	0.0675	0.0295	+/-0.0103	0.050	pCi/L							
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IsoU "As Received"

Uranium-234		0.344	+/-0.0354	0.0701	0.0306	+/-0.0397	1.00	pCi/L			JXR5	11/05/17	1532	1713390	3
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Uranium-235/236	U	0.0368	+/-0.0159	0.0746	0.0317	+/-0.016	1.00	pCi/L							
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Uranium-238		0.106	+/-0.022	0.0678	0.0294	+/-0.0226	0.500	pCi/L							
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Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	0.355	+/-1.02	3.97	1.74	+/-1.03	8.00	pCi/L			MXR1	11/07/17	0942	1711850	4
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Cobalt-60	U	0.873	+/-0.692	3.52	1.40	+/-0.721	8.00	pCi/L							
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Neptunium-237	U	-2.15	+/-1.82	5.11	2.23	+/-1.89		pCi/L							
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Potassium-40	U	-17.5	+/-14.3	54.1	23.5	+/-14.9		pCi/L							
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Sodium-22	U	0.945	+/-0.839	3.95	1.62	+/-0.868		pCi/L							
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Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	0.0358	+/-0.119	0.438	0.191	+/-0.119	0.500	pCi/L			LXB3	11/09/17	1111	1714181	5
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WSP-GrossA/B "As Received"

Beta		4.34	+/-0.683	1.89	0.883	+/-0.773	3.00	pCi/L			AXH4	11/08/17	1207	1714187	6
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Alpha	U	1.12	+/-0.801	2.72	0.986	+/-0.806	3.00	pCi/L			AXH4	11/11/17	1413	1717894	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"	1713388	83.4	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1713389	86.6	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1713390	75.1	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1714181	79	(50%-105%)

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Certificate of Analysis

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Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147585

Sample ID: 435718012

Project: ESHL00114

Client ID: ARSL004

Report Date: November 16, 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

GEL LABORATORIES LLC

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QC Summary

Report Date: November 16, 2017
Page 1 of 6

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

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 435718

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1713388										
QC1203905947	435630002	DUP									
Americium-241	U	-0.00202	U	0.00497	pCi/L	0.261		(0-1)	JXR5	11/05/17	12:18
	Uncert:	+/-0.00729		+/-0.00608							
	TPU:	+/-0.00729		+/-0.00609							
**Americium-243 Tracer	2.62	2.15		2.50	pCi/L		95.2	(50%-105%)			
	Uncert:	+/-0.0731		+/-0.0808							
	TPU:	+/-0.136		+/-0.144							
QC1203905948	LCS										
Americium-241	1.97			1.80	pCi/L		91.7	(80%-120%)	JXR5	11/05/17	12:18
	Uncert:			+/-0.0588							
	TPU:			+/-0.100							
**Americium-243 Tracer	2.10			1.92	pCi/L		91.4	(50%-105%)			
	Uncert:			+/-0.0629							
	TPU:			+/-0.114							
QC1203905946	MB										
Americium-241			U	0.00284	pCi/L				JXR5	11/06/17	17:11
	Uncert:			+/-0.00634							
	TPU:			+/-0.00635							
**Americium-243 Tracer	2.10			1.41	pCi/L		67.2	(50%-105%)			
	Uncert:			+/-0.0769							
	TPU:			+/-0.130							
Batch	1713389										
QC1203905950	436322006	DUP									
Plutonium-238	U	-0.0122	U	0.00248	pCi/L	0.43		(0-1)	JXR5	11/09/17	13:00
	Uncert:	+/-0.00968		+/-0.00743							
	TPU:	+/-0.00968		+/-0.00743							
Plutonium-239/240	U	-0.0184	U	0.00248	pCi/L	0.53		(0-1)			
	Uncert:	+/-0.0122		+/-0.00743							
	TPU:	+/-0.0122		+/-0.00743							
**Plutonium-242 Tracer	2.47	1.83		1.66	pCi/L		67.2	(50%-105%)			
	Uncert:	+/-0.0879		+/-0.0791							
	TPU:	+/-0.165		+/-0.156							
QC1203905951	LCS										
Plutonium-238			U	0.00726	pCi/L			(80%-120%)	JXR5	11/08/17	14:56
	Uncert:			+/-0.00541							
	TPU:			+/-0.00543							
Plutonium-239/240	1.98			2.14	pCi/L		108	(80%-120%)			
	Uncert:			+/-0.072							
	TPU:			+/-0.140							
**Plutonium-242 Tracer	1.97			1.49	pCi/L		75.6	(50%-105%)			
	Uncert:			+/-0.0692							
	TPU:			+/-0.131							

GEL LABORATORIES LLC

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

QC Summary

Workorder: 435718

Page 2 of 6

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1713389										
QC1203905949	MB										
Plutonium-238			U	0.00	pCi/L				JXR5	11/08/17	14:56
				Uncert:							
				TPU:							
Plutonium-239/240			U	0.00872	pCi/L						
				Uncert:							
				TPU:							
**Plutonium-242 Tracer	1.97			1.69	pCi/L		85.5	(50%-105%)			
				Uncert:							
				TPU:							
Batch	1713390										
QC1203905953	435630002 DUP										
Uranium-234		0.500		0.567	pCi/L	0.351		(0-1)	JXR5	11/06/17	09:16
		Uncert:		+/-0.0414							
		TPU:		+/-0.0503							
Uranium-235/236		U	0.0367	U	0.0623	pCi/L	0.413	(0-1)			
		Uncert:		+/-0.0168							
		TPU:		+/-0.0171							
Uranium-238		0.265		0.264	pCi/L	0.005		(0-1)			
		Uncert:		+/-0.0295							
		TPU:		+/-0.0324							
**Uranium-232 Tracer	2.62	1.79		1.89	pCi/L		72.1	(50%-105%)			
		Uncert:		+/-0.0894							
		TPU:		+/-0.160							
QC1203905954	LCS										
Uranium-234				2.34	pCi/L				JXR5	11/06/17	09:16
		Uncert:		+/-0.0715							
		TPU:		+/-0.136							
Uranium-235/236				0.163	pCi/L						
		Uncert:		+/-0.0215							
		TPU:		+/-0.0229							
Uranium-238	2.70			2.64	pCi/L		97.9	(80%-120%)			
		Uncert:		+/-0.0759							
		TPU:		+/-0.151							
**Uranium-232 Tracer	2.10			1.69	pCi/L		80.9	(50%-105%)			
		Uncert:		+/-0.0678							
		TPU:		+/-0.124							
QC1203905952	MB										
Uranium-234			U	0.0352	pCi/L				JXR5	11/05/17	15:33
		Uncert:		+/-0.0123							
		TPU:		+/-0.0125							
Uranium-235/236			U	0.0124	pCi/L						
		Uncert:		+/-0.00762							
		TPU:		+/-0.00764							
Uranium-238			U	0.00252	pCi/L						
		Uncert:		+/-0.00665							
		TPU:		+/-0.00666							

GEL LABORATORIES LLC

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

QC Summary

Workorder: 435718

Page 3 of 6

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1713390										
**Uranium-232 Tracer	2.10			1.51	pCi/L		71.8	(50%-105%)			
	Uncert:			+/-0.0729							
	TPU:			+/-0.129							
Rad Gamma Spec											
Batch	1711850										
QC1203902341	435410002	DUP									
Cesium-137	U	0.321	U	-0.252	pCi/L	0.106		(0-1)	MXR1	11/07/17	11:43
	Uncert:	+/-1.15		+/-1.54							
	TPU:	+/-1.15		+/-1.54							
Cobalt-60	U	0.479	U	-1.74	pCi/L	0.437		(0-1)			
	Uncert:	+/-0.935		+/-1.55							
	TPU:	+/-0.941		+/-1.60							
Neptunium-237	U	-2.02	U	0.208	pCi/L	0.245		(0-1)			
	Uncert:	+/-2.10		+/-2.40							
	TPU:	+/-2.15		+/-2.40							
Potassium-40	U	10.7	U	20.6	pCi/L	0.107		(0-1)			
	Uncert:	+/-14.6		+/-31.7							
	TPU:	+/-14.6		+/-31.7							
Sodium-22	U	0.534	U	-0.493	pCi/L	0.245		(0-1)			
	Uncert:	+/-1.00		+/-1.08							
	TPU:	+/-1.01		+/-1.08							
QC1203902342	LCS										
Americium-241	34300			37000	pCi/L		108	(80%-120%)	MXR1	11/03/17	15:07
	Uncert:			+/-822							
	TPU:			+/-1940							
Cesium-137	13000			13400	pCi/L		103	(80%-120%)			
	Uncert:			+/-180							
	TPU:			+/-587							
Cobalt-60	11300			11700	pCi/L		103	(80%-120%)			
	Uncert:			+/-191							
	TPU:			+/-557							
Neptunium-237			U	74.3	pCi/L						
	Uncert:			+/-62.8							
	TPU:			+/-65.2							
Potassium-40			U	12.6	pCi/L						
	Uncert:			+/-95.7							
	TPU:			+/-95.7							
Sodium-22			U	5.12	pCi/L						
	Uncert:			+/-17.1							
	TPU:			+/-17.1							
QC1203902340	MB										
Cesium-137			U	-1.1	pCi/L				MXR1	11/07/17	11:02
	Uncert:			+/-1.11							
	TPU:			+/-1.14							
Cobalt-60			U	0.669	pCi/L						
	Uncert:			+/-1.21							

GEL LABORATORIES LLC

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

QC Summary

Workorder: 435718

Page 4 of 6

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

GEL LABORATORIES LLC

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

QC Summary

Workorder: 435718

Page 5 of 6

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

Notes:

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

The Qualifiers in this report are defined as follows:

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

GEL LABORATORIES LLC

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

QC Summary

Workorder: 435718

Page 6 of 6

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

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

** Indicates analyte is a surrogate/tracer compound.

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

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

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