

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of field COCs
3. Validation Report
4. Laboratory analysis

Comments:

[illegible]

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11415

EVENT NAME: LA/Pueblo (TA 21) and Ancho (MDA AB)
MY2017 Q4

SAMPLE ID: CAAN-17-144827

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	09/22/2017	ok	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):	1057		MEDIA:	W	
PRS ID:	ok		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-30		FIELD PREP:	F	
LOCATION TYPE:	mon		FIELD QC TYPE:	REG	
TOP DEPTH:	N/A		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	N/A		EXCAVATED:		YES / NO / (NA)

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

SAMPLE COMMENTS: none

LOCATION COMMENTS: none

FIELD PARAMETERS: none

Sample Time NA HH:MM

COLLECTED BY (PRINT): A. Visil, T. Vander Vrs

RELINQUISHED BY (Printed Name) <i>Mauricio Sandoz</i> (Signature) <i>Mauricio Sandoz</i>	Date/Time 9/22/17 12:00	RECEIVED BY (Printed Name) <i>M. Sandoz</i> (Signature) <i>M. Sandoz</i>	Date/Time 9/22/17 12:00
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 09/06/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11415

EVENT NAME: LA/Pueblo (TA 21) and Ancho (MDA AB)
MY2017 Q4

SAMPLE ID: CAAN-17-144829

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	09/22/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1057		MEDIA:	W	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-30		FIELD PREP:	UF	
LOCATION TYPE:	mon		FIELD QC TYPE:	REG	
TOP DEPTH:	NA		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	NA		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-8330B-NMED HEXP	1 LITER AMBER GLASS	3	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: generator Running at about 50' away

LOCATION COMMENTS: none

FIELD PARAMETERS:

PH = 8.113V Spec. Cond = 118.8 μ S/cm Turb = 0.28 NTU
 Sample Time 1057 HH:MM Temp = 20.2°C DO = 7.00 mg/L ORP = 292.3 mV

COLLECTED BY (PRINT):

GPM = 5.7 gpm
 A. Visil, T. Vander Vis

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11415**EVENT NAME:** LA/Pueblo (TA 21) and Ancho (MDA AB)
MY2017 Q4**SAMPLE ID:** CAAN-17-144829**WORK ORDER:**

RELINQUISHED BY (Printed Name) <i>Mauricio Shundo</i> (Signature) <i>Mauricio Shundo</i>	Date/Time <i>9/22/17</i> <i>12:00</i>	RECEIVED BY <i>M. Martin</i> (Printed Name) (Signature) <i>M. Martin</i>	Date/Time <i>9/22/17</i> <i>12:00</i>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 09/06/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11415

EVENT NAME: LA/Pueblo (TA 21) and Ancho (MDA AB)
MY2017 Q4

SAMPLE ID: CAAN-17-144830

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	09/22/2017	ok	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):	1057		MEDIA:	w	
PRS ID:	ok		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-30		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FB	
TOP DEPTH:	NA		SAMPLE USAGE:	QC	
BOTTOM DEPTH:	NA		EXCAVATED:		YES / NO / NA

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

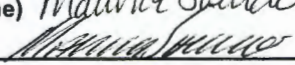
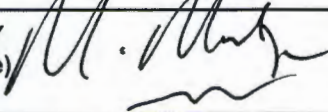
SAMPLE COMMENTS: none

LOCATION COMMENTS: none

FIELD PARAMETERS: none

Sample Time NA HH:MM

COLLECTED BY (PRINT): K. Tow

RELINQUISHED BY (Printed Name) Maurice Spence (Signature) 	Date/Time 9/22/17 12:00	RECEIVED BY (Printed Name) M. Althoff (Signature) 	Date/Time 9/22/17 12:00
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 09/06/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11415

EVENT NAME: LA/Pueblo (TA 21) and Ancho (MDA AB)
MY2017 Q4

SAMPLE ID: CAAN-17-144832

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	9/22/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1057		MEDIA:	W	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-30		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FTB	
TOP DEPTH:	NA		SAMPLE USAGE:	QC	
BOTTOM DEPTH:	NA		EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS: none 09-22-17

LOCATION COMMENTS: none

FIELD PARAMETERS: none

Sample Time NA HH:MM

COLLECTED BY (PRINT): A. Visil, T. Vander Joss

RELINQUISHED BY (Printed Name) <i>Maurice Shendo</i> (Signature) <i>[Signature]</i>	Date/Time 9/22/17 12:00	RECEIVED BY (Printed Name) <i>M. Montoya</i> (Signature) <i>[Signature]</i>	Date/Time 9/22/17 12:00
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 09/06/2017

COC: 2017-2890

TEST - Explosives		YES	NO
Samples collected from a WFO area			X
Field Test for Explosives Results		YES	NO
Spot test shows presence of explosives residues. If YES - Do not ship.		X	

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity.				X
Sample Activity (dpm/100cm 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		X
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.		X	
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 		X
Am-241, Pu-238, Pu-239/240, or Th 228 > 27,000,000 pCi; or Cs-137 > 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. If YES - Do not ship.			X
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on prior analytical measurements of radioactive isotopes.			X

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

HOLD SAMPLES FOR ANALYSIS	
The sampling location within TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, Sediment/Soil from Effluent Canyon, Mortandad Canyon from Effluent Canyon to the Soil Contamination Area near the sediment traps, Bayo Canyon at TA-10, TA-35, TA-15, TA-36, TA-39, TA-48 or TA-49 AND does not have usable field screening measurements of alpha and beta activity available AND the sampling location or related sampling location(s) do not have prior reliable analytical measurements of radioactive isotopes available AND knowledge of the sample is not acceptable to identify appropriate labeling.	

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

Hazard Assessment Completed By:	Date/Time
(Printed Name) Melissa Montoya	9/25/17
(Signature)	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) S. Sherwood	9/25/17
(Signature)	3pm

DATA VALIDATION REPORT

Chain Of Custody No. 2017-2890

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
433548	EPA:120.1	1				
433548	EPA:150.1	1				
433548	EPA:160.1	1				
433548	EPA:170.0	2		1	1	
433548	EPA:245.2	2				
433548	EPA:300.0	1				
433548	EPA:310.1	1				
433548	EPA:335.4	1				
433548	EPA:350.1	1				
433548	EPA:351.2	1				
433548	EPA:353.2	1				
433548	EPA:365.4	1				
433548	EPA:900	1				
433548	EPA:901.1	1				
433548	EPA:905.0	1				
433548	HASL-300:AM-241	1				
433548	HASL-300:ISOPU	1				
433548	HASL-300:ISOU	1				
433548	SM:A2340B	1				
433548	SW-846:6010C	1				
433548	SW-846:6020	1				
433548	SW-846:6850	1				
433548	SW-846:8260B	1		1	1	
433548	SW-846:8270D	1			1	
433548	SW-846:8330B	1				
433548	SW-846:9060	1				

DATA VALIDATION REPORT

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
433548	EPA:120.1	1706333	1706333	1										1				1			
433548	EPA:150.1	1703903	1703903	1										1				1			
433548	EPA:160.1	1703295	1703295	1					1					1				1			
433548	EPA:170.0	NA	NA	2		1	1														
433548	EPA:245.2	1705900	1705899	2					1	1				1				1			
433548	EPA:300.0	1704820	1704820	1					1					1				1			
433548	EPA:310.1	1703908	1703908	1						1				1				1			
433548	EPA:335.4	1703861	1703860	1					1	1				1				1			
433548	EPA:350.1	1705053	1705052	1					1	2				1				2			
433548	EPA:351.2	1705044	1705043	1					1	2				1				2			
433548	EPA:353.2	1705047	1705047	1					1					1				1			
433548	EPA:365.4	1705035	1705034	1					1	1				1				1			
433548	EPA:900	1704269	1704269	1					1	1	1			1				1			
433548	EPA:901.1	1703806	1703806	1					1					1				1			
433548	EPA:905.0	1704268	1704268	1					1	1				1				1			
433548	HASL-300:AM-241	1704325	1704325	1					1					1				1			
433548	HASL-300:ISOPU	1704326	1704326	1					1					1				1			
433548	HASL-300:ISOU	1704327	1704327	1					1					1				1			
433548	SM:A2340B	1710208	1710208	1																	
433548	SW-846:6010C	1703901	1703899	1					1	1				1				1			
433548	SW-846:6020	1703915	1703914	1					1	1				1				1			
433548	SW-846:6850	1704161	1704157	1					1	1	1			1							
433548	SW-846:8260B	1704601	1704601	1		1	1		1					2							
433548	SW-846:8270D	1704024	1704023	1			1		1	1	1			1							
433548	SW-846:8330B	1704128	1704126	1					1	1	1			1							
433548	SW-846:9060	1703144	1703144	1					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	CAAN-17-144827	433548001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CALA-17-144807	1203888587	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203888586	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAAN-17-144827	433548001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CALA-17-143818	1203882962	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203882961	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAAN-17-144827	433548001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203881532	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203881531	MB	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	WSTMO-17-147251	1203881534	DUP	1	0	0	0
EPA:170.0	VOC	CAAN-17-144827	433548001	REG	1	0	0	0
EPA:170.0	VOC	CAAN-17-144829	433548002	REG	1	0	0	0
EPA:170.0	VOC	CAAN-17-144830	433548004	FB	1	0	0	0
EPA:170.0	VOC	CAAN-17-144832	433548005	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAAN-17-144826	1203887585	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAAN-17-144826	1203887586	MS	0	0	1	0
EPA:245.2	INORGANIC	CAAN-17-144827	433548001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAAN-17-144829	433548002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203887584	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203887583	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAAN-17-144827	433548001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CALA-17-143819	1203885092	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203885091	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203885090	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAAN-17-144826	1203882981	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAAN-17-144826	1203882983	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAAN-17-144827	433548001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203882979	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAAN-17-144829	1203882921	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAAN-17-144829	1203882923	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAAN-17-144829	433548002	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203882920	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203882919	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-17-144826	1203885583	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-17-144826	1203885584	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-17-144827	1203886315	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-17-144827	1203886316	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-17-144827	433548001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203885582	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203885581	MB	1	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:351.2	GENERAL CHEMISTRY	CAAN-17-144828	1203885560	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-17-144828	1203885561	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-17-144829	1203886313	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-17-144829	1203886314	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-17-144829	433548002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203885559	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203885558	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAAN-17-144826	1203885569	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAAN-17-144827	433548001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203885568	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203885567	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAAN-17-144826	1203885542	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAAN-17-144826	1203885543	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAAN-17-144827	433548001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203885541	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203885540	MB	1	0	0	0
EPA:900	RAD	CAAN-17-144829	433548002	REG	2	0	0	0
EPA:900	RAD	CALA-17-143815	1203883806	DUP	2	0	0	0
EPA:900	RAD	CALA-17-143815	1203883807	MS	0	0	2	0
EPA:900	RAD	CALA-17-143815	1203883808	MSD	0	0	2	0
EPA:900	RAD	LCS	1203883809	LCS	0	0	2	0
EPA:900	RAD	MB	1203883805	MB	2	0	0	0
EPA:901.1	RAD	CAAN-17-144829	433548002	REG	5	0	0	0
EPA:901.1	RAD	CALA-17-144813	1203882804	DUP	5	0	0	0
EPA:901.1	RAD	LCS	1203882805	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203882803	MB	5	0	0	0
EPA:905.0	RAD	CAAN-17-144829	433548002	REG	1	0	0	0
EPA:905.0	RAD	CALA-17-144818	1203883798	DUP	1	0	0	0
EPA:905.0	RAD	CALA-17-144818	1203883799	MS	0	0	1	0
EPA:905.0	RAD	LCS	1203883800	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203883797	MB	1	0	0	0
HASL-300:AM-241	RAD	CAAN-17-144828	1203883964	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAAN-17-144829	433548002	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203883965	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203883963	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAAN-17-144828	1203883967	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAAN-17-144829	433548002	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203883968	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203883966	MB	2	0	0	0
HASL-300:ISOU	RAD	CAAN-17-144828	1203883970	DUP	3	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
HASL-300:ISOU	RAD	CAAN-17-144829	433548002	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203883971	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203883969	MB	3	0	0	0
SM:A2340B	INORGANIC	CAAN-17-144827	433548001	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAAN-17-144826	1203882957	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAAN-17-144826	1203882958	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAAN-17-144827	433548001	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203882956	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203882955	MB	17	0	0	0
SW-846:6020	INORGANIC	CAAN-17-144826	1203882990	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAAN-17-144826	1203882991	MS	0	0	11	0
SW-846:6020	INORGANIC	CAAN-17-144827	433548001	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203882989	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203882988	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAAN-17-144827	433548001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CALA-17-144806	1203883509	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CALA-17-144806	1203883510	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203883508	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203883507	MB	1	0	0	0
SW-846:8260B	VOC	CAAN-17-144829	433548003	REG	80	3	0	0
SW-846:8260B	VOC	CAAN-17-144830	433548004	FB	80	3	0	0
SW-846:8260B	VOC	CAAN-17-144832	433548005	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203884638	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203884639	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203884637	MB	80	3	0	0
SW-846:8270D	SVOC	CAAN-17-144828	1203883245	MS	0	6	76	0
SW-846:8270D	SVOC	CAAN-17-144828	1203883246	MSD	0	6	76	0
SW-846:8270D	SVOC	CAAN-17-144829	433548003	REG	80	6	0	0
SW-846:8270D	SVOC	CAAN-17-144830	433548004	FB	80	6	0	0
SW-846:8270D	SVOC	LCS	1203883244	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203883243	MB	80	6	0	0
SW-846:8330B	LCMS/MS HIGH	CAAN-17-144828	1203883445	MS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAAN-17-144828	1203883446	MSD	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAAN-17-144829	433548002	REG	20	1	0	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203883444	LCS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	MB	1203883443	MB	20	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAAN-17-144829	433548002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CALA-17-143813	1203882503	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203882500	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203882499	MB	1	0	0	0

DATA VALIDATION REPORT

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203882955	METHOD BLANK	SW-846:6010C	W	Sodium	146	J	ug/L	300
CAAN-17-144830	433548004	FIELD BLANK	EPA:170.0	W	Temperature	1		Deg C	
CAAN-17-144832	433548005	TRIP BLANK	EPA:170.0	W	Temperature	1		Deg C	

No.

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
CAAN-17-144828	1203885561		EPA:351.2	Total Kjeldahl Nitrogen	1705043	10-02-2017	W	81.7		110	90	10		

DATA VALIDATION REPORT

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAAN-17-144826	1203885543		EPA:365.4	Total Phosphate as Phosphorus	1705034	10-02-2017	W	145		139	63	10		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00681	pCi/L	0.00681	pCi/L	0.0299	0.00539	W	09/22/2017		1704325	VAL	Y
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-2.01	pCi/L	-2.01	pCi/L	5.05	1.45	W	09/22/2017		1703806	VAL	Y
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.976	pCi/L	-0.976	pCi/L	5.61	1.58	W	09/22/2017		1703806	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-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.544	pCi/L	0.544	pCi/L	2.74	0.716	W	09/22/2017		1704269	VAL	Y
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	0.927	pCi/L	0.927	pCi/L	2.75	0.807	W	09/22/2017		1704269	VAL	Y
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	1.77	pCi/L	1.77	pCi/L	11.4	3.09	W	09/22/2017		1703806	VAL	Y
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.00699	pCi/L	0.00699	pCi/L	0.0404	0.00773	W	09/22/2017		1704326	VAL	Y
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0163	pCi/L	-0.0163	pCi/L	0.0524	0.00902	W	09/22/2017		1704326	VAL	Y
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5a	N	79.1	pCi/L	79.1	pCi/L	54.6	30.0	W	09/22/2017		1703806	VAL	Y
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-1.34	pCi/L	-1.34	pCi/L	5.47	1.84	W	09/22/2017		1703806	VAL	Y
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.0837	pCi/L	-0.0837	pCi/L	0.436	0.102	W	09/22/2017		1704268	VAL	Y
R-30	2017-2890	CAAN-17-144829	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0488	pCi/L	0.0488	pCi/L	0.105	0.0201	W	09/22/2017		1704327	VAL	Y

Reason Code

Description

J_LAB

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

NQ

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

R5

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

R5a

The analyte should be regarded as rejected because spectral interferences prevent positive identification of the analytes.

U_LAB

The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAAN-17-144827	R-30	REG	EPA:120.1	0	1
CAAN-17-144827	R-30	REG	EPA:150.1	0	1
CAAN-17-144827	R-30	REG	EPA:160.1	0	1
CAAN-17-144827	R-30	REG	EPA:170.0	0	1
CAAN-17-144827	R-30	REG	EPA:245.2	0	1
CAAN-17-144827	R-30	REG	EPA:300.0	0	4
CAAN-17-144827	R-30	REG	EPA:310.1	0	2
CAAN-17-144827	R-30	REG	EPA:350.1	0	1
CAAN-17-144827	R-30	REG	EPA:353.2	0	1
CAAN-17-144827	R-30	REG	EPA:365.4	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAAN-17-144827	R-30	REG	SM:A2340B	0	1
CAAN-17-144827	R-30	REG	SW-846:6010C	0	17
CAAN-17-144827	R-30	REG	SW-846:6020	0	11
CAAN-17-144827	R-30	REG	SW-846:6850	0	1
CAAN-17-144829	R-30	REG	EPA:170.0	0	1
CAAN-17-144829	R-30	REG	EPA:245.2	0	1
CAAN-17-144829	R-30	REG	EPA:335.4	0	1
CAAN-17-144829	R-30	REG	EPA:351.2	0	1
CAAN-17-144829	R-30	REG	EPA:900	0	2
CAAN-17-144829	R-30	REG	EPA:901.1	0	5
CAAN-17-144829	R-30	REG	EPA:905.0	0	1
CAAN-17-144829	R-30	REG	HASL-300:AM-241	0	1
CAAN-17-144829	R-30	REG	HASL-300:ISOPU	0	2
CAAN-17-144829	R-30	REG	HASL-300:ISOU	0	3
CAAN-17-144829	R-30	REG	SW-846:8260B	0	80
CAAN-17-144829	R-30	REG	SW-846:8270D	0	80
CAAN-17-144829	R-30	REG	SW-846:8330B	0	20
CAAN-17-144829	R-30	REG	SW-846:9060	0	1
CAAN-17-144830	R-30	FB	EPA:170.0	0	1
CAAN-17-144830	R-30	FB	SW-846:8260B	0	80
CAAN-17-144830	R-30	FB	SW-846:8270D	0	80
CAAN-17-144832	R-30	FTB	EPA:170.0	0	1
CAAN-17-144832	R-30	FTB	SW-846:8260B	0	80

October 17, 2017

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

Re: LANL- WQH Water Samples
Work Order: 433548
SDG: 2017-2890

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on September 26, 2017, and analyzed for Explosives by LCMSMS, 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,



Katrina Hiott for
Valerie Davis
Project Manager

Chain of Custody: 2017-2890
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 433548
SDG: 2017-2890

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 433548
SDG # : 2017-2890**

October 17, 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 September 26, 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>
433548001	CAAN-17-144827
433548002	CAAN-17-144829
433548003	CAAN-17-144829
433548004	CAAN-17-144830
433548005	CAAN-17-144832

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: Explosives by LCMSMS, 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.


Katrina Hiott for
Valerie Davis
Project Manager

List of current GEL Certifications as of 17 October 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	SC000122017-23
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Chain of Custody and Supporting Documentation

COC: 2017-2890

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

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

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

HOLD SAMPLES FOR ANALYSIS
The sampling location within TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, Sediment/Soil from Effluent Canyon, Mortandad Canyon from Effluent Canyon to the Soil Contamination Area near the sediment traps, Bayo Canyon at TA-10, TA-35, TA-15, TA-36, TA-39, TA-48 or TA-49 AND does not have usable field screening measurements of alpha and beta activity available AND the sampling location or related sampling location(s) do not have prior reliable analytical measurements of radioactive isotopes available AND knowledge of the sample is not acceptable to identify appropriate labeling.

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

Hazard Assessment Completed By:	Date/Time
(Printed Name) Melissa Mark	9/25/17
(Signature)	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) S. Sherwood	9/25/17
(Signature)	3pm



Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: <u>ESIL</u>		SDG/AR/COC/Work Order: <u>438548</u>
Received By: <u>ZKW</u>		Date Received: <u>9/26/17</u>
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 <u>5908 1782 7681-212 (reham only)</u> <u>5908 1782 7692-12</u> <u>5908 1782 7707-32</u> <u>5908 1782 7718-32</u>
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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hazard Class Shipped: _____ UN#: _____
COC/Samples marked or classified as radioactive?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius <u>See</u> TEMP: <u>Above</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <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 type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials metDate 9/26/17Page 1 of 1

GL-CHL-SR-001 Rev 5

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

SHIP DATE: 25SEP17
ACTWGT: 48.0 LB MAN
CAD: 0014176/CAFE291

LOS ALAMOS, NM 87545
UNITED STATES US

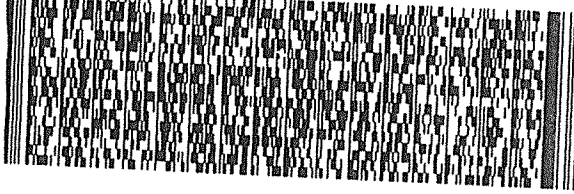
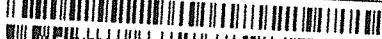
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



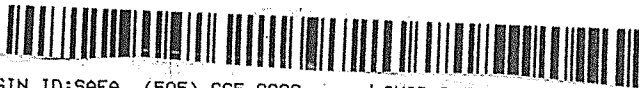
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TUE - 26 SEP 10:30A
PRIORITY OVERNIGHT

X7 RBWA

29407

SC-US CHS



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

SHIP DATE: 25SEP17
ACTWGT: 30.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

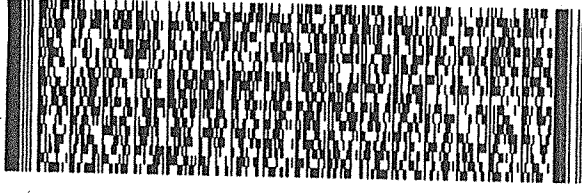
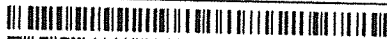
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



1 of 3
TRK# 5908 1782 7681
0201

TUE - 26 SEP 10:30A
PRIORITY OVERNIGHT

X7 RBWA

29407

SC-US CHS

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

SHIP DATE: 25SEP17
ACTWGT: 50.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

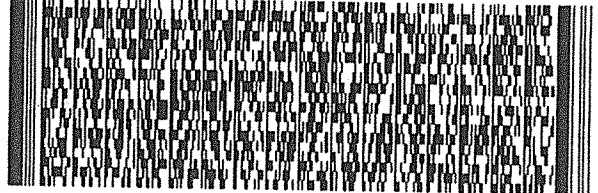
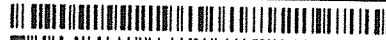
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



3 of 3
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0263

Mstr# 5908 1782 7681

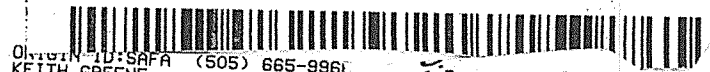
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TUE - 26 SEP 10:30A
PRIORITY OVERNIGHT

X7 RBWA

29407

SC-US CHS



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

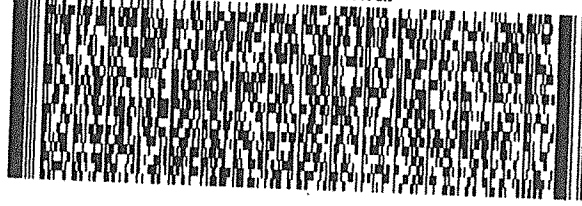
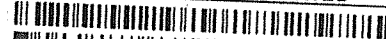
LOS ALAMOS, NM 87545
UNITED STATES US

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



2 of 3
MPS# 5908 1782 7692
0263

Mstr# 5908 1782 7681

0201

TUE - 26 SEP 10:30A
PRIORITY OVERNIGHT

X7 RBWA

29407

SC-US CHS



Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

Qualifier Explanation

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a surrogate compound

< Result is less than value reported

> Result is greater than value reported

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL

A The TIC is a suspected aldol-condensation product

B Target analyte was detected in the associated blank

B Metals-Either presence of analyte detected in the associated blank, or
MDL/IDL < sample value < PQL

BD Results are either below the MDC or tracer recovery is low

C Analyte has been confirmed by GC/MS analysis

D Results are reported from a diluted aliquot of the sample

d 5-day BOD-The 2:1 depletion requirement was not met for this sample

E Organics-Concentration of the target analyte exceeds the instrument calibration range

E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria

H Analytical holding time was exceeded

h Preparation or preservation holding time was exceeded

J Value is estimated

N Metals-The Matrix spike sample recovery is not within specified control limits

N Organics-Presumptive evidence based on mass spectral library search to make a tentative
identification of the analyte (TIC). Quantitation is based on nearest internal standard
response factor

N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration
by 4X or more

ND Analyte concentration is not detected above the reporting limit

UI Gamma Spectroscopy-Uncertain identification

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Y QC Samples were not spiked with this compound

Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.
For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Volatile Analysis

Case Narrative

**GC/MS Volatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2890
Work Order #: 433548**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch
Number: 1704601

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
433548003	CAAN-17-144829
433548004	CAAN-17-144830
433548005	CAAN-17-144832
1203884637	Method Blank (MB)
1203884638	Laboratory Control Sample (LCS)
1203884639	Laboratory Control Sample (LCS)
1203884640	433548003(CAAN-17-144829) Post Spike (PS)
1203884641	433548003(CAAN-17-144829) Post Spike (PS)
1203884642	433548003(CAAN-17-144829) Post Spike Duplicate (PSD)
1203884643	433548003(CAAN-17-144829) Post Spike Duplicate (PSD)

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

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

SOP Reference

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

Calibration Information

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

Initial Calibration

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

Continuing Calibration Verification Requirements

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

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

The blank analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 433548003 (CAAN-17-144829) 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
VOA4.I	Hewlett Packard 6890/5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	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: 2017-2890 GEL Work Order: 433548

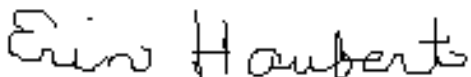
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 20 OCT 2017

Title: Data Validator

Sample Data Summary

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	433548003	Date Received:	09/26/2017 09:05		
Client Sample:	VOA/SVOA	Client:	ARSL004	Project:	ESHL00114
Client ID:	CAAN-17-144829	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1704601	Inst:	VOA4.I	Dilution:	1
Run Date:	09/28/2017 12:03	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/28/2017 12:03				
Data File:	092817V4\4B409.D	Column:	DB-624		

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	433548003	Date Received:	09/26/2017 09:05		
Client Sample:	VOA/SVOA	Client:	ARSL004	Project:	ESHL00114
Client ID:	CAAN-17-144829	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1704601	Inst:	VOA4.I	Dilution:	1
Run Date:	09/28/2017 12:03	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/28/2017 12:03				
Data File:	092817V4\4B409.D	Column:	DB-624		

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	433548003	Date Received:	09/26/2017 09:05		
Client Sample:	VOA/SVOA	Client:	ARSL004	Project:	ESHL00114
Client ID:	CAAN-17-144829	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1704601	Inst:	VOA4.I	Dilution:	1
Run Date:	09/28/2017 12:03	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/28/2017 12:03				
Data File:	092817V4\4B409.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	52.5	50.0	ug/L	105 (71%-134%)
Bromofluorobenzene	46.7	50.0	ug/L	93 (70%-131%)
Toluene-d8	51.9	50.0	ug/L	104 (74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown hydrocarbon	4.301	39.8	ug/L	0	J
	unknown siloxane	12.107	5.08	ug/L	0	J
	unknown siloxane	14.491	14.5	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 433548004	Date Received: 09/26/2017 09:05	
Client Sample: VOA/SVOA	Client: ARSL004	Project: ESHL00114
Client ID: CAAN-17-144830	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 12:32	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 12:32		
Data File: 092817V4\4B410.D	Column: DB-624	

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 433548004	Date Received: 09/26/2017 09:05	
Client Sample: VOA/SVOA	Client: ARSL004	Project: ESHL00114
Client ID: CAAN-17-144830	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 12:32	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 12:32		
Data File: 092817V4\4B410.D	Column: DB-624	

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 433548004	Date Received: 09/26/2017 09:05	
Client Sample: VOA/SVOA	Client: ARSL004	Project: ESHL00114
Client ID: CAAN-17-144830	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 12:32	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 12:32		
Data File: 092817V4\4B410.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	50.5	50.0	ug/L 101	(71%-134%)
Bromofluorobenzene	46.1	50.0	ug/L 92	(70%-131%)
Toluene-d8	50.6	50.0	ug/L 101	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown hydrocarbon	4.301	29.5	ug/L	0	J
	unknown siloxane	12.101	5.45	ug/L	0	J
	unknown siloxane	14.491	11.6	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 433548005	Date Received: 09/26/2017 09:05	
Client Sample: VOA	Client: ARSL004	Project: ESHL00114
Client ID: CAAN-17-144832	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 13:02	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 13:02		
Data File: 092817V4\4B411.D	Column: DB-624	

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	433548005	Date Received:	09/26/2017 09:05		
Client Sample:	VOA	Client:	ARSL004	Project:	ESHL00114
Client ID:	CAAN-17-144832	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1704601	Inst:	VOA4.I	Dilution:	1
Run Date:	09/28/2017 13:02	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/28/2017 13:02				
Data File:	092817V4\4B411.D	Column:	DB-624		

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 433548005	Date Received: 09/26/2017 09:05	
Client Sample: VOA	Client: ARSL004	Project: ESHL00114
Client ID: CAAN-17-144832	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 13:02	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 13:02		
Data File: 092817V4\4B411.D	Column: DB-624	

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.0	50.0	ug/L	102 (71%-134%)
Bromofluorobenzene	44.8	50.0	ug/L	90 (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 hydrocarbon	4.309	30.5	ug/L	0	J
	unknown siloxane	12.107	6.76	ug/L	0	J
	unknown siloxane	14.491	13.3	ug/L	0	J

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2017-2890**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203884638	LCS for batch 1704601	96	101	91
1203884639	LCS for batch 1704601	92	101	91
1203884637	MB for batch 1704601	93	102	93
433548003	CAAN-17-144829	105	104	93
433548004	CAAN-17-144830	101	101	92
433548005	CAAN-17-144832	102	100	90
1203884640	CAAN-17-144829PS	100	103	91
1203884642	CAAN-17-144829PSD	101	103	94
1203884641	CAAN-17-144829PS	103	104	94
1203884643	CAAN-17-144829PSD	100	104	96

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: 2017-2890

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1704601

Matrix: WATER

Lab Sample ID 1203884638

Instrument: VOA4.I

Analysis Date: 09/28/2017 09:07

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	86.3	86	71-127
75-05-8	LCS Acetonitrile	1250	0.0	920	74	61-125
67-64-1	LCS Acetone	250	0.0	177	71	48-157
74-88-4	LCS Iodomethane	250	0.0	211	84	72-128
75-15-0	LCS Carbon disulfide	250	0.0	200	80	69-138
108-05-4	LCS Vinyl acetate	250	0.0	230	92	67-125
78-93-3	LCS 2-Butanone	250	0.0	187	75	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	190	76	66-124
591-78-6	LCS 2-Hexanone	250	0.0	198	79	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	57.2	114	40-160
74-87-3	LCS Chloromethane	50.0	0.0	49.1	98	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	50.3	101	65-137
74-83-9	LCS Bromomethane	50.0	0.0	51.7	103	63-137
75-00-3	LCS Chloroethane	50.0	0.0	47.9	96	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	50.1	100	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	47.9	96	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	40.1	80	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	41.5	83	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	40.5	81	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	42.8	86	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	42.6	85	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	44.6	89	75-123

Volatile
Quality Control Summary
Spike Recovery Report

SDG Number: 2017-2890

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1704601

Matrix: WATER

Lab Sample ID 1203884638

Instrument: VOA4.I

Analysis Date: 09/28/2017 09:07

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	41.4	83	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	46.2	92	76-125
67-66-3	LCS Chloroform	50.0	0.0	43.5	87	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	42.4	85	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	40.9	82	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	43.2	86	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	42.5	85	74-122
71-43-2	LCS Benzene	50.0	0.0	42.2	84	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	43.9	88	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	42.2	84	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	43.9	88	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	44.5	89	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	43.6	87	78-131
108-88-3	LCS Toluene	50.0	0.0	42.5	85	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	43.5	87	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	44.3	89	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	42.1	84	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	44.0	88	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	45.0	90	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	45.5	91	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	43.3	87	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	42.3	85	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2017-2890

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1704601

Matrix: WATER

Lab Sample ID 1203884638

Instrument: VOA4.I

Analysis Date: 09/28/2017 09:07

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	42.0	84	74-126
100-42-5	LCS Styrene	50.0	0.0	44.2	88	72-130
75-25-2	LCS Bromoform	50.0	0.0	41.8	84	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	41.5	83	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	41.6	83	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	42.4	85	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	43.7	87	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	41.0	82	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	43.0	86	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	43.3	87	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	42.1	84	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	44.5	89	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	42.9	86	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	43.0	86	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	43.1	86	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	44.6	89	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	42.9	86	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	42.1	84	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	40.0	80	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	44.9	90	72-136
91-20-3	LCS Naphthalene	50.0	0.0	46.1	92	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	47.5	95	70-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2017-2890

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1704601

Matrix: WATER

Lab Sample ID 1203884638

Instrument: VOA4.I

Analysis Date: 09/28/2017 09:07

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	46.5	93	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	45.3	91	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	43.6	87	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4040	81	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2017-2890

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1704601

Matrix: WATER

Lab Sample ID 1203884639

Instrument: VOA4.I

Analysis Date: 09/28/2017 10:05

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	179	72	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	230	92	61-148
107-05-1	LCS Allyl chloride	250	0.0	200	80	59-125
107-13-1	LCS Acrylonitrile	250	0.0	195	78	65-122
107-12-0	LCS Propionitrile	250	0.0	186	74	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	191	76	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	201	80	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	204	82	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	1880	75	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	36.8	74	66-147

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2890

Sample Type: Post Spike

Client ID: CAAN-17-144829PS

Matrix: W

Lab Sample ID 1203884640

Instrument: VOA4.I

Analysis Date: 09/28/2017 18:25

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	89.5	89	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1050	84	56-131
67-64-1	PS Acetone	250	0.00 U	99.2	40	25-155
74-88-4	PS Iodomethane	250	0.00 U	231	92	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	223	89	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	230	92	48-133
78-93-3	PS 2-Butanone	250	0.00 U	136	55	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	210	84	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	152	61	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	56.8	114	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	51.2	102	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	51.3	103	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	54.9	110	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	50.0	100	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	51.5	103	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	48.4	97	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	43.0	86	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	44.8	90	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	43.2	86	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	45.5	91	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	45.1	90	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	47.3	95	69-127

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2017-2890

Sample Type: Post Spike

Client ID: CAAN-17-144829PS

Matrix: W

Lab Sample ID 1203884640

Instrument: VOA4.I

Analysis Date: 09/28/2017 18:25

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	43.0	86	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	49.0	98	71-130
67-66-3	PS Chloroform	50.0	0.00 U	46.0	92	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	45.9	92	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	42.9	86	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	46.6	93	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	44.5	89	69-130
71-43-2	PS Benzene	50.0	0.00 U	44.3	89	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	46.4	93	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	44.0	88	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	45.9	92	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	45.6	91	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	43.4	87	70-134
108-88-3	PS Toluene	50.0	0.00 U	44.5	89	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	44.3	89	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	47.2	94	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	44.2	88	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	46.2	92	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	46.3	93	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	48.2	96	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	45.2	90	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	44.2	88	61-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 8

SDG Number: 2017-2890

Sample Type: Post Spike

Client ID: CAAN-17-144829PS

Matrix: W

Lab Sample ID 1203884640

Instrument: VOA4.I

Analysis Date: 09/28/2017 18:25

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	43.9	88	62-131
100-42-5	PS Styrene	50.0	0.00 U	45.4	91	59-135
75-25-2	PS Bromoform	50.0	0.00 U	42.2	84	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	43.0	86	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	45.3	91	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	46.5	93	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	45.1	90	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	42.1	84	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	43.1	86	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	44.4	89	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	42.2	84	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	44.9	90	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	43.1	86	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	43.7	87	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	43.2	86	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	44.5	89	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	42.3	85	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	41.3	83	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	42.7	85	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	40.9	82	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	46.5	93	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	43.9	88	52-135

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 8

SDG Number: 2017-2890

Sample Type: Post Spike

Client ID: CAAN-17-144829PS

Matrix: W

Lab Sample ID 1203884640

Instrument: VOA4.I

Analysis Date: 09/28/2017 18:25

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	42.4	85	50-133
630-20-6	PS 1,1,1,2-Tetrachloroethane	50.0	0.00 U	47.2	94	71-133
95-50-1	PS 1,2-Dichlorobenzene	50.0	0.00 U	44.3	89	60-125
71-36-3	PS n-Butyl alcohol	5000	0.00 U	4560	91	60-140

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2890

Sample Type: Post Spike Duplicate

Client ID: CAAN-17-144829PSD

Matrix: W

Lab Sample ID 1203884642

Instrument: VOA4.I

Analysis Date: 09/28/2017 18:54

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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 88.1	88	59-132	1	0-20
75-05-8	PSD Acetonitrile	1250	0.00	U 1100	88	56-131	5	0-20
67-64-1	PSD Acetone	250	0.00	U 102	41	25-155	3	0-20
74-88-4	PSD Iodomethane	250	0.00	U 224	89	66-133	3	0-20
75-15-0	PSD Carbon disulfide	250	0.00	U 215	86	61-141	4	0-20
108-05-4	PSD Vinyl acetate	250	0.00	U 234	94	48-133	2	0-20
78-93-3	PSD 2-Butanone	250	0.00	U 141	57	25-143	4	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00	U 211	84	61-127	1	0-20
591-78-6	PSD 2-Hexanone	250	0.00	U 155	62	33-138	2	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00	U 56.3	113	33-164	1	0-20
74-87-3	PSD Chloromethane	50.0	0.00	U 51.2	102	53-139	0	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00	U 50.9	102	58-140	1	0-20
74-83-9	PSD Bromomethane	50.0	0.00	U 53.9	108	59-146	2	0-20
75-00-3	PSD Chloroethane	50.0	0.00	U 49.3	99	65-129	1	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00	U 50.6	101	65-141	2	0-20
60-29-7	PSD Ethyl ether	50.0	0.00	U 50.0	100	69-127	3	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00	U 41.6	83	59-130	3	0-20
75-09-2	PSD Methylene chloride	50.0	0.00	U 44.1	88	62-123	2	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00	U 43.8	88	69-132	1	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00	U 43.7	87	65-127	4	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00	U 44.1	88	67-127	2	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00	U 46.7	93	69-127	1	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2890

Sample Type: Post Spike Duplicate

Client ID: CAAN-17-144829PSD

Matrix: W

Lab Sample ID 1203884642

Instrument: VOA4.I

Analysis Date: 09/28/2017 18:54

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	42.2	84	66-137	2	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00 U	48.9	98	71-130	0	0-20
67-66-3	PSD Chloroform	50.0	0.00 U	45.0	90	71-129	2	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00 U	43.9	88	69-139	4	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00 U	41.7	83	67-130	3	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00 U	44.3	89	66-143	5	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00 U	44.9	90	69-130	1	0-20
71-43-2	PSD Benzene	50.0	0.00 U	43.8	88	66-125	1	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00 U	45.2	90	65-131	3	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00 U	43.5	87	67-127	1	0-20
74-95-3	PSD Dibromomethane	50.0	0.00 U	46.4	93	72-129	1	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00 U	45.5	91	70-138	0	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00 U	43.4	87	70-134	0	0-20
108-88-3	PSD Toluene	50.0	0.00 U	43.5	87	60-126	2	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00 U	44.3	89	69-135	0	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00 U	47.0	94	66-125	0	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00 U	44.6	89	67-124	1	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00 U	44.9	90	60-130	3	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00 U	46.9	94	68-143	1	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00 U	49.7	99	71-127	3	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00 U	44.9	90	64-124	1	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00 U	43.6	87	61-130	1	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2890

Sample Type: Post Spike Duplicate

Client ID: CAAN-17-144829PSD

Matrix: W

Lab Sample ID 1203884642

Instrument: VOA4.I

Analysis Date: 09/28/2017 18:54

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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 43.2	86	62-131	2	0-20
100-42-5	PSD Styrene	50.0	0.00	U 44.9	90	59-135	1	0-20
75-25-2	PSD Bromoform	50.0	0.00	U 42.8	86	64-138	1	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00	U 41.9	84	55-133	2	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00	U 46.4	93	62-129	2	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00	U 47.9	96	70-124	3	0-20
108-86-1	PSD Bromobenzene	50.0	0.00	U 45.6	91	62-124	1	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00	U 41.0	82	50-133	3	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00	U 42.9	86	53-135	0	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00	U 43.7	87	56-128	2	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00	U 41.9	84	53-130	1	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00	U 44.4	89	55-135	1	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00	U 43.0	86	53-132	0	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00	U 43.1	86	50-138	1	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00	U 43.0	86	49-138	0	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00	U 44.5	89	56-126	0	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00	U 42.8	86	55-125	1	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00	U 41.1	82	43-142	0	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00	U 44.7	89	62-141	5	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00	U 42.0	84	40-147	3	0-20
91-20-3	PSD Naphthalene	50.0	0.00	U 49.2	98	62-134	5	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00	U 46.0	92	52-135	5	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 8 of 8

SDG Number: 2017-2890

Sample Type: Post Spike Duplicate

Client ID: CAAN-17-144829PSD

Matrix: W

Lab Sample ID 1203884642

Instrument: VOA4.I

Analysis Date: 09/28/2017 18:54

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
120-82-1	PSD 1,2,4-Trichlorobenzene	50.0	0.00 U	44.1	88	50-133	4	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	47.2	94	71-133	0	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	44.5	89	60-125	0	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	4910	98	60-140	7	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 2

SDG Number: 2017-2890

Sample Type: Post Spike

Client ID: CAAN-17-144829PS

Matrix: W

Lab Sample ID 1203884641

Instrument: VOA4.I

Analysis Date: 09/28/2017 19:23

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

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	230	92	49-141
76-13-1	PS Trichlorotrifluoroethane	250	0.00 U	245	98	57-149
107-05-1	PS Allyl chloride	250	0.00 U	209	84	54-128
107-13-1	PS Acrylonitrile	250	0.00 U	254	101	59-129
107-12-0	PS Propionitrile	250	0.00 U	248	99	58-131
126-98-7	PS Methacrylonitrile	250	0.00 U	242	97	59-134
80-62-6	PS Methyl methacrylate	250	0.00 U	246	98	62-135
97-63-2	PS Ethyl methacrylate	250	0.00 U	234	94	60-136
78-83-1	PS Isobutyl alcohol	2500	0.00 U	2440	98	60-143
126-99-8	PS 2-Chloro-1,3-butadiene	50.0	0.00 U	38.2	76	63-146

Volatile

Page 2 of 2

Quality Control Summary
Spike Recovery Report

SDG Number: 2017-2890

Sample Type: Post Spike Duplicate

Client ID: CAAN-17-144829PSD

Matrix: W

Lab Sample ID 1203884643

Instrument: VOA4.I

Analysis Date: 09/28/2017 19:52

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1704601

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD Acrolein	250	0.00 U	223	89	49-141	3	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00 U	255	102	57-149	4	0-20
107-05-1	PSD Allyl chloride	250	0.00 U	217	87	54-128	4	0-20
107-13-1	PSD Acrylonitrile	250	0.00 U	248	99	59-129	2	0-20
107-12-0	PSD Propionitrile	250	0.00 U	239	96	58-131	4	0-20
126-98-7	PSD Methacrylonitrile	250	0.00 U	234	93	59-134	4	0-20
80-62-6	PSD Methyl methacrylate	250	0.00 U	241	96	62-135	2	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00 U	232	93	60-136	1	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00 U	2400	96	60-143	2	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00 U	39.8	80	63-146	4	0-20

Method Blank Summary

Page 1 of 1

SDG Number:	2017-2890	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1704601	Instrument ID:	VOA4.I	Data File:	092817V4\4B406a.D
Lab Sample ID:	1203884637	Prep Date:	09/28/2017 10:35	Analyzed:	09/28/17 10:35
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 1704601	1203884638	092817V4\4B403a.D	09/28/17	0907
02 LCS for batch 1704601	1203884639	092817V4\4B405a.D	09/28/17	1005
03 CAAN-17-144829	433548003	092817V4\4B409.D	09/28/17	1203
04 CAAN-17-144830	433548004	092817V4\4B410.D	09/28/17	1232
05 CAAN-17-144832	433548005	092817V4\4B411.D	09/28/17	1302
06 CAAN-17-144829PS	1203884640	092817V4\4B422.D	09/28/17	1825
07 CAAN-17-144829PSD	1203884642	092817V4\4B423.D	09/28/17	1854
08 CAAN-17-144829PS	1203884641	092817V4\4B424.D	09/28/17	1923
09 CAAN-17-144829PSD	1203884643	092817V4\4B425.D	09/28/17	1952

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890

Matrix: WATER

Lab Sample ID: 1203884637

Client Sample: QC for batch 1704601

Client: ARSL004

Project: QC

Client ID: MB for batch 1704601

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1704601

Inst: VOA4.I

Dilution: 1

Run Date: 09/28/2017 10:35

Analyst: VXY1

Purge Vol: 5 mL

Prep Date: 09/28/2017 10:35

Data File: 092817V4\4B406a.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890		Matrix: WATER
Lab Sample ID: 1203884637		
Client Sample: QC for batch 1704601	Client: ARSL004	Project: QC
Client ID: MB for batch 1704601	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 10:35	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 10:35		
Data File: 092817V4\4B406a.D	Column: DB-624	

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2890	Matrix:	WATER
Lab Sample ID:	1203884637		
Client Sample:	QC for batch 1704601	Client:	ARSL004
Client ID:	MB for batch 1704601	Method:	SW-846:8260B
Batch ID:	1704601	Inst:	VOA4.I
Run Date:	09/28/2017 10:35	Analyst:	VXY1
Prep Date:	09/28/2017 10:35	Purge Vol:	5 mL
Data File:	092817V4\4B406a.D	Column:	DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	46.6	50.0	ug/L 93	(71%-134%)
Bromofluorobenzene	46.7	50.0	ug/L 93	(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 hydrocarbon	4.27	15.3	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890

Matrix: WATER

Lab Sample ID: 1203884638

Client Sample: QC for batch 1704601

Client: ARSL004

Project: QC

Client ID: LCS for batch 1704601

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1704601

Inst: VOA4.I

Dilution: 1

Run Date: 09/28/2017 09:07

Analyst: VXY1

Purge Vol: 5 mL

Prep Date: 09/28/2017 09:07

Data File: 092817V4\4B403a.D

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		45.3	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		42.4	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		41.6	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		44.3	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		42.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		40.1	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		40.9	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		47.5	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		42.4	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		46.5	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		42.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		40.0	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		45.5	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		43.6	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		42.5	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		42.2	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		43.0	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		44.6	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		42.1	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		42.9	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		41.4	ug/L	0.300	1.00
78-93-3	2-Butanone		187	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		43.3	ug/L	0.300	1.00
591-78-6	2-Hexanone		198	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		42.1	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		43.1	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		190	ug/L	1.50	5.00
67-64-1	Acetone		177	ug/L	1.50	10.0
75-05-8	Acetonitrile		920	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		42.2	ug/L	0.300	1.00
108-86-1	Bromobenzene		43.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		46.2	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		44.5	ug/L	0.300	1.00
75-25-2	Bromoform		41.8	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2890

Lab Sample ID: 1203884638

Client Sample: QC for batch 1704601

Client ID: LCS for batch 1704601

Batch ID: 1704601

Run Date: 09/28/2017 09:07

Prep Date: 09/28/2017 09:07

Data File: 092817V4\4B403a.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: VXY1

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		51.7	ug/L	0.300	1.00
75-15-0	Carbon disulfide		200	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		43.2	ug/L	0.300	1.00
108-90-7	Chlorobenzene		43.3	ug/L	0.300	1.00
75-00-3	Chloroethane		47.9	ug/L	0.300	1.00
67-66-3	Chloroform		43.5	ug/L	0.300	1.00
74-87-3	Chloromethane		49.1	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		45.0	ug/L	0.300	1.00
74-95-3	Dibromomethane		43.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		57.2	ug/L	0.300	1.00
60-29-7	Ethyl ether		47.9	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		42.3	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		44.9	ug/L	0.300	1.00
74-88-4	Iodomethane		211	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		41.5	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		41.5	ug/L	1.00	10.0
91-20-3	Naphthalene		46.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		44.2	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		44.0	ug/L	0.300	1.00
108-88-3	Toluene		42.5	ug/L	0.300	1.00
79-01-6	Trichloroethylene		43.9	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		50.1	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		230	ug/L	1.50	5.00
75-01-4	Vinyl chloride		50.3	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		44.6	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		43.6	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		86.3	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4040	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		42.1	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		41.0	ug/L	0.300	1.00
95-47-6	o-Xylene		42.0	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		43.0	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2890	Matrix:	WATER
Lab Sample ID:	1203884638		
Client Sample:	QC for batch 1704601	Client:	ARSL004
Client ID:	LCS for batch 1704601	Method:	SW-846:8260B
Batch ID:	1704601	Inst:	VOA4.I
Run Date:	09/28/2017 09:07	Analyst:	VXY1
Prep Date:	09/28/2017 09:07	Purge Vol:	5 mL
Data File:	092817V4\4B403a.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		40.5	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		44.5	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		42.8	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		43.5	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.0	50.0	96	(71%-134%)
Bromofluorobenzene	45.6	50.0	91	(70%-131%)
Toluene-d8	50.3	50.0	101	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890

Matrix: WATER

Lab Sample ID: 1203884639

Client Sample: QC for batch 1704601

Client: ARSL004

Project: QC

Client ID: LCS for batch 1704601

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1704601

Inst: VOA4.I

Dilution: 1

Run Date: 09/28/2017 10:05

Analyst: VXY1

Purge Vol: 5 mL

Prep Date: 09/28/2017 10:05

Data File: 092817V4\4B405a.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		36.8	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		179	ug/L	1.50	5.00
107-13-1	Acrylonitrile		195	ug/L	1.50	5.00
107-05-1	Allyl chloride		200	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:	2017-2890	Matrix:	WATER
Lab Sample ID:	1203884639		
Client Sample:	QC for batch 1704601	Client:	ARSL004
Client ID:	LCS for batch 1704601	Method:	SW-846:8260B
Batch ID:	1704601	Inst:	VOA4.I
Run Date:	09/28/2017 10:05	Analyst:	VXY1
Prep Date:	09/28/2017 10:05	Purge Vol:	5 mL
Data File:	092817V4\4B405a.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		204	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		1880	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		191	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		201	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		186	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		230	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:	2017-2890	Matrix:	WATER
Lab Sample ID:	1203884639		
Client Sample:	QC for batch 1704601	Client:	ARSL004
Client ID:	LCS for batch 1704601	Method:	SW-846:8260B
Batch ID:	1704601	Inst:	VOA4.I
Run Date:	09/28/2017 10:05	Analyst:	VXY1
Prep Date:	09/28/2017 10:05	Purge Vol:	5 mL
Data File:	092817V4\4B405a.D	Column:	DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	46.2	50.0	92	(71%-134%)
Bromofluorobenzene	45.4	50.0	91	(70%-131%)
Toluene-d8	50.5	50.0	101	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	1203884640	Date Received:	09/26/2017 09:05		
Client Sample:	QC for batch 1704601	Client:	ARSL004	Project:	QC
Client ID:	CAAN-17-144829PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1704601	Inst:	VOA4.I	Dilution:	1
Run Date:	09/28/2017 18:25	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/28/2017 18:25				
Data File:	092817V4\4B422.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		47.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		45.9	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		45.3	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		45.1	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		43.0	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		42.9	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		43.9	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		46.5	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		42.4	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		43.1	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		42.7	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		48.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		44.3	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		44.5	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		44.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		43.1	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		44.5	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		44.2	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		42.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		43.0	ug/L	0.300	1.00
78-93-3	2-Butanone		136	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		44.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		152	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		42.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		43.2	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		210	ug/L	1.50	5.00
67-64-1	Acetone		99.2	ug/L	1.50	10.0
75-05-8	Acetonitrile		1050	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		44.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		45.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		49.0	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		45.6	ug/L	0.300	1.00
75-25-2	Bromoform		42.2	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 1203884640	Date Received: 09/26/2017 09:05	
Client Sample: QC for batch 1704601	Client: ARSL004	Project: QC
Client ID: CAAN-17-144829PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 18:25	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 18:25		
Data File: 092817V4\4B422.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		54.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		223	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		46.6	ug/L	0.300	1.00
108-90-7	Chlorobenzene		45.2	ug/L	0.300	1.00
75-00-3	Chloroethane		50.0	ug/L	0.300	1.00
67-66-3	Chloroform		46.0	ug/L	0.300	1.00
74-87-3	Chloromethane		51.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		46.3	ug/L	0.300	1.00
74-95-3	Dibromomethane		45.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		56.8	ug/L	0.300	1.00
60-29-7	Ethyl ether		48.4	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		44.2	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		40.9	ug/L	0.300	1.00
74-88-4	Iodomethane		231	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		43.0	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		44.8	ug/L	1.00	10.0
91-20-3	Naphthalene		46.5	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		45.4	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.2	ug/L	0.300	1.00
108-88-3	Toluene		44.5	ug/L	0.300	1.00
79-01-6	Trichloroethylene		46.4	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		51.5	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		230	ug/L	1.50	5.00
75-01-4	Vinyl chloride		51.3	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		47.3	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		43.4	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		89.5	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4560	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		41.3	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		42.1	ug/L	0.300	1.00
95-47-6	o-Xylene		43.9	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		43.7	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	1203884640	Date Received:	09/26/2017 09:05		
Client Sample:	QC for batch 1704601	Client:	ARSL004	Project:	QC
Client ID:	CAAN-17-144829PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1704601	Inst:	VOA4.I	Dilution:	1
Run Date:	09/28/2017 18:25	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/28/2017 18:25				
Data File:	092817V4\4B422.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		43.2	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		44.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		45.5	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		44.3	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.1	50.0	ug/L 100	(71%-134%)
Bromofluorobenzene	45.7	50.0	ug/L 91	(70%-131%)
Toluene-d8	51.7	50.0	ug/L 103	(74%-124%)

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	1203884641	Date Received:	09/26/2017 09:05		
Client Sample:	QC for batch 1704601	Client:	ARSL004	Project:	QC
Client ID:	CAAN-17-144829PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1704601	Inst:	VOA4.I	Dilution:	1
Run Date:	09/28/2017 19:23	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/28/2017 19:23				
Data File:	092817V4\4B424.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		38.2	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		230	ug/L	1.50	5.00
107-13-1	Acrylonitrile		254	ug/L	1.50	5.00
107-05-1	Allyl chloride		209	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: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 1203884641	Date Received: 09/26/2017 09:05	
Client Sample: QC for batch 1704601	Client: ARSL004	Project: QC
Client ID: CAAN-17-144829PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 19:23	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 19:23		
Data File: 092817V4\4B424.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		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		2440	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		242	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		246	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		248	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		245	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	1203884641	Date Received:	09/26/2017 09:05		
Client Sample:	QC for batch 1704601	Client:	ARSL004	Project:	QC
Client ID:	CAAN-17-144829PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1704601	Inst:	VOA4.I	Dilution:	1
Run Date:	09/28/2017 19:23	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/28/2017 19:23				
Data File:	092817V4\4B424.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.6	50.0	ug/L	103 (71%-134%)
Bromofluorobenzene	47.0	50.0	ug/L	94 (70%-131%)
Toluene-d8	52.2	50.0	ug/L	104 (74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 1203884642	Date Received: 09/26/2017 09:05	
Client Sample: QC for batch 1704601	Client: ARSL004	Project: QC
Client ID: CAAN-17-144829PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 18:54	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 18:54		
Data File: 092817V4\4B423.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		47.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		43.9	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		46.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.0	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		44.1	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		41.6	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		41.7	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		46.0	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		47.9	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		44.1	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		43.0	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		44.7	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		49.7	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		44.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		44.9	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		43.5	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		42.9	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		44.5	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		44.6	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		42.8	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		42.2	ug/L	0.300	1.00
78-93-3	2-Butanone		141	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		43.7	ug/L	0.300	1.00
591-78-6	2-Hexanone		155	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		41.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		43.0	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		211	ug/L	1.50	5.00
67-64-1	Acetone		102	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		43.8	ug/L	0.300	1.00
108-86-1	Bromobenzene		45.6	ug/L	0.300	1.00
74-97-5	Bromochloromethane		48.9	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		45.5	ug/L	0.300	1.00
75-25-2	Bromoform		42.8	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 1203884642	Date Received: 09/26/2017 09:05	
Client Sample: QC for batch 1704601	Client: ARSL004	Project: QC
Client ID: CAAN-17-144829PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 18:54	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 18:54		
Data File: 092817V4\4B423.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		53.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		215	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		44.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		44.9	ug/L	0.300	1.00
75-00-3	Chloroethane		49.3	ug/L	0.300	1.00
67-66-3	Chloroform		45.0	ug/L	0.300	1.00
74-87-3	Chloromethane		51.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		46.9	ug/L	0.300	1.00
74-95-3	Dibromomethane		46.4	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		56.3	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		43.6	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		42.0	ug/L	0.300	1.00
74-88-4	Iodomethane		224	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		41.9	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		44.1	ug/L	1.00	10.0
91-20-3	Naphthalene		49.2	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		44.9	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		44.9	ug/L	0.300	1.00
108-88-3	Toluene		43.5	ug/L	0.300	1.00
79-01-6	Trichloroethylene		45.2	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		50.6	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		234	ug/L	1.50	5.00
75-01-4	Vinyl chloride		50.9	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		46.7	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		43.4	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		88.1	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4910	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		41.1	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		41.0	ug/L	0.300	1.00
95-47-6	o-Xylene		43.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		43.1	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	1203884642	Date Received:	09/26/2017 09:05		
Client Sample:	QC for batch 1704601	Client:	ARSL004	Project:	QC
Client ID:	CAAN-17-144829PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1704601	Inst:	VOA4.I	Dilution:	1
Run Date:	09/28/2017 18:54	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/28/2017 18:54				
Data File:	092817V4\4B423.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		43.8	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		44.4	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		43.7	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		44.3	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.3	50.0	101	(71%-134%)
Bromofluorobenzene	47.0	50.0	94	(70%-131%)
Toluene-d8	51.5	50.0	103	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 1203884643	Date Received: 09/26/2017 09:05	
Client Sample: QC for batch 1704601	Client: ARSL004	Project: QC
Client ID: CAAN-17-144829PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 19:52	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 19:52		
Data File: 092817V4\4B425.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		39.8	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		223	ug/L	1.50	5.00
107-13-1	Acrylonitrile		248	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:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	1203884643	Date Received:	09/26/2017 09:05		
Client Sample:	QC for batch 1704601	Client:	ARSL004	Project:	QC
Client ID:	CAAN-17-144829PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1704601	Inst:	VOA4.I	Dilution:	1
Run Date:	09/28/2017 19:52	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/28/2017 19:52				
Data File:	092817V4\4B425.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		232	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		234	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		241	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		255	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: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 1203884643	Date Received: 09/26/2017 09:05	
Client Sample: QC for batch 1704601	Client: ARSL004	Project: QC
Client ID: CAAN-17-144829PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1704601	Inst: VOA4.I	Dilution: 1
Run Date: 09/28/2017 19:52	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/28/2017 19:52		
Data File: 092817V4\4B425.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	50.2	50.0	100	(71%-134%)
Bromofluorobenzene	48.2	50.0	96	(70%-131%)
Toluene-d8	52.0	50.0	104	(74%-124%)

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2890
Work Order #: 433548**

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:	1704024
Prep Batch Number:	1704023

Sample Analysis

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

Sample ID	Client ID
433548003	CAAN-17-144829
433548004	CAAN-17-144830
1203883243	Method Blank (MB)
1203883244	Laboratory Control Sample (LCS)
1203883245	433549003(CAAN-17-144828) Matrix Spike (MS)
1203883246	433549003(CAAN-17-144828) 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 433548003 (CAAN-17-144829) and 433548004 (CAAN-17-144830) 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 433549003 (CAAN-17-144828) 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 433548003 (CAAN-17-144829) and 433548004 (CAAN-17-144830) 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
MSDA.I	Agilent 7890B/5977A GC/MSD with 7693A Autoinjector	Agilent7890B/5977	DB-5MS	25m x 0.2mm x 0.33um (5% Polysilarylene-95% Polydimethylsiloxane)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the

requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-2890 GEL Work Order: 433548

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: 18 OCT 2017

Title: Data Validator

Sample Data Summary

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

Page 1 of 3

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 433548003	Date Received: 09/26/2017 09:05	
Client Sample: VOA/SVOA	Client: ARSL004	Project: ESHL00114
Client ID: CAAN-17-144829	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1704024	Inst: MSDA.I	Dilution: 1
Run Date: 09/29/2017 16:50	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 09/27/2017 18:23	Aliquot: 960 mL	Final Volume: 1 mL
Data File: 092917.s\AI2918.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.13	ug/L	3.13	10.4
120-82-1	1,2,4-Trichlorobenzene	U	3.13	ug/L	3.13	10.4
95-50-1	1,2-Dichlorobenzene	U	3.13	ug/L	3.13	10.4
122-66-7	Azobenzene	U	3.13	ug/L	3.13	10.4
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.13	ug/L	3.13	10.4
106-46-7	1,4-Dichlorobenzene	U	3.13	ug/L	3.13	10.4
123-91-1	1,4-Dioxane	U	3.13	ug/L	3.13	10.4
90-12-0	1-Methylnaphthalene	U	0.313	ug/L	0.313	1.04
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.13	ug/L	3.13	10.4
95-95-4	2,4,5-Trichlorophenol	U	3.13	ug/L	3.13	10.4
88-06-2	2,4,6-Trichlorophenol	U	3.13	ug/L	3.13	10.4
120-83-2	2,4-Dichlorophenol	U	3.13	ug/L	3.13	10.4
105-67-9	2,4-Dimethylphenol	U	3.13	ug/L	3.13	10.4
51-28-5	2,4-Dinitrophenol	U	5.21	ug/L	5.21	20.8
121-14-2	2,4-Dinitrotoluene	U	3.13	ug/L	3.13	10.4
606-20-2	2,6-Dinitrotoluene	U	3.13	ug/L	3.13	10.4
91-58-7	2-Chloronaphthalene	U	0.427	ug/L	0.427	1.04
95-57-8	2-Chlorophenol	U	3.13	ug/L	3.13	10.4
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.13	ug/L	3.13	10.4
91-57-6	2-Methylnaphthalene	U	0.313	ug/L	0.313	1.04
88-75-5	2-Nitrophenol	U	3.13	ug/L	3.13	10.4
91-94-1	3,3'-Dichlorobenzidine	U	3.13	ug/L	3.13	10.4
101-55-3	4-Bromophenylphenylether	U	3.13	ug/L	3.13	10.4
59-50-7	Parachlorometa cresol	U	3.13	ug/L	3.13	10.4
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.44	ug/L	3.44	10.4
7005-72-3	4-Chlorophenylphenylether	U	3.13	ug/L	3.13	10.4
100-02-7	4-Nitrophenol	U	3.13	ug/L	3.13	10.4
83-32-9	Acenaphthene	U	0.313	ug/L	0.313	1.04
208-96-8	Acenaphthylene	U	0.313	ug/L	0.313	1.04
62-53-3	Aniline	U	4.38	ug/L	4.38	10.4
120-12-7	Anthracene	U	0.313	ug/L	0.313	1.04
1912-24-9	Atrazine	U	3.13	ug/L	3.13	10.4
92-87-5	Benzidine	U	4.06	ug/L	4.06	10.4
56-55-3	Benzo(a)anthracene	U	0.313	ug/L	0.313	1.04
50-32-8	Benzo(a)pyrene	U	0.313	ug/L	0.313	1.04
205-99-2	Benzo(b)fluoranthene	U	0.313	ug/L	0.313	1.04
191-24-2	Benzo(ghi)perylene	U	0.313	ug/L	0.313	1.04

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

SDG Number:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	433548003	Date Received:	09/26/2017 09:05		
Client Sample:	VOA/SVOA	Client:	ARSL004	Project:	ESHL00114
Client ID:	CAAN-17-144829	Method:	SW846 3510C/8270D	SOP Ref:	GL-OA-E-009
Batch ID:	1704024	Inst:	MSDA.I	Dilution:	1
Run Date:	09/29/2017 16:50	Analyst:	JMB3	Inj. Vol:	1 uL
Prep Date:	09/27/2017 18:23	Aliquot:	960 mL	Final Volume:	1 mL
Data File:	092917.s\AI2918.D	Column:	DB-5ms		

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

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

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SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 433548003	Date Received: 09/26/2017 09:05	
Client Sample: VOA/SVOA	Client: ARSL004	Project: ESHL00114
Client ID: CAAN-17-144829	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1704024	Inst: MSDA.I	Dilution: 1
Run Date: 09/29/2017 16:50	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 09/27/2017 18:23	Aliquot: 960 mL	Final Volume: 1 mL
Data File: 092917.s\AI2918.D	Column: DB-5ms	

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	79.8	104	ug/L	77	(32%-124%)
2-Fluorobiphenyl	32.1	52.1	ug/L	62	(32%-112%)
2-Fluorophenol	48.0	104	ug/L	46	(15%-88%)
Nitrobenzene-d5	37.9	52.1	ug/L	73	(36%-115%)
Phenol-d5	29.1	104	ug/L	28	(15%-91%)
p-Terphenyl-d14	49.1	52.1	ug/L	94	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.975	4.4	ug/L	0	J

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

Page 1 of 3

SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 433548004	Date Received: 09/26/2017 09:05	
Client Sample: VOA/SVOA	Client: ARSL004	Project: ESHL00114
Client ID: CAAN-17-144830	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1704024	Inst: MSDA.I	Dilution: 1
Run Date: 09/29/2017 17:17	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 09/27/2017 18:23	Aliquot: 940 mL	Final Volume: 1 mL
Data File: 092917.s\AI2919.D	Column: DB-5ms	

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:	2017-2890	Date Collected:	09/22/2017 10:57	Matrix:	W
Lab Sample ID:	433548004	Date Received:	09/26/2017 09:05		
Client Sample:	VOA/SVOA	Client:	ARSL004	Project:	ESHL00114
Client ID:	CAAN-17-144830	Method:	SW846 3510C/8270D	SOP Ref:	GL-OA-E-009
Batch ID:	1704024	Inst:	MSDA.I	Dilution:	1
Run Date:	09/29/2017 17:17	Analyst:	JMB3	Inj. Vol:	1 uL
Prep Date:	09/27/2017 18:23	Aliquot:	940 mL	Final Volume:	1 mL
Data File:	092917.s\AI2919.D	Column:	DB-5ms		

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**

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SDG Number: 2017-2890	Date Collected: 09/22/2017 10:57	Matrix: W
Lab Sample ID: 433548004	Date Received: 09/26/2017 09:05	
Client Sample: VOA/SVOA	Client: ARSL004	Project: ESHL00114
Client ID: CAAN-17-144830	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1704024	Inst: MSDA.I	Dilution: 1
Run Date: 09/29/2017 17:17	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 09/27/2017 18:23	Aliquot: 940 mL	Final Volume: 1 mL
Data File: 092917.s\AI2919.D	Column: DB-5ms	

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	80.7	106	ug/L	76 (32%-124%)
2-Fluorobiphenyl	30.3	53.2	ug/L	57 (32%-112%)
2-Fluorophenol	46.3	106	ug/L	44 (15%-88%)
Nitrobenzene-d5	35.3	53.2	ug/L	66 (36%-115%)
Phenol-d5	28.6	106	ug/L	27 (15%-91%)
p-Terphenyl-d14	48.2	53.2	ug/L	91 (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: 2017-2890

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203883243	MB for batch 1704023	37	23	63	52	78	86
1203883244	LCS for batch 1704023	48	31	77	66	103	96
433548003	CAAN-17-144829	46	28	73	62	77	94
433548004	CAAN-17-144830	44	27	66	57	76	91
1203883245	CAAN-17-144828MS	58	45	71	64	94	94
1203883246	CAAN-17-144828MSD	56	46	72	63	91	92

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: 2017-2890

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1704023

Matrix: WATER

Lab Sample ID 1203883244

Instrument: MSDA.I

Analysis Date: 09/29/2017 16:24

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

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	22.8	46	30-88
110-86-1	LCS Pyridine	50.0	0.0	24.1	48	27-89
62-53-3	LCS Aniline	50.0	0.0	37.8	76	49-112
108-95-2	LCS Phenol	50.0	0.0	17.0	34	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	41.7	83	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	39.0	78	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	31.3	63	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	31.5	63	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	32.5	65	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)et	50.0	0.0	40.4	81	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	34.6	69	44-102
95-48-7	LCS o-Cresol	50.0	0.0	34.7	69	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	36.1	72	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	42.8	86	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	30.2	60	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	40.8	82	53-115
78-59-1	LCS Isophorone	50.0	0.0	42.6	85	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	47.0	94	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	33.2	66	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	42.3	85	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	40.4	81	53-109
65-85-0	LCS Benzoic acid	100	0.0	31.7	32	21-74

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2890

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1704023

Matrix: WATER

Lab Sample ID 1203883244

Instrument: MSDA.I

Analysis Date: 09/29/2017 16:24

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	LCS 4-Chloroaniline	50.0	0.0	47.2	94	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	30.1	60	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	42.0	84	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	36.6	73	42-103
91-20-3	LCS Naphthalene	50.0	0.0	35.2	70	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	37.2	74	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	25.8	52	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	40.4	81	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	40.5	81	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	35.8	72	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	45.6	91	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	60.5	121	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	44.0	88	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	47.9	96	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	54.9	110	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	39.6	79	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	41.9	84	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	54.6	109	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	40.7	81	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	44.5	89	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	46.4	93	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	15.9	32	15-137

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2890

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1704023

Matrix: WATER

Lab Sample ID 1203883244

Instrument: MSDA.I

Analysis Date: 09/29/2017 16:24

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

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	42.6	85	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	60.3	121	44-137
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	54.9	110	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	37.1	74	55-113
122-66-7	LCS Azobenzene <i>1,2-Diphenylhydrazine</i>	50.0	0.0	36.9	74	53-115
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	37.7	75	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	38.2	76	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	40.5	81	55-110
120-12-7	LCS Anthracene	50.0	0.0	40.1	80	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	43.4	87	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	42.3	85	54-118
129-00-0	LCS Pyrene	50.0	0.0	43.9	88	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	45.6	91	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	40.8	82	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	41.3	83	57-112
218-01-9	LCS Chrysene	50.0	0.0	41.4	83	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	39.9	80	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	43.5	87	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	45.0	90	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	41.2	82	40-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

SDG Number: 2017-2890

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1704023

Matrix: WATER

Lab Sample ID 1203883244

Instrument: MSDA.I

Analysis Date: 09/29/2017 16:24

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	LCS Indeno(1,2,3-cd)pyrene	50.0	0.0	37.4	75	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	39.4	79	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	36.9	74	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	26.1	52	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	40.1	80	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	36.9	74	44-102
1912-24-9	LCS Atrazine	50.0	0.0	43.6	87	60-131
92-87-5	LCS Benzidine	100	0.0	80.2	80	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	40.3	81	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	32.8	66	39-99

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2017-2890

Sample Type: Matrix Spike

Client ID: CAAN-17-144828MS

Matrix: W

Lab Sample ID 1203883245

Instrument: MSDA.I

Analysis Date: 09/29/2017 18:09

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

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	114	0.00 U	66.6	59	25-106
110-86-1	MS Pyridine	114	0.00 U	53.4	47	24-93
62-53-3	MS Aniline	114	0.00 U	84.6	74	37-113
108-95-2	MS Phenol	114	0.00 U	56.9	50	23-82
111-44-4	MS bis(2-Chloroethyl) ether	114	0.00 U	86.1	76	39-114
95-57-8	MS 2-Chlorophenol	114	0.00 U	83.6	74	37-108
541-73-1	MS 1,3-Dichlorobenzene	114	0.00 U	60.4	53	27-97
106-46-7	MS 1,4-Dichlorobenzene	114	0.00 U	60.8	53	28-97
95-50-1	MS 1,2-Dichlorobenzene	114	0.00 U	63.4	56	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)et	114	0.00 U	84.0	74	32-127
100-51-6	MS Benzyl alcohol	114	0.00 U	84.3	74	37-116
95-48-7	MS o-Cresol	114	0.00 U	81.2	71	34-109
65794-96-9	MS m,p-Cresols	114	0.00 U	90.4	80	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	114	0.00 U	90.1	79	42-118
67-72-1	MS Hexachloroethane	114	0.00 U	57.0	50	29-94
98-95-3	MS Nitrobenzene	114	0.00 U	86.1	76	38-123
78-59-1	MS Isophorone	114	0.00 U	91.1	80	43-120
88-75-5	MS 2-Nitrophenol	114	0.00 U	97.6	86	39-115
105-67-9	MS 2,4-Dimethylphenol	114	0.00 U	72.8	64	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	114	0.00 U	91.1	80	42-118
120-83-2	MS 2,4-Dichlorophenol	114	0.00 U	87.3	77	40-111
65-85-0	MS Benzoic acid	227	0.00 U	124	54	17-95

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2017-2890

Sample Type: Matrix Spike

Client ID: CAAN-17-144828MS

Matrix: W

Lab Sample ID 1203883245

Instrument: MSDA.I

Analysis Date: 09/29/2017 18:09

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS	4-Chloroaniline	114	0.00	U	106	93	44-138
87-68-3	MS	Hexachlorobutadiene	114	0.00	U	58.5	51	26-98
59-50-7	MS	Parachlorometa cresol 4-Chloro-3-methylphenol	114	0.00	U	90.8	80	41-122
91-57-6	MS	2-Methylnaphthalene	114	0.00	U	73.0	64	29-109
91-20-3	MS	Naphthalene	114	0.00	U	71.2	63	31-108
90-12-0	MS	1-Methylnaphthalene	114	0.00	U	75.1	66	33-112
77-47-4	MS	Hexachlorocyclopentadiene	114	0.00	U	51.4	45	26-79
88-06-2	MS	2,4,6-Trichlorophenol	114	0.00	U	88.5	78	39-124
95-95-4	MS	2,4,5-Trichlorophenol	114	0.00	U	91.0	80	42-120
91-58-7	MS	2-Chloronaphthalene	114	0.00	U	73.1	64	29-113
88-74-4	MS	2-Nitroaniline o-Nitroaniline	114	0.00	U	98.4	87	41-121
99-09-2	MS	3-Nitroaniline m-Nitroaniline	114	0.00	U	132	116	42-144
131-11-3	MS	Dimethylphthalate	114	0.00	U	96.7	85	45-128
606-20-2	MS	2,6-Dinitrotoluene	114	0.00	U	105	92	46-124
121-14-2	MS	2,4-Dinitrotoluene	114	0.00	U	117	103	45-125
208-96-8	MS	Acenaphthylene	114	0.00	U	82.3	72	35-120
83-32-9	MS	Acenaphthene	114	0.00	U	87.5	77	35-117
51-28-5	MS	2,4-Dinitrophenol	114	0.00	U	102	90	27-122
132-64-9	MS	Dibenzofuran	114	0.00	U	85.1	75	38-113
58-90-2	MS	2,3,4,6-Tetrachlorophenol	114	0.00	U	95.8	84	40-128
84-66-2	MS	Diethylphthalate	114	0.00	U	101	89	43-127
100-02-7	MS	4-Nitrophenol	114	0.00	U	60.3	53	17-85

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2890

Sample Type: Matrix Spike

Client ID: CAAN-17-144828MS

Matrix: W

Lab Sample ID 1203883245

Instrument: MSDA.I

Analysis Date: 09/29/2017 18:09

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS	Fluorene	114	0.00	U	90.0	79	39-117
7005-72-3	MS	4-Chlorophenylphenylether	114	0.00	U	89.4	79	39-121
100-01-6	MS	4-Nitroaniline <i>p-Nitroaniline</i>	114	0.00	U	123	108	30-133
534-52-1	MS	2-Methyl-4,6-dinitrophenol	114	0.00	U	113	99	32-126
122-39-4	MS	Diphenylamine	114	0.00	U	82.0	72	37-118
122-66-7	MS	Azobenzene <i>1,2-Diphenylhydrazine</i>	114	0.00	U	82.0	72	38-120
101-55-3	MS	4-Bromophenylphenylether	114	0.00	U	82.6	73	39-121
118-74-1	MS	Hexachlorobenzene	114	0.00	U	86.2	76	40-118
87-86-5	MS	Pentachlorophenol	114	0.00	U	105	93	35-121
85-01-8	MS	Phenanthrene	114	0.00	U	88.9	78	40-115
120-12-7	MS	Anthracene	114	0.00	U	87.2	77	38-120
84-74-2	MS	Di-n-butylphthalate	114	0.00	U	93.6	82	41-128
206-44-0	MS	Fluoranthene	114	0.00	U	88.3	78	41-119
129-00-0	MS	Pyrene	114	0.00	U	100	88	35-128
85-68-7	MS	Butylbenzylphthalate	114	0.00	U	98.5	87	40-129
117-81-7	MS	bis(2-Ethylhexyl)phthalate	114	0.00	U	87.3	77	38-131
56-55-3	MS	Benzo(a)anthracene	114	0.00	U	89.3	79	39-120
218-01-9	MS	Chrysene	114	0.00	U	90.4	80	41-124
117-84-0	MS	Di-n-octylphthalate	114	0.00	U	81.4	72	37-134
205-99-2	MS	Benzo(b)fluoranthene	114	0.00	U	94.4	83	31-122
207-08-9	MS	Benzo(k)fluoranthene	114	0.00	U	97.7	86	33-123
50-32-8	MS	Benzo(a)pyrene	114	0.00	U	86.9	76	32-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2890

Sample Type: Matrix Spike

Client ID: CAAN-17-144828MS

Matrix: W

Lab Sample ID 1203883245

Instrument: MSDA.I

Analysis Date: 09/29/2017 18:09

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	MS Indeno(1,2,3-cd)pyrene	114	0.00 U	77.3	68	27-121
53-70-3	MS Dibenzo(a,h)anthracene	114	0.00 U	83.1	73	30-125
191-24-2	MS Benzo(ghi)perylene	114	0.00 U	78.4	69	24-126
123-91-1	MS 1,4-Dioxane	114	0.00 U	74.9	66	24-110
930-55-2	MS N-Nitrosopyrrolidine	114	0.00 U	91.9	81	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	114	0.00 U	73.3	64	32-101
1912-24-9	MS Atrazine	114	0.00 U	97.8	86	42-129
92-87-5	MS Benzidine	227	0.00 U	69.6	31	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	114	0.00 U	81.9	72	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	114	0.00 U	64.3	57	26-102

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2890

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-17-144828MSD

Matrix: W

Lab Sample ID 1203883246

Instrument: MSDA.I

Analysis Date: 09/29/2017 18:35

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

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	114	0.00 U	68.4	60	25-106	3	0-30
110-86-1	MSD Pyridine	114	0.00 U	60.5	53	24-93	12	0-30
62-53-3	MSD Aniline	114	0.00 U	87.2	77	37-113	3	0-30
108-95-2	MSD Phenol	114	0.00 U	57.7	51	23-82	1	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	114	0.00 U	87.7	77	39-114	2	0-30
95-57-8	MSD 2-Chlorophenol	114	0.00 U	84.7	75	37-108	1	0-30
541-73-1	MSD 1,3-Dichlorobenzene	114	0.00 U	62.4	55	27-97	3	0-30
106-46-7	MSD 1,4-Dichlorobenzene	114	0.00 U	63.4	56	28-97	4	0-30
95-50-1	MSD 1,2-Dichlorobenzene	114	0.00 U	66.0	58	28-99	4	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)et	114	0.00 U	86.0	76	32-127	2	0-30
100-51-6	MSD Benzyl alcohol	114	0.00 U	86.1	76	37-116	2	0-30
95-48-7	MSD o-Cresol	114	0.00 U	83.2	73	34-109	2	0-30
65794-96-9	MSD m,p-Cresols	114	0.00 U	91.3	80	36-120	1	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	114	0.00 U	90.8	80	42-118	1	0-30
67-72-1	MSD Hexachloroethane	114	0.00 U	60.2	53	29-94	5	0-30
98-95-3	MSD Nitrobenzene	114	0.00 U	88.4	78	38-123	3	0-30
78-59-1	MSD Isophorone	114	0.00 U	91.6	81	43-120	0	0-30
88-75-5	MSD 2-Nitrophenol	114	0.00 U	100	88	39-115	3	0-30
105-67-9	MSD 2,4-Dimethylphenol	114	0.00 U	76.4	67	39-107	5	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	114	0.00 U	92.7	82	42-118	2	0-30
120-83-2	MSD 2,4-Dichlorophenol	114	0.00 U	88.7	78	40-111	2	0-30
65-85-0	MSD Benzoic acid	227	0.00 U	131	58	17-95	6	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2890

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-17-144828MSD

Matrix: W

Lab Sample ID 1203883246

Instrument: MSDA.I

Analysis Date: 09/29/2017 18:35

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
106-47-8	MSD 4-Chloroaniline	114	0.00 U	105	93	44-138	1	0-30
87-68-3	MSD Hexachlorobutadiene	114	0.00 U	62.8	55	26-98	7	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	114	0.00 U	92.4	81	41-122	2	0-30
91-57-6	MSD 2-Methylnaphthalene	114	0.00 U	76.0	67	29-109	4	0-30
91-20-3	MSD Naphthalene	114	0.00 U	74.8	66	31-108	5	0-30
90-12-0	MSD 1-Methylnaphthalene	114	0.00 U	77.6	68	33-112	3	0-30
77-47-4	MSD Hexachlorocyclopentadiene	114	0.00 U	52.2	46	26-79	1	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	114	0.00 U	87.8	77	39-124	1	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	114	0.00 U	89.9	79	42-120	1	0-30
91-58-7	MSD 2-Chloronaphthalene	114	0.00 U	74.8	66	29-113	2	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	114	0.00 U	97.0	85	41-121	1	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	114	0.00 U	132	116	42-144	0	0-30
131-11-3	MSD Dimethylphthalate	114	0.00 U	94.5	83	45-128	2	0-30
606-20-2	MSD 2,6-Dinitrotoluene	114	0.00 U	103	91	46-124	2	0-30
121-14-2	MSD 2,4-Dinitrotoluene	114	0.00 U	115	101	45-125	2	0-30
208-96-8	MSD Acenaphthylene	114	0.00 U	82.8	73	35-120	1	0-30
83-32-9	MSD Acenaphthene	114	0.00 U	87.0	77	35-117	1	0-30
51-28-5	MSD 2,4-Dinitrophenol	114	0.00 U	108	95	27-122	6	0-30
132-64-9	MSD Dibenzofuran	114	0.00 U	84.8	75	38-113	0	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	114	0.00 U	94.1	83	40-128	2	0-30
84-66-2	MSD Diethylphthalate	114	0.00 U	98.0	86	43-127	3	0-30
100-02-7	MSD 4-Nitrophenol	114	0.00 U	59.5	52	17-85	1	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 7 of 8

SDG Number: 2017-2890

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-17-144828MSD

Matrix: W

Lab Sample ID 1203883246

Instrument: MSDA.I

Analysis Date: 09/29/2017 18:35

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
86-73-7	MSD Fluorene	114	0.00 U	88.3	78	39-117	2	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	114	0.00 U	88.1	78	39-121	1	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	114	0.00 U	122	108	30-133	0	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	114	0.00 U	116	102	32-126	2	0-30
122-39-4	MSD Diphenylamine	114	0.00 U	80.1	70	37-118	2	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	114	0.00 U	79.7	70	38-120	3	0-30
101-55-3	MSD 4-Bromophenylphenylether	114	0.00 U	80.8	71	39-121	2	0-30
118-74-1	MSD Hexachlorobenzene	114	0.00 U	82.3	72	40-118	5	0-30
87-86-5	MSD Pentachlorophenol	114	0.00 U	103	91	35-121	3	0-30
85-01-8	MSD Phenanthrene	114	0.00 U	85.1	75	40-115	4	0-30
120-12-7	MSD Anthracene	114	0.00 U	83.2	73	38-120	5	0-30
84-74-2	MSD Di-n-butylphthalate	114	0.00 U	89.7	79	41-128	4	0-30
206-44-0	MSD Fluoranthene	114	0.00 U	85.0	75	41-119	4	0-30
129-00-0	MSD Pyrene	114	0.00 U	96.8	85	35-128	3	0-30
85-68-7	MSD Butylbenzylphthalate	114	0.00 U	96.5	85	40-129	2	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	114	0.00 U	86.4	76	38-131	1	0-30
56-55-3	MSD Benzo(a)anthracene	114	0.00 U	85.3	75	39-120	5	0-30
218-01-9	MSD Chrysene	114	0.00 U	87.3	77	41-124	4	0-30
117-84-0	MSD Di-n-octylphthalate	114	0.00 U	79.2	70	37-134	3	0-30
205-99-2	MSD Benzo(b)fluoranthene	114	0.00 U	92.2	81	31-122	2	0-30
207-08-9	MSD Benzo(k)fluoranthene	114	0.00 U	95.1	84	33-123	3	0-30
50-32-8	MSD Benzo(a)pyrene	114	0.00 U	83.4	73	32-118	4	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 8 of 8

SDG Number: 2017-2890

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-17-144828MSD

Matrix: W

Lab Sample ID 1203883246

Instrument: MSDA.I

Analysis Date: 09/29/2017 18:35

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1704023

Inj. Vol: 1 uL

Batch ID: 1704024

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
193-39-5	MSD Indeno(1,2,3-cd)pyrene	114	0.00 U	79.8	70	27-121	3	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	114	0.00 U	82.4	73	30-125	1	0-30
191-24-2	MSD Benzo(ghi)perylene	114	0.00 U	77.5	68	24-126	1	0-30
123-91-1	MSD 1,4-Dioxane	114	0.00 U	76.1	67	24-110	2	0-30
930-55-2	MSD N-Nitrosopyrrolidine	114	0.00 U	92.0	81	47-119	0	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	114	0.00 U	75.4	66	32-101	3	0-30
1912-24-9	MSD Atrazine	114	0.00 U	91.8	81	42-129	6	0-30
92-87-5	MSD Benzidine	227	0.00 U	67.2	30	15-130	4	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	114	0.00 U	77.9	69	34-124	5	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	114	0.00 U	67.7	60	26-102	5	0-30

Method Blank Summary

Page 1 of 1

SDG Number:	2017-2890	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1704023	Instrument ID:	MSDA.I	Data File:	092917.s\AI2916.D
Lab Sample ID:	1203883243	Prep Date:	09/27/2017 18:23	Analyzed:	09/29/17 15:58
Column:	DB-5ms				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1704023	1203883244	092917.s\AI2917.D	09/29/17	1624
02 CAAN-17-144829	433548003	092917.s\AI2918.D	09/29/17	1650
03 CAAN-17-144830	433548004	092917.s\AI2919.D	09/29/17	1717
04 CAAN-17-144828MS	1203883245	092917.s\AI2921.D	09/29/17	1809
05 CAAN-17-144828MSD	1203883246	092917.s\AI2922.D	09/29/17	1835

Quality Control Data

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

Page 1 of 3

SDG Number: 2017-2890

Matrix: WATER

Lab Sample ID: 1203883243

Client Sample: QC for batch 1704023

Client: ARSL004

Project: QC

Client ID: MB for batch 1704023

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1704024

Inst: MSDA.I

Dilution: 1

Run Date: 09/29/2017 15:58

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 09/27/2017 18:23

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: 092917.s\AI2916.D

Column: DB-5ms

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

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

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SDG Number: 2017-2890

Matrix: WATER

Lab Sample ID: 1203883243

Client Sample: QC for batch 1704023

Client: ARSL004

Project: QC

Client ID: MB for batch 1704023

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1704024

Inst: MSDA.I

Dilution: 1

Run Date: 09/29/2017 15:58

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 09/27/2017 18:23

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: 092917.s\AI2916.D

Column: DB-5ms

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

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

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SDG Number: 2017-2890

Lab Sample ID: 1203883243

Client Sample: QC for batch 1704023

Client ID: MB for batch 1704023

Batch ID: 1704024

Run Date: 09/29/2017 15:58

Prep Date: 09/27/2017 18:23

Data File: 092917.s\AI2916.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.70	ug/L	3.70	10.0
99-09-2	3-Nitroaniline	U	3.00	ug/L	3.00	10.0
	<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	78.5	100	ug/L	78	(32%-124%)
2-Fluorobiphenyl	26.1	50.0	ug/L	52	(32%-112%)
2-Fluorophenol	36.8	100	ug/L	37	(15%-88%)
Nitrobenzene-d5	31.7	50.0	ug/L	63	(36%-115%)
Phenol-d5	22.9	100	ug/L	23	(15%-91%)
p-Terphenyl-d14	42.8	50.0	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**

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SDG Number: 2017-2890	Matrix: WATER
Lab Sample ID: 1203883244	
Client Sample: QC for batch 1704023	Client: ARSL004
Client ID: LCS for batch 1704023	Method: SW846 3510C/8270D
Batch ID: 1704024	Inst: MSDA.I
Run Date: 09/29/2017 16:24	Analyst: JMB3
Prep Date: 09/27/2017 18:23	Aliquot: 1000 mL
Data File: 092917.s\AI2917.D	Column: DB-5ms
	Project: QC
	SOP Ref: GL-OA-E-009
	Dilution: 1
	Inj. Vol: 1 uL
	Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		36.9	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		32.8	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		32.5	ug/L	3.00	10.0
122-66-7	Azobenzene		36.9	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		31.3	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		31.5	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		26.1	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		37.2	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		44.5	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		40.5	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		40.4	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		40.4	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		33.2	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		54.6	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		54.9	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		47.9	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		35.8	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		39.0	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		54.9	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		36.6	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		47.0	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		40.3	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		37.7	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		42.0	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		47.2	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		42.3	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		15.9	ug/L	3.00	10.0
83-32-9	Acenaphthene		41.9	ug/L	0.300	1.00
208-96-8	Acenaphthylene		39.6	ug/L	0.300	1.00
62-53-3	Aniline		37.8	ug/L	4.20	10.0
120-12-7	Anthracene		40.1	ug/L	0.300	1.00
1912-24-9	Atrazine		43.6	ug/L	3.00	10.0
92-87-5	Benzidine		80.2	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		41.3	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		41.2	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		43.5	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		36.9	ug/L	0.300	1.00

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

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SDG Number: 2017-2890

Lab Sample ID: 1203883244

Client Sample: QC for batch 1704023

Client ID: LCS for batch 1704023

Batch ID: 1704024

Run Date: 09/29/2017 16:24

Prep Date: 09/27/2017 18:23

Data File: 092917.s\AI2917.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.I

Analyst: JMB3

Aliquot: 1000 mL

Column: DB-5ms

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		45.0	ug/L	0.300	1.00
65-85-0	Benzoic acid		31.7	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		34.6	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		45.6	ug/L	3.00	10.0
218-01-9	Chrysene		41.4	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		43.4	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		39.9	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		39.4	ug/L	0.300	1.00
132-64-9	Dibenzofuran		40.7	ug/L	3.00	10.0
84-66-2	Diethylphthalate		46.4	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		44.0	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		37.1	ug/L	3.00	10.0
206-44-0	Fluoranthene		42.3	ug/L	0.300	1.00
86-73-7	Fluorene		42.6	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		38.2	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		30.1	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		25.8	ug/L	3.00	10.0
67-72-1	Hexachloroethane		30.2	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		37.4	ug/L	0.300	1.00
78-59-1	Isophorone		42.6	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		22.8	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi--n-propylamine		42.8	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		40.1	ug/L	3.00	10.0
91-20-3	Naphthalene		35.2	ug/L	0.300	1.00
98-95-3	Nitrobenzene		40.8	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		40.5	ug/L	0.300	1.00
108-95-2	Phenol		17.0	ug/L	3.00	10.0
129-00-0	Pyrene		43.9	ug/L	0.300	1.00
110-86-1	Pyridine		24.1	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		40.4	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		42.3	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		41.7	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		40.8	ug/L	3.00	10.0

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

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SDG Number: 2017-2890	Matrix: WATER
Lab Sample ID: 1203883244	
Client Sample: QC for batch 1704023	Client: ARSL004
Client ID: LCS for batch 1704023	Method: SW846 3510C/8270D
Batch ID: 1704024	Inst: MSDA.I
Run Date: 09/29/2017 16:24	Analyst: JMB3
Prep Date: 09/27/2017 18:23	Aliquot: 1000 mL
Data File: 092917.s\AI2917.D	Column: DB-5ms
	Project: QC
	SOP Ref: GL-OA-E-009
	Dilution: 1
	Inj. Vol: 1 uL
	Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		36.1	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		60.5	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		34.7	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		45.6	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		60.3	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	103	100	ug/L	103	(32%-124%)
2-Fluorobiphenyl	32.9	50.0	ug/L	66	(32%-112%)
2-Fluorophenol	47.9	100	ug/L	48	(15%-88%)
Nitrobenzene-d5	38.4	50.0	ug/L	77	(36%-115%)
Phenol-d5	30.7	100	ug/L	31	(15%-91%)
p-Terphenyl-d14	48.2	50.0	ug/L	96	(36%-121%)

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

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SDG Number: 2017-2890	Date Collected: 09/22/2017 12:13	Matrix: W
Lab Sample ID: 1203883245	Date Received: 09/26/2017 09:00	
Client Sample: QC for batch 1704023	Client: ARSL004	Project: QC
Client ID: CAAN-17-144828MS	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1704024	Inst: MSDA.I	Dilution: 1
Run Date: 09/29/2017 18:09	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 09/27/2017 18:23	Aliquot: 440 mL	Final Volume: 1 mL
Data File: 092917.s\AI2921.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		73.3	ug/L	6.82	22.7
120-82-1	1,2,4-Trichlorobenzene		64.3	ug/L	6.82	22.7
95-50-1	1,2-Dichlorobenzene		63.4	ug/L	6.82	22.7
122-66-7	Azobenzene		82.0	ug/L	6.82	22.7
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		60.4	ug/L	6.82	22.7
106-46-7	1,4-Dichlorobenzene		60.8	ug/L	6.82	22.7
123-91-1	1,4-Dioxane		74.9	ug/L	6.82	22.7
90-12-0	1-Methylnaphthalene		75.1	ug/L	0.682	2.27
58-90-2	2,3,4,6-Tetrachlorophenol		95.8	ug/L	6.82	22.7
95-95-4	2,4,5-Trichlorophenol		91.0	ug/L	6.82	22.7
88-06-2	2,4,6-Trichlorophenol		88.5	ug/L	6.82	22.7
120-83-2	2,4-Dichlorophenol		87.3	ug/L	6.82	22.7
105-67-9	2,4-Dimethylphenol		72.8	ug/L	6.82	22.7
51-28-5	2,4-Dinitrophenol		102	ug/L	11.4	45.5
121-14-2	2,4-Dinitrotoluene		117	ug/L	6.82	22.7
606-20-2	2,6-Dinitrotoluene		105	ug/L	6.82	22.7
91-58-7	2-Chloronaphthalene		73.1	ug/L	0.932	2.27
95-57-8	2-Chlorophenol		83.6	ug/L	6.82	22.7
534-52-1	2-Methyl-4,6-dinitrophenol		113	ug/L	6.82	22.7
91-57-6	2-Methylnaphthalene		73.0	ug/L	0.682	2.27
88-75-5	2-Nitrophenol		97.6	ug/L	6.82	22.7
91-94-1	3,3'-Dichlorobenzidine		81.9	ug/L	6.82	22.7
101-55-3	4-Bromophenylphenylether		82.6	ug/L	6.82	22.7
59-50-7	Parachlorometa cresol		90.8	ug/L	6.82	22.7
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		106	ug/L	7.50	22.7
7005-72-3	4-Chlorophenylphenylether		89.4	ug/L	6.82	22.7
100-02-7	4-Nitrophenol		60.3	ug/L	6.82	22.7
83-32-9	Acenaphthene		87.5	ug/L	0.682	2.27
208-96-8	Acenaphthylene		82.3	ug/L	0.682	2.27
62-53-3	Aniline		84.6	ug/L	9.55	22.7
120-12-7	Anthracene		87.2	ug/L	0.682	2.27
1912-24-9	Atrazine		97.8	ug/L	6.82	22.7
92-87-5	Benzidine		69.6	ug/L	8.86	22.7
56-55-3	Benzo(a)anthracene		89.3	ug/L	0.682	2.27
50-32-8	Benzo(a)pyrene		86.9	ug/L	0.682	2.27
205-99-2	Benzo(b)fluoranthene		94.4	ug/L	0.682	2.27
191-24-2	Benzo(ghi)perylene		78.4	ug/L	0.682	2.27

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

SDG Number:	2017-2890	Date Collected:	09/22/2017 12:13	Matrix:	W
Lab Sample ID:	1203883245	Date Received:	09/26/2017 09:00		
Client Sample:	QC for batch 1704023	Client:	ARSL004	Project:	QC
Client ID:	CAAN-17-144828MS	Method:	SW846 3510C/8270D	SOP Ref:	GL-OA-E-009
Batch ID:	1704024	Inst:	MSDA.I	Dilution:	1
Run Date:	09/29/2017 18:09	Analyst:	JMB3	Inj. Vol:	1 uL
Prep Date:	09/27/2017 18:23	Aliquot:	440 mL	Final Volume:	1 mL
Data File:	092917.s\AI2921.D	Column:	DB-5ms		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		97.7	ug/L	0.682	2.27
65-85-0	Benzoic acid		124	ug/L	13.6	45.5
100-51-6	Benzyl alcohol		84.3	ug/L	6.82	22.7
85-68-7	Butylbenzylphthalate		98.5	ug/L	6.82	22.7
218-01-9	Chrysene		90.4	ug/L	0.682	2.27
84-74-2	Di-n-butylphthalate		93.6	ug/L	6.82	22.7
117-84-0	Di-n-octylphthalate		81.4	ug/L	6.82	22.7
53-70-3	Dibenzo(a,h)anthracene		83.1	ug/L	0.682	2.27
132-64-9	Dibenzofuran		85.1	ug/L	6.82	22.7
84-66-2	Diethylphthalate		101	ug/L	6.82	22.7
131-11-3	Dimethylphthalate		96.7	ug/L	6.82	22.7
88-85-7	Dinoseb	U	6.82	ug/L	6.82	22.7
122-39-4	Diphenylamine		82.0	ug/L	6.82	22.7
206-44-0	Fluoranthene		88.3	ug/L	0.682	2.27
86-73-7	Fluorene		90.0	ug/L	0.682	2.27
118-74-1	Hexachlorobenzene		86.2	ug/L	6.82	22.7
87-68-3	Hexachlorobutadiene		58.5	ug/L	6.82	22.7
77-47-4	Hexachlorocyclopentadiene		51.4	ug/L	6.82	22.7
67-72-1	Hexachloroethane		57.0	ug/L	6.82	22.7
193-39-5	Indeno(1,2,3-cd)pyrene		77.3	ug/L	0.682	2.27
78-59-1	Isophorone		91.1	ug/L	7.95	22.7
62-75-9	N-Methyl-N-nitrosomethylamine		66.6	ug/L	6.82	22.7
924-16-3	N-Nitrosodi-n-butylamine	U	6.82	ug/L	6.82	22.7
55-18-5	N-Nitrosodiethylamine	U	6.82	ug/L	6.82	22.7
621-64-7	N-Nitrosodi--n-propylamine		90.1	ug/L	6.82	22.7
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		91.9	ug/L	6.82	22.7
91-20-3	Naphthalene		71.2	ug/L	0.682	2.27
98-95-3	Nitrobenzene		86.1	ug/L	6.82	22.7
608-93-5	Pentachlorobenzene	U	6.82	ug/L	6.82	22.7
87-86-5	Pentachlorophenol		105	ug/L	6.82	22.7
85-01-8	Phenanthrene		88.9	ug/L	0.682	2.27
108-95-2	Phenol		56.9	ug/L	6.82	22.7
129-00-0	Pyrene		100	ug/L	0.682	2.27
110-86-1	Pyridine		53.4	ug/L	6.82	22.7
108-60-1	bis(2-Chloro-1-methylethyl)ether		84.0	ug/L	6.82	22.7
111-91-1	bis(2-Chloroethoxy)methane		91.1	ug/L	6.82	22.7
111-44-4	bis(2-Chloroethyl) ether		86.1	ug/L	6.82	22.7
117-81-7	bis(2-Ethylhexyl)phthalate		87.3	ug/L	6.82	22.7

**Semi-Volatile
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Sample Summary**

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SDG Number: 2017-2890	Date Collected: 09/22/2017 12:13	Matrix: W
Lab Sample ID: 1203883245	Date Received: 09/26/2017 09:00	
Client Sample: QC for batch 1704023	Client: ARSL004	Project: QC
Client ID: CAAN-17-144828MS	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1704024	Inst: MSDA.I	Dilution: 1
Run Date: 09/29/2017 18:09	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 09/27/2017 18:23	Aliquot: 440 mL	Final Volume: 1 mL
Data File: 092917.s\AI2921.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		90.4	ug/L	8.41	22.7
99-09-2	3-Nitroaniline		132	ug/L	6.82	22.7
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		81.2	ug/L	6.82	22.7
88-74-4	2-Nitroaniline		98.4	ug/L	6.82	22.7
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		123	ug/L	6.82	22.7
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	214	227	ug/L	94	(32%-124%)
2-Fluorobiphenyl	72.6	114	ug/L	64	(32%-112%)
2-Fluorophenol	132	227	ug/L	58	(15%-88%)
Nitrobenzene-d5	80.7	114	ug/L	71	(36%-115%)
Phenol-d5	103	227	ug/L	45	(15%-91%)
p-Terphenyl-d14	107	114	ug/L	94	(36%-121%)

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

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SDG Number: 2017-2890	Date Collected: 09/22/2017 12:13	Matrix: W
Lab Sample ID: 1203883246	Date Received: 09/26/2017 09:00	
Client Sample: QC for batch 1704023	Client: ARSL004	Project: QC
Client ID: CAAN-17-144828MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1704024	Inst: MSDA.I	Dilution: 1
Run Date: 09/29/2017 18:35	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 09/27/2017 18:23	Aliquot: 440 mL	Final Volume: 1 mL
Data File: 092917.s\AI2922.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		75.4	ug/L	6.82	22.7
120-82-1	1,2,4-Trichlorobenzene		67.7	ug/L	6.82	22.7
95-50-1	1,2-Dichlorobenzene		66.0	ug/L	6.82	22.7
122-66-7	Azobenzene		79.7	ug/L	6.82	22.7
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		62.4	ug/L	6.82	22.7
106-46-7	1,4-Dichlorobenzene		63.4	ug/L	6.82	22.7
123-91-1	1,4-Dioxane		76.1	ug/L	6.82	22.7
90-12-0	1-Methylnaphthalene		77.6	ug/L	0.682	2.27
58-90-2	2,3,4,6-Tetrachlorophenol		94.1	ug/L	6.82	22.7
95-95-4	2,4,5-Trichlorophenol		89.9	ug/L	6.82	22.7
88-06-2	2,4,6-Trichlorophenol		87.8	ug/L	6.82	22.7
120-83-2	2,4-Dichlorophenol		88.7	ug/L	6.82	22.7
105-67-9	2,4-Dimethylphenol		76.4	ug/L	6.82	22.7
51-28-5	2,4-Dinitrophenol		108	ug/L	11.4	45.5
121-14-2	2,4-Dinitrotoluene		115	ug/L	6.82	22.7
606-20-2	2,6-Dinitrotoluene		103	ug/L	6.82	22.7
91-58-7	2-Chloronaphthalene		74.8	ug/L	0.932	2.27
95-57-8	2-Chlorophenol		84.7	ug/L	6.82	22.7
534-52-1	2-Methyl-4,6-dinitrophenol		116	ug/L	6.82	22.7
91-57-6	2-Methylnaphthalene		76.0	ug/L	0.682	2.27
88-75-5	2-Nitrophenol		100	ug/L	6.82	22.7
91-94-1	3,3'-Dichlorobenzidine		77.9	ug/L	6.82	22.7
101-55-3	4-Bromophenylphenylether		80.8	ug/L	6.82	22.7
59-50-7	Parachlorometa cresol		92.4	ug/L	6.82	22.7
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		105	ug/L	7.50	22.7
7005-72-3	4-Chlorophenylphenylether		88.1	ug/L	6.82	22.7
100-02-7	4-Nitrophenol		59.5	ug/L	6.82	22.7
83-32-9	Acenaphthene		87.0	ug/L	0.682	2.27
208-96-8	Acenaphthylene		82.8	ug/L	0.682	2.27
62-53-3	Aniline		87.2	ug/L	9.55	22.7
120-12-7	Anthracene		83.2	ug/L	0.682	2.27
1912-24-9	Atrazine		91.8	ug/L	6.82	22.7
92-87-5	Benzidine		67.2	ug/L	8.86	22.7
56-55-3	Benzo(a)anthracene		85.3	ug/L	0.682	2.27
50-32-8	Benzo(a)pyrene		83.4	ug/L	0.682	2.27
205-99-2	Benzo(b)fluoranthene		92.2	ug/L	0.682	2.27
191-24-2	Benzo(ghi)perylene		77.5	ug/L	0.682	2.27

**Semi-Volatile
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SDG Number: 2017-2890	Date Collected: 09/22/2017 12:13	Matrix: W
Lab Sample ID: 1203883246	Date Received: 09/26/2017 09:00	
Client Sample: QC for batch 1704023	Client: ARSL004	Project: QC
Client ID: CAAN-17-144828MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1704024	Inst: MSDA.I	Dilution: 1
Run Date: 09/29/2017 18:35	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 09/27/2017 18:23	Aliquot: 440 mL	Final Volume: 1 mL
Data File: 092917.s\AI2922.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		95.1	ug/L	0.682	2.27
65-85-0	Benzoic acid		131	ug/L	13.6	45.5
100-51-6	Benzyl alcohol		86.1	ug/L	6.82	22.7
85-68-7	Butylbenzylphthalate		96.5	ug/L	6.82	22.7
218-01-9	Chrysene		87.3	ug/L	0.682	2.27
84-74-2	Di-n-butylphthalate		89.7	ug/L	6.82	22.7
117-84-0	Di-n-octylphthalate		79.2	ug/L	6.82	22.7
53-70-3	Dibenzo(a,h)anthracene		82.4	ug/L	0.682	2.27
132-64-9	Dibenzofuran		84.8	ug/L	6.82	22.7
84-66-2	Diethylphthalate		98.0	ug/L	6.82	22.7
131-11-3	Dimethylphthalate		94.5	ug/L	6.82	22.7
88-85-7	Dinoseb	U	6.82	ug/L	6.82	22.7
122-39-4	Diphenylamine		80.1	ug/L	6.82	22.7
206-44-0	Fluoranthene		85.0	ug/L	0.682	2.27
86-73-7	Fluorene		88.3	ug/L	0.682	2.27
118-74-1	Hexachlorobenzene		82.3	ug/L	6.82	22.7
87-68-3	Hexachlorobutadiene		62.8	ug/L	6.82	22.7
77-47-4	Hexachlorocyclopentadiene		52.2	ug/L	6.82	22.7
67-72-1	Hexachloroethane		60.2	ug/L	6.82	22.7
193-39-5	Indeno(1,2,3-cd)pyrene		79.8	ug/L	0.682	2.27
78-59-1	Isophorone		91.6	ug/L	7.95	22.7
62-75-9	N-Methyl-N-nitrosomethylamine		68.4	ug/L	6.82	22.7
924-16-3	N-Nitrosodi-n-butylamine	U	6.82	ug/L	6.82	22.7
55-18-5	N-Nitrosodiethylamine	U	6.82	ug/L	6.82	22.7
621-64-7	N-Nitrosodi--n-propylamine		90.8	ug/L	6.82	22.7
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		92.0	ug/L	6.82	22.7
91-20-3	Naphthalene		74.8	ug/L	0.682	2.27
98-95-3	Nitrobenzene		88.4	ug/L	6.82	22.7
608-93-5	Pentachlorobenzene	U	6.82	ug/L	6.82	22.7
87-86-5	Pentachlorophenol		103	ug/L	6.82	22.7
85-01-8	Phenanthrene		85.1	ug/L	0.682	2.27
108-95-2	Phenol		57.7	ug/L	6.82	22.7
129-00-0	Pyrene		96.8	ug/L	0.682	2.27
110-86-1	Pyridine		60.5	ug/L	6.82	22.7
108-60-1	bis(2-Chloro-1-methylethyl)ether		86.0	ug/L	6.82	22.7
111-91-1	bis(2-Chloroethoxy)methane		92.7	ug/L	6.82	22.7
111-44-4	bis(2-Chloroethyl) ether		87.7	ug/L	6.82	22.7
117-81-7	bis(2-Ethylhexyl)phthalate		86.4	ug/L	6.82	22.7

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SDG Number: 2017-2890	Date Collected: 09/22/2017 12:13	Matrix: W
Lab Sample ID: 1203883246	Date Received: 09/26/2017 09:00	
Client Sample: QC for batch 1704023	Client: ARSL004	Project: QC
Client ID: CAAN-17-144828MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1704024	Inst: MSDA.I	Dilution: 1
Run Date: 09/29/2017 18:35	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 09/27/2017 18:23	Aliquot: 440 mL	Final Volume: 1 mL
Data File: 092917.s\AI2922.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		91.3	ug/L	8.41	22.7
99-09-2	3-Nitroaniline		132	ug/L	6.82	22.7
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		83.2	ug/L	6.82	22.7
88-74-4	2-Nitroaniline		97.0	ug/L	6.82	22.7
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		122	ug/L	6.82	22.7
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	207	227	ug/L	91	(32%-124%)
2-Fluorobiphenyl	71.2	114	ug/L	63	(32%-112%)
2-Fluorophenol	127	227	ug/L	56	(15%-88%)
Nitrobenzene-d5	81.6	114	ug/L	72	(36%-115%)
Phenol-d5	104	227	ug/L	46	(15%-91%)
p-Terphenyl-d14	104	114	ug/L	92	(36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2890
Work Order #: 433548**

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: 1704161

Prep Batch Number: 1704157

Sample Analysis

Sample ID	Client ID
433548001	433548001 (CAAN-17-144827)
1203883577	Interference Check Sample (ICS)
1203883507	Method Blank (MB)
1203883508	Laboratory Control Sample (LCS)
1203883509	433284001(CALA-17-144806) Matrix Spike (MS)
1203883510	433284001(CALA-17-144806) 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 433284001 (CALA-17-144806) 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 Quattro 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: 2017-2890 GEL Work Order: 433548

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 02 OCT 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: 1704157Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAAN-17-144827Date Received: 26-SEP-17GEL Job No (SDG): 2017-2890GEL Sample ID: 433548001Date Filtered: 27-SEP-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	0.262	ug/L		1	27-SEP-17 19:03	per0927028a
	Perchlorate Isotope Ratio			2.94			1	27-SEP-17 19:03	per0927028a
14797-73-0	Perchlorate-101	.05	.2	0.243	ug/L		1	27-SEP-17 19:03	per0927028a
	Perchlorate-O(18)			0.446	ug/L		1	27-SEP-17 19:03	per0927028a

^ 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): 2017-2890

Extract Batch Code: 1704157

Date Filtered: 27-SEP-17

Matrix: WATER

Sample ID: 1203883508

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.19	ug/L	95		85 - 115
Perchlorate Isotope Ratio		2.51				-
Perchlorate-101	0.200	.207	ug/L	104		85 - 115
Perchlorate-O(18)		.498	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): 2017-2890

Extract Batch Code: 1704157

Date Extracted: 27-SEP-17

GEL MS/PS ID: 1203883509

Client ID: CALA-17-144806

GEL MSD/PSD ID: 1203883510

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	0.297	ug/L	0.521	112	.508	106	2	30	75 - 125
Perchlorate Isotope Ratio	0	2.95		2.75		2.73		0		-
Perchlorate-101	0.200	0.275	ug/L	0.518	121	.508	116	2	30	75 - 125
Perchlorate-O(18)	0	0.498	ug/L	0.474		.486		3		-

^ 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: 1704157Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 27-SEP-17GEL Job No (SDG): 2017-2890GEL Sample ID: 1203883507Date Filtered: 27-SEP-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	27-SEP-17 16:49	per0927013a
	Perchlorate Isotope Ratio						1	27-SEP-17 16:49	per0927013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	27-SEP-17 16:49	per0927013a
	Perchlorate-O(18)			0.480	ug/L		1	27-SEP-17 16:49	per0927013a

^ 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: 1704157Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 27-SEP-17GEL Job No (SDG): 2017-2890GEL Sample ID: 1203883508Date Filtered: 27-SEP-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	0.190	ug/L	J	1	27-SEP-17 16:58	per0927014a
	Perchlorate Isotope Ratio			2.51			1	27-SEP-17 16:58	per0927014a
14797-73-0	Perchlorate-101	.05	.2	0.207	ug/L		1	27-SEP-17 16:58	per0927014a
	Perchlorate-O(18)			0.498	ug/L		1	27-SEP-17 16:58	per0927014a

^ 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: STORM WATERExtraction Batch ID: 1704157Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-2890GEL Sample ID: 1203883577Date Filtered: 27-SEP-17Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.228	ug/L		1	27-SEP-17 17:07	per0927015a
	Perchlorate Isotope Ratio			2.64			1	27-SEP-17 17:07	per0927015a
14797-73-0	Perchlorate-101	.05	.2	0.236	ug/L		1	27-SEP-17 17:07	per0927015a
	Perchlorate-O(18)			0.498	ug/L		1	27-SEP-17 17:07	per0927015a

^ 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: 1704157Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CALA-17-144806MSDate Received: 21-SEP-17GEL Job No (SDG): 2017-2890GEL Sample ID: 1203883509Date Filtered: 27-SEP-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	0.521	ug/L		1	27-SEP-17 17:43	per0927019a
	Perchlorate Isotope Ratio			2.75			1	27-SEP-17 17:43	per0927019a
14797-73-0	Perchlorate-101	.05	.2	0.518	ug/L		1	27-SEP-17 17:43	per0927019a
	Perchlorate-O(18)			0.474	ug/L		1	27-SEP-17 17:43	per0927019a

^ 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: 1704157Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CALA-17-144806MSDDate Received: 21-SEP-17GEL Job No (SDG): 2017-2890GEL Sample ID: 1203883510Date Filtered: 27-SEP-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	0.508	ug/L		1	27-SEP-17 17:52	per0927020a
	Perchlorate Isotope Ratio			2.73			1	27-SEP-17 17:52	per0927020a
14797-73-0	Perchlorate-101	.05	.2	0.508	ug/L		1	27-SEP-17 17:52	per0927020a
	Perchlorate-O(18)			0.486	ug/L		1	27-SEP-17 17:52	per0927020a

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

*Concentration =

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

Explosives by LCMSMS Analysis

Case Narrative

**Explosives by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2890
Work Order #: 433548**

Method/Analysis Information

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

Analytical Method: SW846 3535A/8330B

Prep Method: SW846 3535A

Analytical Batch
Number: 1704128

Prep Batch Number: 1704126

Sample Analysis

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

Sample ID	Client ID
433548002	CAAN-17-144829
1203883443	Method Blank (MB)
1203883444	Laboratory Control Sample (LCS)
1203883445	433549002(CAAN-17-144828) Matrix Spike (MS)
1203883446	433549002(CAAN-17-144828) Matrix Spike Duplicate (MSD)

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-068 REV# 7.

Calibration Information

Initial Calibration

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

Calibration Verification Standard Requirements

All calibration verification standards (ICV or CCV) have not met requirements of 80-120% for samples in this SDG. Please refer to Form 7 of the data package for a list of recoveries. Since the recoveries are biased high and target analytes were not detected in the associated samples, the data are considered unaffected. The data are reported. All continuing calibration verification standards (CCV) have not met requirements of 80-120% for in this SDG. Please refer to Form 7 of the data package for a list of recoveries. A LLOQ level standard was analyzed following the biased low CCV with all target analytes meeting acceptance limits. Since the target analyte was not detected in the associated samples, the data are reported.

Calibration Blank Requirements

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

CRI Requirements

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

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

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

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries were within the established acceptance limits.

QC Sample Designation

Client sample 433549002 (CAAN-17-144828) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS and/or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. Because the recoveries were biased high and target analytes were not detected in the associated samples, the data were reported.

Sample	Analyte	Value
1203883445 (CAAN-17-144828MS)	TATB	163* (38%-149%)
1203883446 (CAAN-17-144828MSD)	TATB	167* (38%-149%)

MS/MSD Relative Percent Difference (RPD) Statement

The RPD values between the MS and MSD (See Below) were not within the acceptance limits. Since all other RPD values met acceptance criteria, the noted exceptions are attributed to vagaries in the extraction process. The data are reported.

Sample	Analyte	Value
1203883445MS and 1203883446MSD (CAAN-17-144828)	2,6-Diamino-4-nitrotoluene	47* (0%-30%)

Internal Standard (ISTD) Acceptance

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

Technical Information**Holding Time Specifications**

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

days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

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

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Manual Integrations

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

Additional Comments

Due to software limitations, all initial calibration blanks must be designated as XIB001 in order for the forms to be correct. Due to software limitations, file extensions such as DL, RE, etc. may not appear on the generated forms and/or raw data. Relative Retention Time (RRT) is used by the laboratory to establish peak identity. The RRT of each target analyte is calculated using the retention time of the corresponding internal standard. The RRT of each analyte in a sample must be within 0.1 of the analyte's calculated RRT in the ICV.

System Configuration

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

Electronic Packaging Comment

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

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

Chromatographic Columns

The LC-MS/MS Explosives analysis was performed on a ABSciex 5500 Qtrap LC/MS/MS.

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-2890 GEL Work Order: 433548

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: 03 OCT 2017

Title: Group Leader

Sample Data Summary

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-17-144829

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Matrix: WATER

GEL Sample ID: 433548002

Sample Amount 940 mL

Date Received: 26-SEP-17

Moisture: .

Extraction Batch ID: 1704126

Extraction Type Sol Exchange

Date Extracted: 27-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0929046.wiff

Date Analyzed: 30-SEP-17 12:59

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0851	U	0.0851	0.266
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0851	U	0.0851	0.266
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.0851	U	0.0851	0.266
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0851	U	0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0851	U	0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0851	U	0.0851	0.266
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0851	U	0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	.0851	U	0.0851	0.266
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
98-95-3	Nitrobenzene	.0851	U	0.0851	0.266
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0851	U	0.0851	0.266
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.0851	U	0.0851	0.266
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.0851	U	0.0851	0.266
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.0872	U	0.0872	0.266
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-17-144829

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Matrix: WATER

GEL Sample ID: 433548002

Sample Amount 940 mL

Date Received: 26-SEP-17

Moisture: .

Extraction Batch ID: 1704126

Extraction Type Sol Exchange

Date Extracted: 27-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	.106	U	0.106	0.532
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.16	U	0.160	0.532
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.319	U	0.319	1.06
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.319	U	0.319	1.06
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.319	U	0.319	1.06
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.532	U	0.532	2.66
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.532	U	0.532	2.66
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				

Quality Control Summary

High Explosives Surrogate Recovery Summary**Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2017-2890**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
433548002	CAAN-17-144829	86	55 - 115	
1203883443	MB for batch 1704126	103	55 - 115	
1203883444	LCS for batch 1704126	87	55 - 115	
1203883445	CAAN-17-144828MS	98	55 - 115	
1203883446	CAAN-17-144828MSD	91	55 - 115	

DNT = 3,4-Dinitrotoluene

3B
High Explosives LCS/LCS Duplicate Summary

Lab Name: GEL Laboratories LLC

Client ID: LCS

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Extract Batch Code: 1704126

Date Extracted: 27-SEP-17

GEL LCS ID: 1203883444

GEL LCSDUP ID: .

Analysis Date/Time: 30-SEP-17 12:24

DUP Analysis Date/Time:

Reporting Units: ug/L

QC Type: LCS/LCSD

Compound	Spike Added	LCS Conc	LCS Rec #	LCSD Conc	LCSD Rec #	RPD #	RPD	Recovery Limits
RDX	5	3.95	79					64 - 117
TATB	1.25	1.57	125					47 - 135
Tetryl	5	3.1	62					55 - 122
m-Dinitrobenzene	5	4.68	94					74 - 117
m-Nitrotoluene	5	5.11	102					66 - 114
o-Nitrotoluene	5	4.86	97					64 - 115
p-Nitrotoluene	5	5.37	107					66 - 127
tris(o-cresyl) phosphate	5	2.64	53					43 - 104
1,3,5-Trinitrobenzene	5	4.13	83					70 - 110
2,4,6-Trinitrotoluene	5	4.21	84					69 - 113
2,4-Diamino-6-nitrotoluene	5	3.95	79					50 - 121
2,4-Dinitrotoluene	5	4.75	95					71 - 110
2,6-Diamino-4-nitrotoluene	5	5.18	104					53 - 127
2,6-Dinitrotoluene	5	4.23	85					72 - 105
2-Amino-4,6-dinitrotoluene	5	4	80					70 - 112
3,5-Dinitroaniline	5	3.93	79					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.01	80					74 - 116
HMX	5	3.48	70					58 - 113
Nitrobenzene	5	5	100					64 - 115
PETN	5	4.47	89					57 - 126

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

* Values outside of QC limits

3
High Explosives MS/MSD Summary

Lab Name: GEL Laboratories LLC

Client ID: CAAN-17-144828

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Extract Batch Code: 1704126

Date Extracted: 27-SEP-17

GEL Spike ID: 1203883445

GEL SpikeDup ID: 1203883446

Analysis Date/Time: 30-SEP-17 14:10

MSD Analysis Date/Time: 30-SEP-17 14:46

Reporting Units: ug/L

QC Type: MS/MSD

Compound	Spike Added	Sample Conc	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Rec Limits
1,3,5-Trinitrobenzene	5.31915	0	4.89	92	5.61	105	14	30	67 - 111
2,4,6-Trinitrotoluene	5.31915	0	5.04	95	4.97	93	1	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.31915	0	6.24	117	5.85	110	6	30	50 - 121
2,4-Dinitrotoluene	5.31915	0	5.31	100	5.03	95	5	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.31915	0	6.61	124	4.09	77	47 *	30	53 - 127
2,6-Dinitrotoluene	5.31915	0	4.82	91	5.2	98	8	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.31915	0	5.21	98	5.27	99	1	30	67 - 115
4-Amino-2,6-dinitrotoluene	5.31915	0	5.09	96	5.04	95	1	30	65 - 120
HMX	5.31915	0	4.55	85	4.67	88	3	30	44 - 128
Nitrobenzene	5.31915	0	5.47	103	5.77	108	5	30	62 - 116
PETN	5.31915	0	5	94	5.08	95	2	30	51 - 131
RDX	5.31915	0	5.05	95	5	94	1	30	57 - 125
TATB	1.32979	0	2.17	163 *	2.22	167 *	3	30	38 - 149
Tetryl	5.31915	0	3.86	73	4.13	78	7	30	50 - 126
m-Dinitrobenzene	5.31915	0	5.3	100	5.51	104	4	30	74 - 117
m-Nitrotoluene	5.31915	0	5.23	98	5.74	108	9	30	59 - 120
o-Nitrotoluene	5.31915	0	5.21	98	4.75	89	9	30	56 - 119
p-Nitrotoluene	5.31915	0	5.59	105	5.7	107	2	30	61 - 129
tris(o-cresyl) phosphate	5.31915	0	3.88	73	2.97	56	27	30	38 - 105
3,5-Dinitroaniline	5.31915	0	5.1	96	4.68	88	9	30	70 - 121

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

Quality Control Data

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1704126

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Matrix: WATER

GEL Sample ID: 1203883443

Sample Amount 1000 mL

Date Received: 26-SEP-17

Moisture: .

Extraction Batch ID: 1704126

Extraction Type Sol Exchange

Date Extracted: 27-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0929044.wiff

Date Analyzed: 30-SEP-17 11:48

Dilution Factor: 2

Concentration Units: ug/L

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

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High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1704126

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Matrix: WATER

GEL Sample ID: 1203883443

Sample Amount 1000 mL

Date Received: 26-SEP-17

Moisture: .

Extraction Batch ID: 1704126

Extraction Type Sol Exchange

Date Extracted: 27-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

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

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1704126

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Matrix: WATER

GEL Sample ID: 1203883444

Sample Amount 1000 mL

Date Received: 26-SEP-17

Moisture: .

Extraction Batch ID: 1704126

Extraction Type Sol Exchange

Date Extracted: 27-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0929045.wiff

Date Analyzed: 30-SEP-17 12:24

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	1.57		0.300	1.00
3058-38-6	TATB				
78-30-8	tris(o-cresyl) phosphate	2.64		0.300	1.00
78-30-8	tris(o-cresyl) phosphate				
479-45-8	Tetryl	3.1		0.080	0.500
479-45-8	Tetryl				
2691-41-0	HMX	3.48		0.080	0.250
2691-41-0	HMX				
618-87-1	3,5-Dinitroaniline	3.93		0.300	1.00
618-87-1	3,5-Dinitroaniline				
121-82-4	RDX	3.95		0.080	0.250
121-82-4	RDX				
6629-29-4	2,4-Diamino-6-nitrotoluene	3.95		0.500	2.50
6629-29-4	2,4-Diamino-6-nitrotoluene				
35572-78-2	2-Amino-4,6-dinitrotoluene	4		0.080	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.01		0.080	0.250
19406-51-0	4-Amino-2,6-dinitrotoluene				
99-35-4	1,3,5-Trinitrobenzene	4.13		0.080	0.250
99-35-4	1,3,5-Trinitrobenzene				
118-96-7	2,4,6-Trinitrotoluene	4.21		0.080	0.250
118-96-7	2,4,6-Trinitrotoluene				
606-20-2	2,6-Dinitrotoluene	4.23		0.080	0.250
606-20-2	2,6-Dinitrotoluene				
78-11-5	PETN	4.47		0.100	0.500
78-11-5	PETN				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1704126

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Matrix: WATER

GEL Sample ID: 1203883444

Sample Amount 1000 mL

Date Received: 26-SEP-17

Moisture: .

Extraction Batch ID: 1704126

Extraction Type Sol Exchange

Date Extracted: 27-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-65-0	m-Dinitrobenzene	4.68		0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
121-14-2	2,4-Dinitrotoluene	4.75		0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
88-72-2	o-Nitrotoluene	4.86		0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	5		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	5.11		0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.18		0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
99-99-0	p-Nitrotoluene	5.37		0.150	0.500
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-17-144828(433549002MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Matrix: WATER

GEL Sample ID: 1203883445

Sample Amount 940 mL

Date Received: 26-SEP-17

Moisture: .

Extraction Batch ID: 1704126

Extraction Type Sol Exchange

Date Extracted: 27-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0929048.wiff

Date Analyzed: 30-SEP-17 14:10

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	2.17		0.319	1.06
3058-38-6	TATB				
479-45-8	Tetryl	3.86		0.0851	0.532
479-45-8	Tetryl				
78-30-8	tris(o-cresyl) phosphate	3.88		0.319	1.06
78-30-8	tris(o-cresyl) phosphate				
2691-41-0	HMX	4.55		0.0851	0.266
2691-41-0	HMX				
606-20-2	2,6-Dinitrotoluene	4.82		0.0851	0.266
606-20-2	2,6-Dinitrotoluene				
99-35-4	1,3,5-Trinitrobenzene	4.89		0.0851	0.266
99-35-4	1,3,5-Trinitrobenzene				
78-11-5	PETN	5		0.106	0.532
78-11-5	PETN				
118-96-7	2,4,6-Trinitrotoluene	5.04		0.0851	0.266
118-96-7	2,4,6-Trinitrotoluene				
121-82-4	RDX	5.05		0.0851	0.266
121-82-4	RDX				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.09		0.0851	0.266
19406-51-0	4-Amino-2,6-dinitrotoluene				
618-87-1	3,5-Dinitroaniline	5.1		0.319	1.06
618-87-1	3,5-Dinitroaniline				
35572-78-2	2-Amino-4,6-dinitrotoluene	5.21		0.0851	0.266
35572-78-2	2-Amino-4,6-dinitrotoluene				
88-72-2	o-Nitrotoluene	5.21		0.0872	0.266
88-72-2	o-Nitrotoluene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-17-144828(433549002MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Matrix: WATER

GEL Sample ID: 1203883445

Sample Amount 940 mL

Date Received: 26-SEP-17

Moisture: .

Extraction Batch ID: 1704126

Extraction Type Sol Exchange

Date Extracted: 27-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-08-1	m-Nitrotoluene	5.23		0.0851	0.266
99-08-1	m-Nitrotoluene				
99-65-0	m-Dinitrobenzene	5.3		0.0851	0.266
99-65-0	m-Dinitrobenzene				
121-14-2	2,4-Dinitrotoluene	5.31		0.0851	0.266
121-14-2	2,4-Dinitrotoluene				
98-95-3	Nitrobenzene	5.47		0.0851	0.266
98-95-3	Nitrobenzene				
99-99-0	p-Nitrotoluene	5.59		0.160	0.532
99-99-0	p-Nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	6.24		0.532	2.66
6629-29-4	2,4-Diamino-6-nitrotoluene				
59229-75-3	2,6-Diamino-4-nitrotoluene	6.61		0.532	2.66
59229-75-3	2,6-Diamino-4-nitrotoluene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-17-144828(433549002MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Matrix: WATER

GEL Sample ID: 1203883446

Sample Amount 940 mL

Date Received: 26-SEP-17

Moisture: .

Extraction Batch ID: 1704126

Extraction Type Sol Exchange

Date Extracted: 27-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0929049.wiff

Date Analyzed: 30-SEP-17 14:46

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	2.22		0.319	1.06
<i>3058-38-6</i>	<i>TATB</i>				
78-30-8	tris(o-cresyl) phosphate	2.97		0.319	1.06
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.09		0.532	2.66
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
479-45-8	Tetryl	4.13		0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
2691-41-0	HMX	4.67		0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
618-87-1	3,5-Dinitroaniline	4.68		0.319	1.06
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
88-72-2	o-Nitrotoluene	4.75		0.0872	0.266
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.97		0.0851	0.266
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-82-4	RDX	5		0.0851	0.266
<i>121-82-4</i>	<i>RDX</i>				
121-14-2	2,4-Dinitrotoluene	5.03		0.0851	0.266
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.04		0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
78-11-5	PETN	5.08		0.106	0.532
<i>78-11-5</i>	<i>PETN</i>				
606-20-2	2,6-Dinitrotoluene	5.2		0.0851	0.266
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-17-144828(433549002MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-2890

Matrix: WATER

GEL Sample ID: 1203883446

Sample Amount 940 mL

Date Received: 26-SEP-17

Moisture: .

Extraction Batch ID: 1704126

Extraction Type Sol Exchange

Date Extracted: 27-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
35572-78-2	2-Amino-4,6-dinitrotoluene	5.27		0.0851	0.266
35572-78-2	2-Amino-4,6-dinitrotoluene				
99-65-0	m-Dinitrobenzene	5.51		0.0851	0.266
99-65-0	m-Dinitrobenzene				
99-35-4	1,3,5-Trinitrobenzene	5.61		0.0851	0.266
99-35-4	1,3,5-Trinitrobenzene				
99-99-0	p-Nitrotoluene	5.7		0.160	0.532
99-99-0	p-Nitrotoluene				
99-08-1	m-Nitrotoluene	5.74		0.0851	0.266
99-08-1	m-Nitrotoluene				
98-95-3	Nitrobenzene	5.77		0.0851	0.266
98-95-3	Nitrobenzene				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.85		0.532	2.66
6629-29-4	2,4-Diamino-6-nitrotoluene				

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-2890Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 29-SEP-17 10:21GEL Data File: EXP0929001.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

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

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-2890Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 29-SEP-17 10:59GEL Data File: EXP0929002.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2890

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 29-SEP-17 15:42

GEL Data File: EXP0929010.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	1.07
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2890

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 29-SEP-17 18:04

GEL Data File: EXP0929014.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2890

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 29-SEP-17 22:13

GEL Data File: EXP0929021.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2890

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 29-SEP-17 23:24

GEL Data File: EXP0929023.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2890

Lab Code: GEL

Lab Sample ID: XIBLK06

Analysis Date: 30-SEP-17 04:07

GEL Data File: EXP0929031.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2890

Lab Code: GEL

Lab Sample ID: XIBLK07

Analysis Date: 30-SEP-17 05:18

GEL Data File: EXP0929033.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2890

Lab Code: GEL

Lab Sample ID: XIBLK08

Analysis Date: 30-SEP-17 09:27

GEL Data File: EXP0929040.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2890

Lab Code: GEL

Lab Sample ID: XIBLK09

Analysis Date: 30-SEP-17 10:38

GEL Data File: EXP0929042.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2890

Lab Code: GEL

Lab Sample ID: XIBLK10

Analysis Date: 30-SEP-17 15:21

GEL Data File: EXP0929050.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2890

Lab Code: GEL

Lab Sample ID: XIBLK11

Analysis Date: 30-SEP-17 16:32

GEL Data File: EXP0929052.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2890
Work Order #: 433548

Sample ID	Client ID
433548001	CAAN-17-144827
433548002	CAAN-17-144829
1203882955	Method Blank (MB) ICP
1203882956	Laboratory Control Sample (LCS)
1203882959	433549001(CAAN-17-144826L) Serial Dilution (SD)
1203882957	433549001(CAAN-17-144826D) Sample Duplicate (DUP)
1203882958	433549001(CAAN-17-144826S) Matrix Spike (MS)
1203882988	Method Blank (MB) ICP-MS
1203882989	Laboratory Control Sample (LCS)
1203882992	433549001(CAAN-17-144826L) Serial Dilution (SD)
1203882990	433549001(CAAN-17-144826D) Sample Duplicate (DUP)
1203882991	433549001(CAAN-17-144826S) Matrix Spike (MS)
1203887583	Method Blank (MB) CVAA
1203887584	Laboratory Control Sample (LCS)
1203887587	433549001(CAAN-17-144826L) Serial Dilution (SD)
1203887585	433549001(CAAN-17-144826D) Sample Duplicate (DUP)
1203887586	433549001(CAAN-17-144826S) Matrix Spike (MS)

Sample Analysis

Samples 433548001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1703901, 1703915, 1705900 and 1710208
Prep Batch :	1703899, 1703914 and 1705899
Standard Operating Procedures:	GL-MA-E-013 REV# 29, GL-MA-E-006 REV# 13, GL-MA-E-014 REV# 32, GL-MA-E-010 REV# 35 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 zinc. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 433548001 (CAAN-17-144827)-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: 433549001 (CAAN-17-144826)-ICP, ICP-MS and CVAA.

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Additional Comments

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

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

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

Certification Statement

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

GEL LABORATORIES LLC

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: 2017-2890 GEL Work Order: 433548

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:



Name: Nik-Cole Elmore

Date: 23 OCT 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2890**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 433548001**BASIS:** As Received**DATE COLLECTED** 22-SEP-17**CLIENT ID:** CAAN-17-144827**LEVEL:** Low**DATE RECEIVED** 26-SEP-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	10/04/17 12:13	100417W-3	1705900

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2890

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 433548001

BASIS: As Received

DATE COLLECTED 22-SEP-17

CLIENT ID: CAAN-17-144827

LEVEL: Low

DATE RECEIVED 26-SEP-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	09/28/17 12:26	092817A-1	1703901
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7440-39-3	Barium	13	ug/L		1	5	5	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7440-70-2	Calcium	9430	ug/L		50	200	200	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7439-95-4	Magnesium	2860	ug/L		110	300	300	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7439-98-7	Molybdenum	1.13	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7440-09-7	Potassium	1090	ug/L		50	150	150	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7631-86-9	Silica	62500	ug/L		53	213	213	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7440-23-5	Sodium	10200	ug/L		100	300	300	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7440-24-6	Strontium	49.6	ug/L		1	5	5	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7440-61-1	Uranium	0.521	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/16/17 11:07	171016-2	1703915
7440-62-2	Vanadium	6.03	ug/L		1	5	5	1	P	HSC	09/28/17 12:26	092817A-1	1703901
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	09/28/17 12:26	092817A-1	1703901

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2890**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 433548001**BASIS:** As Received**DATE COLLECTED** 22-SEP-17**CLIENT ID:** CAAN-17-144827**LEVEL:** Low**DATE RECEIVED** 26-SEP-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	35.3	mg/L		0.453	1.24	1.24	1		TXT1	10/16/17 16:41		1710208

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1703901	1703899	SW846 3005A	50	mL	50	mL	09/26/17	JXM8
1703915	1703914	SW846 3005A	50	mL	50	mL	09/26/17	JXM8
1705900	1705899	EPA 245.1/245.2 Prep	20	mL	20	mL	10/03/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2890**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 433548002**BASIS:** As Received**DATE COLLECTED** 22-SEP-17**CLIENT ID:** CAAN-17-144829**LEVEL:** Low**DATE RECEIVED** 26-SEP-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	10/04/17 12:15	100417W-3	1705900

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1705900	1705899	EPA 245.1/245.2 Prep	20	mL	20	mL	10/03/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2017-2890

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>
1203882955	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	146	ug/L	+/-300	J	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203882988	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
1203887583	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. 2017-2890 Client ID: CAAN-17-144826S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 433549001 Spike ID: 1203882958

<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	4800		68	U	5000	95.9		P
Barium	ug/L	75-125	472		15.1		500	91.4		P
Beryllium	ug/L	75-125	462		1	U	500	92.3		P
Boron	ug/L	75-125	492		15	U	500	96.7		P
Calcium	ug/L	75-125	14600		10100		5000	90.6		P
Cobalt	ug/L	75-125	468		1.16	J	500	93.3		P
Copper	ug/L	75-125	487		3	U	500	97.3		P
Iron	ug/L	75-125	4880		30	U	5000	97.2		P
Magnesium	ug/L	75-125	7550		2870		5000	93.7		P
Manganese	ug/L	75-125	469		4.38	J	500	92.9		P
Potassium	ug/L	75-125	5520		1100		5000	88.5		P
Silica	ug/L		67500		57800		10700	91.1	N/A	P
Sodium	ug/L	75-125	14900		10100		5000	96.9		P
Strontium	ug/L	75-125	557		58.4		500	99.8		P
Tin	ug/L	75-125	458		2.5	U	500	91.4		P
Vanadium	ug/L	75-125	474		4.56	J	500	93.9		P
Zinc	ug/L	75-125	439		3.3	U	500	87.6		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-2890

Client ID: CAAN-17-144826S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 433549001

Spike ID: 1203882991

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	47.9		1	U	50	95.2		MS
Arsenic	ug/L	75-125	49.2		2	U	50	95.1		MS
Cadmium	ug/L	75-125	48.3		0.3	U	50	96.7		MS
Chromium	ug/L	75-125	47.9		3	U	50	90.7		MS
Lead	ug/L	75-125	50.9		0.5	U	50	102		MS
Molybdenum	ug/L	75-125	50.8		1.15		50	99.2		MS
Nickel	ug/L	75-125	46.7		0.6	U	50	92.7		MS
Selenium	ug/L	75-125	48.9		2	U	50	96.8		MS
Silver	ug/L	75-125	50.6		0.3	U	50	101		MS
Thallium	ug/L	75-125	48		0.6	U	50	95.9		MS
Uranium	ug/L	75-125	52.7		0.404		50	105		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-2890 **Client ID:** CAAN-17-144826S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 433549001 **Spike ID:** 1203887586

<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	2.1		0.067	U	2	104		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
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Duplicate Sample Summary

SDG No.: 2017-2890

Lab Code: GEL

Contract: ESHL00114

Client ID: CAAN-17-144826D

Matrix: WATER

Level: Low

Sample ID: 433549001

Duplicate ID: 1203882957

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-5	15.1		15		.976		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	10100		9680		3.93		P
Cobalt	ug/L	+/-5	1.16 J		1.22 J		4.93		P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	2870		2750		4.16		P
Manganese	ug/L	+/-10	4.38 J		4.36 J		.51		P
Potassium	ug/L	+/-20%	1100		1020		7.7		P
Silica	ug/L	+/-20%	57800		57800		.0813		P
Sodium	ug/L	+/-20%	10100		10200		1.58		P
Strontium	ug/L	+/-20%	58.4		56.7		3.09		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	4.56 J		4.39 J		3.78		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
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Duplicate Sample Summary

SDG No.: 2017-2890

Lab Code: GEL

Contract: ESHL00114

Client ID: CAAN-17-144826D

Matrix: WATER

Level: Low

Sample ID: 433549001

Duplicate ID: 1203882990

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		2 U		2 U				MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.15		1.17		1.89		MS
Nickel	ug/L		0.6 U		0.6 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.404		0.409		1.23		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
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Duplicate Sample Summary

SDG No.: 2017–2890**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAAN–17–144826D**Matrix:** WATER**Level:** Low**Sample ID:** 433549001**Duplicate ID:** 1203887585**Percent Solids for Dup:** N/A

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

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2890

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>
1203882956								
	Aluminum	ug/L	5000	5100		102	80-120	P
	Barium	ug/L	500	483		96.6	80-120	P
	Beryllium	ug/L	500	479		95.7	80-120	P
	Boron	ug/L	500	496		99.2	80-120	P
	Calcium	ug/L	5000	4940		98.9	80-120	P
	Cobalt	ug/L	500	494		98.8	80-120	P
	Copper	ug/L	500	498		99.6	80-120	P
	Iron	ug/L	5000	5060		101	80-120	P
	Magnesium	ug/L	5000	5070		101	80-120	P
	Manganese	ug/L	500	489		97.7	80-120	P
	Potassium	ug/L	5000	4770		95.4	80-120	P
	Silica	ug/L	10700	9910		92.6	80-120	P
	Sodium	ug/L	5000	5030		101	80-120	P
	Strontium	ug/L	500	526		105	80-120	P
	Tin	ug/L	500	474		94.8	80-120	P
	Vanadium	ug/L	500	487		97.4	80-120	P
	Zinc	ug/L	500	458		91.6	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2890

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>
1203882989								
	Antimony	ug/L	50	46.3		92.7	80-120	MS
	Arsenic	ug/L	50	50.8		102	80-120	MS
	Cadmium	ug/L	50	50.3		101	80-120	MS
	Chromium	ug/L	50	49.6		99.1	80-120	MS
	Lead	ug/L	50	50		99.9	80-120	MS
	Molybdenum	ug/L	50	50.2		100	80-120	MS
	Nickel	ug/L	50	52.4		105	80-120	MS
	Selenium	ug/L	50	50.7		101	80-120	MS
	Silver	ug/L	50	53.1		106	80-120	MS
	Thallium	ug/L	50	47.6		95.1	80-120	MS
	Uranium	ug/L	50	53.2		106	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2890

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>
1203887584	Mercury	ug/L	2	2.05		103	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2890

Client ID: CAAN-17-144826L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 433549001

Serial Dilution ID: 1203882959

<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	15.1		15.3	J	.977			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	10100		9760		3.102		10	P
Cobalt	1.16	J	5	U	68.318			P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	2870		2540		11.355			P
Manganese	4.38	J	10	U	8.525			P
Potassium	1100		908		17.528			P
Silica	57800		57400		.742		10	P
Sodium	10100		10100		.482		10	P
Strontium	58.4		60.5		3.459		10	P
Tin	2.5	U	12.5	U				P
Vanadium	4.56	J	5	U	1.959			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2890

Client ID: CAAN-17-144826L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 433549001

Serial Dilution ID: 1203882992

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.15		1.29	J	12.076			MS
Nickel	.6	U	3	U				MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.404		.48	J	18.812			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2890 **Client ID:** CAAN-17-144826L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 433549001 **Serial Dilution ID:** 1203887587

<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 #: 2017-2890
Work Order #: 433548**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1703144

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
433548002	CAAN-17-144829
1203882499	Method Blank (MB)
1203882500	Laboratory Control Sample (LCS)
1203882503	433484001(CALA-17-143813) Sample Duplicate (DUP)
1203882506	433484001(CALA-17-143813) 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 433484001 (CALA-17-143813) 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:	1703861	Method:	WSP-CN(T)
Prep Batch :	1703860	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
433548002	CAAN-17-144829
1203882919	Method Blank (MB)
1203882920	Laboratory Control Sample (LCS)
1203882921	433548002(CAAN-17-144829) Sample Duplicate (DUP)
1203882923	433548002(CAAN-17-144829) 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 433548002 (CAAN-17-144829) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1704820

Method: WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
433548001	CAAN-17-144827
1203885090	Method Blank (MB)
1203885091	Laboratory Control Sample (LCS)
1203885092	433484004(CALA-17-143819) Sample Duplicate (DUP)
1203885093	433484004(CALA-17-143819) 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-1600 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 433484004 (CALA-17-143819) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following samples 1203885092 (CALA-17-143819DUP) and 1203885093 (CALA-17-143819PS) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Sample Re-analysis

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

Miscellaneous Information

Manual Integrations

Samples 1203885092 (CALA-17-143819DUP) and 433548001 (CAAN-17-144827) 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:	1705053	Method:	NH3
Prep Batch :	1705052	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
433548001	CAAN-17-144827
1203885581	Method Blank (MB)
1203885582	Laboratory Control Sample (LCS)
1203885583	433549001(CAAN-17-144826) Sample Duplicate (DUP)
1203886315	433548001(CAAN-17-144827) Sample Duplicate (DUP)
1203885584	433549001(CAAN-17-144826) Matrix Spike (MS)
1203886316	433548001(CAAN-17-144827) 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.

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 433548001 (CAAN-17-144827) and 433549001 (CAAN-17-144826) 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

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:	1705044	Method:	TKN
Prep Batch :	1705043	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
433548002	CAAN-17-144829
1203885558	Method Blank (MB)
1203885559	Laboratory Control Sample (LCS)
1203885560	433549002(CAAN-17-144828) Sample Duplicate (DUP)
1203886313	433548002(CAAN-17-144829) Sample Duplicate (DUP)
1203885561	433549002(CAAN-17-144828) Matrix Spike (MS)
1203886314	433548002(CAAN-17-144829) 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

Samples 433548002 (CAAN-17-144829) and 433549002 (CAAN-17-144828) were selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203885561 (CAAN-17-144828MS)	81.7* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1705047

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
433548001	CAAN-17-144827
1203885567	Method Blank (MB)
1203885568	Laboratory Control Sample (LCS)
1203885569	433549001(CAAN-17-144826) Sample Duplicate (DUP)
1203885571	433549001(CAAN-17-144826) 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 433549001 (CAAN-17-144826) 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 spike recovery falls outside of the GEL acceptance limits but within the client specified limits. 1203885571 (CAAN-17-144826PS).

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 Phosphorus		
Analytical Batch:	1705035	Method:	PO4
Prep Batch :	1705034	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
433548001	CAAN-17-144827
1203885540	Method Blank (MB)
1203885541	Laboratory Control Sample (LCS)
1203885542	433549001(CAAN-17-144826) Sample Duplicate (DUP)
1203885543	433549001(CAAN-17-144826) 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

Sample 433549001 (CAAN-17-144826) 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
Phosphorus, Total as P	1203885543 (CAAN-17-144826MS)	145* (63%-139%)

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

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Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1703295

Method: TDS

Sample Analysis

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

Sample ID	Client ID
433548001	CAAN-17-144827
1203881531	Method Blank (MB)
1203881532	Laboratory Control Sample (LCS)
1203881534	433412002(WSTMO-17-147251) 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 433412002 (WSTMO-17-147251) 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

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Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1706333

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
433548001	CAAN-17-144827
1203888586	Laboratory Control Sample (LCS)
1203888587	433285001(CALA-17-144807) 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# 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 Titration and Ion analysis was performed on a Orion 160 Conductivity Meter.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 433285001 (CALA-17-144807) 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

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Method/Analysis Information

Product: pH

Analytical Batch: 1703903 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
433548001	CAAN-17-144827
1203882961	Laboratory Control Sample (LCS)
1203882962	433394002(CALA-17-143818) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 433394002 (CALA-17-143818) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

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

Sample	Analyte	Value
1203882962 (CALA-17-143818DUP)	pH	Received 22-SEP-17, out of holding 20-SEP-17
433548001 (CAAN-17-144827)	pH	Received 26-SEP-17, out of holding 22-SEP-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:

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Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1703908 **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
433548001	CAAN-17-144827
1203882979	Laboratory Control Sample (LCS)
1203882981	433549001(CAAN-17-144826) Sample Duplicate (DUP)
1203882983	433549001(CAAN-17-144826) 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 433549001 (CAAN-17-144826) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-2890 GEL Work Order: 433548

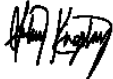
The Qualifiers in this report are defined as follows:

- * 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: 17 OCT 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: October 17, 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: 2017-2890

Client Sample ID: CAAN-17-144827
Sample ID: 433548001
Matrix: W
Collect Date: 22-SEP-17 10:57
Receive Date: 26-SEP-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	09/28/17	1902	1704820	1
Chloride		1.60	0.067	0.200	mg/L		1					
Fluoride		0.182	0.033	0.100	mg/L		1					
Sulfate		1.59	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0477	0.017	0.050	mg/L	1.00	1	KLP1	10/02/17	1021	1705053	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.381	0.017	0.050	mg/L		1	KLP1	10/02/17	1103	1705047	3
PO4 "As Received"												
Phosphorus, Total as P		0.545	0.020	0.050	mg/L	1.00	1	KLP1	10/02/17	1422	1705035	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		117	3.40	14.3	mg/L			KLP1	09/27/17	1033	1703295	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		57.3	1.45	4.00	mg/L			RXB5	09/28/17	1719	1703908	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		129	1.00	1.00	umhos/cm		1	VH1	10/04/17	1334	1706333	7
PH "As Received"												
pH at Temp 18.8C	H	8.10	0.010	0.100	SU		1	RXB5	09/28/17	1718	1703903	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	10/02/17	0835	1705052
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	10/02/17	0940	1705034

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Certificate of Analysis

Report Date: October 17, 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: 2017-2890

Client Sample ID: CAAN-17-144827
Sample ID: 433548001

Project: ESHL00114
Client ID: ARSL004

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: October 17, 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: 2017-2890

Client Sample ID: CAAN-17-144829
Sample ID: 433548002
Matrix: W
Collect Date: 22-SEP-17 10:57
Receive Date: 26-SEP-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	09/29/17	0256	1703144	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	09/28/17	0836	1703861	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	10/02/17	1622	1705044	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	09/28/17	0817	1703860
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	10/02/17	0940	1705043

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: October 17, 2017

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

Contact: Ms. Nita Patel

Workorder: 433548

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1703144										
QC1203882503	433484001	DUP									
Total Organic Carbon Average		J	0.356	J	0.333	mg/L	6.68 ^	(+/-1.00)	TSM	09/29/17	00:35
QC1203882500	LCS										
Total Organic Carbon Average	10.0				10.3	mg/L		103 (80%-120%)		09/28/17	16:12
QC1203882499	MB										
Total Organic Carbon Average			U	ND	mg/L					09/28/17	16:00
QC1203882506	433484001	PS									
Total Organic Carbon Average	10.0	J	0.356		11.1	mg/L		108 (75%-125%)		09/29/17	01:22
Flow Injection Analysis											
Batch	1703861										
QC1203882921	433548002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	09/28/17	08:37
QC1203882920	LCS										
Cyanide, Total	50.0				52.4	ug/L		105 (90%-110%)		09/28/17	08:35
QC1203882919	MB										
Cyanide, Total			U	ND	ug/L					09/28/17	08:34
QC1203882923	433548002	MS									
Cyanide, Total	100	U	ND		108	ug/L		108 (90%-110%)		09/28/17	08:38
Ion Chromatography											
Batch	1704820										
QC1203885092	433484004	DUP									
Bromide			0.890		0.882	mg/L	0.914 ^	(+/-0.200)	MXL2	09/28/17	18:04

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QC Summary

Workorder: 433548

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1704820										
Chloride		23.4		23.5	mg/L	0.431		(0%-20%)	MXL2	09/30/17	02:04
Fluoride	J	0.0519	J	0.0521	mg/L	0.385	^	(+/-0.100)		09/28/17	18:04
Sulfate		11.7		11.6	mg/L	0.461		(0%-20%)			
QC1203885091	LCS										
Bromide	1.25			1.24	mg/L		98.9	(80%-120%)		09/28/17	17:06
Chloride	5.00			4.71	mg/L		94.2	(80%-120%)			
Fluoride	2.50			2.36	mg/L		94.3	(80%-120%)			
Sulfate	10.0			9.78	mg/L		97.8	(80%-120%)			
QC1203885090	MB										
Bromide			U	ND	mg/L					09/28/17	16:38
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203885093	433484004	PS									
Bromide	1.25	0.890		2.09	mg/L		96.3	(75%-125%)		09/28/17	18:33
Chloride	5.00	4.68		10.1	mg/L		108	(75%-125%)		09/30/17	02:32
Fluoride	2.50	J	0.0519	2.38	mg/L		93	(75%-125%)		09/28/17	18:33
Sulfate	10.0	11.7		22.3	mg/L		107	(75%-125%)			

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QC Summary

Workorder: 433548

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1705035										
QC1203885542	433549001	DUP									
Phosphorus, Total as P		0.513		0.519	mg/L	1.16		(0%-27%)	KLP1	10/02/17	14:24
QC1203885541	LCS										
Phosphorus, Total as P	1.00			1.01	mg/L		101	(80%-124%)		10/02/17	14:17
QC1203885540	MB										
Phosphorus, Total as P			U	ND	mg/L					10/02/17	14:16
QC1203885543	433549001	MS									
Phosphorus, Total as P	1.00	0.513		1.96	mg/L		145 *	(63%-139%)		10/02/17	14:25
Batch	1705044										
QC1203885560	433549002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	10/02/17	16:30
QC1203886313	433548002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A			10/02/17	16:23
QC1203885559	LCS										
Nitrogen, Total Kjeldahl	1.00			1.06	mg/L		106	(90%-110%)		10/02/17	16:21
QC1203885558	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					10/02/17	16:20
QC1203885561	433549002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	0.817	mg/L		81.7 *	(90%-110%)		10/02/17	16:30
QC1203886314	433548002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.01	mg/L		101	(90%-110%)		10/02/17	16:28
Batch	1705047										
QC1203885569	433549001	DUP									
Nitrogen, Nitrate/Nitrite		0.346		0.346	mg/L	0		(0%-20%)	KLP1	10/02/17	11:06

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QC Summary

Workorder: 433548

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1705047										
QC1203885568	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.08	mg/L		108	(90%-110%)	KLP1	10/02/17	11:02
QC1203885567	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					10/02/17	11:01
QC1203885571	433549001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.346		1.46	mg/L		111 *	(90%-110%)		10/02/17	11:07
Batch	1705053										
QC1203885583	433549001	DUP									
Nitrogen, Ammonia		J	0.0248	U	ND	mg/L	200 ^		KLP1	10/02/17	10:24
QC1203886315	433548001	DUP									
Nitrogen, Ammonia		J	0.0477		0.0733	mg/L	42.3 ^	(+/-0.050)		10/02/17	10:21
QC1203885582	LCS										
Nitrogen, Ammonia	1.00			0.925	mg/L		92.5	(90%-110%)		10/02/17	10:20
QC1203885581	MB										
Nitrogen, Ammonia			U	ND	mg/L					10/02/17	10:19
QC1203885584	433549001	MS									
Nitrogen, Ammonia	1.00	J	0.0248		1.00	mg/L		97.5	(90%-110%)	10/02/17	10:25
QC1203886316	433548001	MS									
Nitrogen, Ammonia	1.00	J	0.0477		1.05	mg/L		100	(90%-110%)	10/02/17	10:22
Solids Analysis											
Batch	1703295										
QC1203881534	433412002	DUP									
Total Dissolved Solids			764		776	mg/L	0.925	(0%-5%)	KLP1	09/27/17	10:33

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QC Summary

Workorder: 433548

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1703295										
QC1203881532	LCS										
Total Dissolved Solids	300			299	mg/L		99.5	(95%-105%)	KLP1	09/27/17	10:33
Batch	1703295										
QC1203881531	MB										
Total Dissolved Solids			U	ND	mg/L					09/27/17	10:33
Titration and Ion Analysis											
Batch	1703903										
QC1203882962	433394002	DUP									
pH		H	6.91	H	6.93	SU	0.289	(0%-5%)	RXB5	09/28/17	16:52
Batch	1703903										
QC1203882961	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		09/28/17	14:00
Batch	1703908										
QC1203882981	433549001	DUP									
Alkalinity, Total as CaCO3			57.7		56.3	mg/L	2.45	(0%-20%)	RXB5	09/28/17	17:22
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
Batch	1703908										
QC1203882979	LCS										
Alkalinity, Total as CaCO3	100			107	mg/L		107	(90%-110%)		09/28/17	16:32
Batch	1703908										
QC1203882983	433549001	MS									
Alkalinity, Total as CaCO3	100		57.7		161	mg/L	103	(80%-120%)		09/28/17	17:24
Batch	1706333										
QC1203888587	433285001	DUP									
Conductivity			134		134	umhos/cm	0.0747	(0%-10%)	VH1	10/04/17	13:32
Batch	1706333										
QC1203888586	LCS										
Conductivity	1410			1410	umhos/cm		99.6	(95%-105%)		10/04/17	13:32

Notes:

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QC Summary

Workorder: 433548

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

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

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

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

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

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

Radiological Analysis

Case Narrative

**Radiochemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2890
Work Order #: 433548**

Method/Analysis Information

Product: Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1704325

Sample ID	Client ID
433548002	CAAN-17-144829
1203883963	Method Blank (MB)
1203883965	Laboratory Control Sample (LCS)
1203883964	433549002(CAAN-17-144828) 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 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

Aliquots for samples 1203883963 (MB) and 1203883965 (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 greater than 1.65 times the CSU but less than the MDC.

Blank Decision Level

The blank result is greater than the decision level but less than the MDC.

Tracer/Carrier Yield

Sample, (See Below), did not meet the client tracer yield requirements, however it is less than 110 percent and does meet the GEL standard tracer yield requirements.

Sample	Analyte	Value
1203883963 (MB)	Americium-243 Tracer	108* (50%-105%)

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 433549002 (CAAN-17-144828). The QC was from ARSL work order 433549.

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

Sample 1203883965 (LCS) was recounted due to a peak shift. The recount is reported.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: ISOPU
Analytical Method: HASL-300:ISOPU
Analytical Batch Number: 1704326

Sample ID	Client ID
433548002	CAAN-17-144829
1203883966	Method Blank (MB)
1203883968	Laboratory Control Sample (LCS)
1203883967	433549002(CAAN-17-144828) 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 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

Aliquots for samples 1203883966 (MB) and 1203883968 (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: 433549002 (CAAN-17-144828). The QC was from ARSL work order 433549.

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

Sample 1203883966 (MB) was recounted due to a peak shift. The recount is reported.

Miscellaneous Information:

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	IsoU
Analytical Method:	HASL-300:ISOU
Analytical Batch Number:	1704327

Sample ID	Client ID
433548002	CAAN-17-144829

1203883969	Method Blank (MB)
1203883971	Laboratory Control Sample (LCS)
1203883970	433549002(CAAN-17-144828) 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 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

Aliquots for samples 1203883969 (MB) and 1203883971 (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 U-233/234 blank result is greater than 1.65 times the CSU but less than the MDC.

Blank Decision Level

The U-233/234 blank result is greater than the decision level but less than the MDC.

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: 433549002 (CAAN-17-144828). The QC was from ARSL work order 433549.

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

Samples 1203883969 (MB) and 1203883971 (LCS) were recounted due to a suspected blank false positive. The recounts are reported.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: **Gammaspec**

Analytical Method: EPA:901.1

Analytical Batch Number: 1703806

Sample ID	Client ID
433548002	CAAN-17-144829
1203882803	Method Blank (MB)
1203882805	Laboratory Control Sample (LCS)
1203882804	433284002(CALA-17-144813) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 27.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. The initial Calibrations were performed in August 2017, January 2017, July 2017 and October 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

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 1203882803 (MB) result is greater than 1.65 times the CSU but less than the MDC for Bi-212 and Cs-134.

Blank Decision Level

The blank 1203882803 (MB) result is greater than the decision level but less than the MDC for Bi-212 and Cs-134.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 433284002 (CALA-17-144813). The QC was from ARSL work order 433284.

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

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high peak-width.	Potassium-40	433548002	CAAN-17-144829

Method/Analysis Information

Product: GFPC, Sr90, liquid

Analytical Method: EPA:905.0

Analytical Batch Number: 1704268

Sample ID	Client ID
433548002	CAAN-17-144829
1203883797	Method Blank (MB)
1203883800	Laboratory Control Sample (LCS)
1203883798	433664006(CALA-17-144818) Sample Duplicate (DUP)
1203883799	433664006(CALA-17-144818) 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 1203883797 (MB) and 1203883800 (LCS) were changed to 1.0 per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank 1203883797 (MB) result is greater than 1.65 times the CSU but less than the MDC.

Blank Decision Level

The blank 1203883797 (MB) result is greater than the decision level but less than the MDC.

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: 433664006 (CALA-17-144818). The QC was from ARSL work order 433664.

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.

Sample Re-prep/Re-analysis

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

Recounts

Samples 1203883798 (CALA-17-144818DUP) and 433548002 (CAAN-17-144829) were recounted due to high MDCs. The recounts are reported.

Miscellaneous Information:

Sample-Specific MDA/MDC

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

Additional Comments

The matrix spike, 1203883799 (CALA-17-144818MS), 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: 1704269

Sample ID	Client ID
433548002	CAAN-17-144829
1203883805	Method Blank (MB)
1203883809	Laboratory Control Sample (LCS)
1203883806	433484003(CALA-17-143815) Sample Duplicate (DUP)
1203883807	433484003(CALA-17-143815) Matrix Spike (MS)
1203883808	433484003(CALA-17-143815) 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 1203883805 (MB) and 1203883809 (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: 433484003 (CALA-17-143815). The QC was from ARSL work order 433484.

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.

Sample Re-prep/Re-analysis

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

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating, especially to a dull red heat. For this sample set, the prepared planchet was counted for beta activity before being flamed. After flaming, the planchet was counted for alpha activity.

Recounts

None of the samples in this sample set were recounted.

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

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

Additional Comments

The matrix spike and matrix spike duplicate, 1203883807 (CALA-17-143815MS) and 1203883808 (CALA-17-143815MSD), aliquots were reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2017-2890 GEL Work Order: 433548

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Kate Gellatly

Date: 23 OCT 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: October 23, 2017

Client Sample ID: CAAN-17-144829
Sample ID: 433548002
Matrix: W
Collect Date: 22-SEP-17
Receive Date: 26-SEP-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	0.00681	+/-0.00539	0.0299	0.0126	+/-0.00539	0.050	pCi/L			JXR5	09/28/17	1926	1704325	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.00699	+/-0.00773	0.0404	0.017	+/-0.00774	0.050	pCi/L			JXR5	09/28/17	1926	1704326	2
Plutonium-239/240	U	-0.0163	+/-0.00902	0.0524	0.023	+/-0.00902	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.397	+/-0.0477	0.0986	0.0421	+/-0.053	1.00	pCi/L			JXR5	09/28/17	1604	1704327	3
Uranium-235/236	U	0.0488	+/-0.0201	0.105	0.0438	+/-0.0203	1.00	pCi/L							
Uranium-238		0.208	+/-0.0339	0.0954	0.0406	+/-0.036	0.500	pCi/L							
Rad Gamma Spec Analysis															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	-2.01	+/-1.45	5.05	2.21	+/-1.53	8.00	pCi/L			MJH1	09/28/17	1345	1703806	4
Cobalt-60	U	-0.976	+/-1.58	5.61	2.33	+/-1.59	8.00	pCi/L							
Neptunium-237	U	1.77	+/-3.09	11.4	5.29	+/-3.12		pCi/L							
Potassium-40	UI	79.1	+/-30.0	54.6	22.6	+/-30.2		pCi/L							
Sodium-22	U	-1.34	+/-1.84	5.47	2.27	+/-1.87		pCi/L							
Rad Gas Flow Proportional Counting															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.0837	+/-0.102	0.436	0.183	+/-0.102	0.500	pCi/L			KSD1	10/02/17	0808	1704268	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	0.927	+/-0.807	2.75	1.21	+/-0.811	3.00	pCi/L			AXH4	09/29/17	0809	1704269	6
Alpha	U	0.544	+/-0.716	2.74	1.02	+/-0.717	3.00	pCi/L			AXH4	09/30/17	1104	1704269	7

The following Analytical Methods were performed

Method	Description
1	HASL-300:AM-241
2	HASL-300:ISOPU
3	HASL-300:ISOU
4	EPA:901.1
5	EPA:905.0
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1704325	97.6	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1704326	80.3	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1704327	70.7	(50%-105%)

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAAN-17-144829

Sample ID: 433548002

Project: ESHL00114

Client ID: ARSL004

Report Date: October 23, 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"							1704268	73.9	(50%-105%)				

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: October 23, 2017

Page 1 of 6

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

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 433548

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1704325										
QC1203883964	433549002	DUP									
Americium-241	U	0.00161	U	0.00855	pCi/L	0.33		(0-1)	JXR5	09/28/17	19:26
	Uncert:	+/-0.00483		+/-0.00567							
	TPU:	+/-0.00483		+/-0.00568							
**Americium-243 Tracer	2.62	2.66		2.64	pCi/L		101	(50%-105%)			
	Uncert:	+/-0.0648		+/-0.067							
	TPU:	+/-0.127		+/-0.129							
QC1203883965	LCS										
Americium-241	1.97			1.92	pCi/L		97.7	(80%-120%)	JXR5	10/02/17	13:00
	Uncert:			+/-0.0502							
	TPU:			+/-0.0946							
**Americium-243 Tracer	2.10			2.19	pCi/L		105	(50%-105%)			
	Uncert:			+/-0.052							
	TPU:			+/-0.102							
QC1203883963	MB										
Americium-241			U	0.0154	pCi/L				JXR5	09/28/17	19:26
	Uncert:			+/-0.00671							
	TPU:			+/-0.00675							
**Americium-243 Tracer	2.10			2.27	pCi/L		108 *	(50%-105%)			
	Uncert:			+/-0.0542							
	TPU:			+/-0.104							
Batch	1704326										
QC1203883967	433549002	DUP									
Plutonium-238	U	-0.00531	U	-0.0113	pCi/L	0.243		(0-1)	JXR5	09/28/17	19:26
	Uncert:	+/-0.00638		+/-0.00597							
	TPU:	+/-0.00638		+/-0.00597							
Plutonium-239/240	U	-0.0124	U	0.00189	pCi/L	0.463		(0-1)			
	Uncert:	+/-0.00638		+/-0.00905							
	TPU:	+/-0.00638		+/-0.00905							
**Plutonium-242 Tracer	2.47	2.32		2.14	pCi/L		86.6	(50%-105%)			
	Uncert:	+/-0.0662		+/-0.0687							
	TPU:	+/-0.143		+/-0.146							
QC1203883968	LCS										
Plutonium-238			U	-0.00639	pCi/L			(80%-120%)	JXR5	09/28/17	19:26
	Uncert:			+/-0.0119							
	TPU:			+/-0.0119							
Plutonium-239/240	1.98			2.06	pCi/L		105	(80%-120%)			
	Uncert:			+/-0.0677							
	TPU:			+/-0.133							
**Plutonium-242 Tracer	1.97			1.50	pCi/L		76	(50%-105%)			
	Uncert:			+/-0.066							
	TPU:			+/-0.127							

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QC Summary

Workorder: 433548

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1704326										
QC1203883966	MB										
Plutonium-238			U	0.0037	pCi/L				JXR5	10/02/17	13:00
				Uncert:							
				+/-0.0098							
				TPU:							
				+/-0.0098							
Plutonium-239/240			U	-0.0037	pCi/L						
				Uncert:							
				+/-0.00741							
				TPU:							
				+/-0.00741							
**Plutonium-242 Tracer	1.97			1.60	pCi/L		80.9	(50%-105%)			
				Uncert:							
				+/-0.0607							
				TPU:							
				+/-0.122							
Batch	1704327										
QC1203883970	433549002	DUP									
Uranium-234		0.322		0.304	pCi/L	0.092		(0-1)	JXR5	09/28/17	16:02
		Uncert:		+/-0.050							
		TPU:		+/-0.0537							
Uranium-235/236	U	0.0996	U	0.0316	pCi/L	0.68		(0-1)			
		Uncert:		+/-0.0212							
		TPU:		+/-0.0213							
Uranium-238		0.212		0.176	pCi/L	0.239		(0-1)			
		Uncert:		+/-0.0379							
		TPU:		+/-0.0396							
**Uranium-232 Tracer	2.62	1.90		1.80	pCi/L		68.6	(50%-105%)			
		Uncert:		+/-0.139							
		TPU:		+/-0.219							
QC1203883971	LCS										
Uranium-234				2.77	pCi/L				JXR5	10/02/17	12:43
		Uncert:		+/-0.128							
		TPU:		+/-0.221							
Uranium-235/236				0.239	pCi/L						
		Uncert:		+/-0.0424							
		TPU:		+/-0.0452							
Uranium-238	2.70			2.88	pCi/L		107	(80%-120%)			
		Uncert:		+/-0.130							
		TPU:		+/-0.228							
**Uranium-232 Tracer	2.10			1.44	pCi/L		68.5	(50%-105%)			
		Uncert:		+/-0.111							
		TPU:		+/-0.176							
QC1203883969	MB										
Uranium-234			U	0.0427	pCi/L				JXR5	10/02/17	12:43
		Uncert:		+/-0.0176							
		TPU:		+/-0.0178							
Uranium-235/236			U	0.0176	pCi/L						
		Uncert:		+/-0.0134							
		TPU:		+/-0.0134							
Uranium-238			U	0.00607	pCi/L						
		Uncert:		+/-0.00916							
		TPU:		+/-0.00917							

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QC Summary

Workorder: 433548

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1704327										
**Uranium-232 Tracer											
	2.10			1.79	pCi/L		85.6	(50%-105%)			
	Uncert:			+/-0.0931							
	TPU:			+/-0.153							
Rad Gamma Spec											
Batch	1703806										
QC1203882804 433284002 DUP											
Cesium-137	U	-0.338	U	1.93	pCi/L	0.428		(0-1)	MJH1	09/29/17	11:49
	Uncert:	+/-1.26		+/-1.31							
	TPU:	+/-1.27		+/-1.38							
Cobalt-60	U	1.82	U	3.91	pCi/L	0.255		(0-1)			
	Uncert:	+/-2.35		+/-1.45							
	TPU:	+/-2.38		+/-1.72							
Neptunium-237	U	4.79	U	-1.5	pCi/L	0.619		(0-1)			
	Uncert:	+/-2.55		+/-2.27							
	TPU:	+/-2.79		+/-2.29							
Potassium-40	U	-8.23	U	-14.7	pCi/L	0.0805		(0-1)			
	Uncert:	+/-19.9		+/-19.9							
	TPU:	+/-20.0		+/-20.2							
Sodium-22	U	0.141	U	-1.05	pCi/L	0.238		(0-1)			
	Uncert:	+/-1.29		+/-1.19							
	TPU:	+/-1.29		+/-1.22							
QC1203882805 LCS											
Americium-241	34300			37200	pCi/L		108	(80%-120%)	MJH1	09/29/17	11:50
	Uncert:			+/-795							
	TPU:			+/-1940							
Cesium-137	13000			13500	pCi/L		104	(80%-120%)			
	Uncert:			+/-176							
	TPU:			+/-592							
Cobalt-60	11500			11600	pCi/L		101	(80%-120%)			
	Uncert:			+/-188							
	TPU:			+/-554							
Neptunium-237			U	-58	pCi/L						
	Uncert:			+/-61.6							
	TPU:			+/-63.1							
Potassium-40			U	26.1	pCi/L						
	Uncert:			+/-106							
	TPU:			+/-106							
Sodium-22			U	-11.6	pCi/L						
	Uncert:			+/-17.5							
	TPU:			+/-17.7							
QC1203882803 MB											
Cesium-137			U	-1.15	pCi/L				MJH1	09/28/17	13:46
	Uncert:			+/-1.19							
	TPU:			+/-1.22							
Cobalt-60			U	-0.227	pCi/L						
	Uncert:			+/-1.15							

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QC Summary

Workorder: 433548

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
Batch	1703806										
Neptunium-237	TPU:			+/-1.15							
			U	-2.13	pCi/L						
	Uncert:			+/-2.12							
Potassium-40	TPU:			+/-2.18							
			U	-3.45	pCi/L						
	Uncert:			+/-15.2							
Sodium-22	TPU:			+/-15.2							
			U	-0.586	pCi/L						
	Uncert:			+/-1.05							
	TPU:			+/-1.06							
Rad Gas Flow											
Batch	1704268										
QC1203883798	433664006	DUP									
Strontium-90	U	0.139	U	0.0834	pCi/L	0.119		(0-1)	KSD1	10/02/17	07:59
	Uncert:	+/-0.124		+/-0.109							
	TPU:	+/-0.124		+/-0.109							
**Strontium Carrier	7.85	6.50		6.90	mg		87.9	(50%-105%)			
QC1203883800	LCS										
Strontium-90	39.6			43.2	pCi/L		109	(80%-120%)	KSD1	09/30/17	11:40
	Uncert:			+/-1.28							
	TPU:			+/-3.68							
**Strontium Carrier	7.85			5.10	mg		65	(50%-105%)			
QC1203883797	MB										
Strontium-90			U	0.590	pCi/L				KSD1	09/30/17	11:40
	Uncert:			+/-0.217							
	TPU:			+/-0.222							
**Strontium Carrier	7.85			6.70	mg		85.4	(50%-105%)			
QC1203883799	433664006	MS									
Strontium-90	238	U	0.139	206	pCi/L		86.8	(75%-125%)	KSD1	09/30/17	11:40
	Uncert:		+/-0.124	+/-6.35							
	TPU:		+/-0.124	+/-17.7							
**Strontium Carrier	7.85	6.50		6.60	mg		84.1	(50%-105%)			
Batch	1704269										
QC1203883806	433484003	DUP									
Alpha	U	2.27	U	0.916	pCi/L	0.343		(0-1)	AXH4	09/30/17	11:04
	Uncert:	+/-1.17		+/-0.770							
	TPU:	+/-1.20		+/-0.773							
Beta		5.54		9.98	pCi/L	0.88		(0-1)		09/29/17	08:09
	Uncert:	+/-0.971		+/-1.19							
	TPU:	+/-1.08		+/-1.45							
QC1203883809	LCS										
Alpha	12.1			11.1	pCi/L		92	(80%-120%)	AXH4	09/30/17	10:54
	Uncert:			+/-0.557							
	TPU:			+/-1.12							
Beta	47.5			48.6	pCi/L		102	(80%-120%)		09/29/17	08:09

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time	
Rad Gas Flow												
Batch	1704269											
		Uncert:		+/-0.900								
		TPU:		+/-4.13								
QC1203883805	MB											
Alpha			U	0.0627	pCi/L				AXH4	09/30/17	10:54	
		Uncert:		+/-0.0718								
		TPU:		+/-0.072								
Beta			U	-0.0772	pCi/L					09/29/17	08:09	
		Uncert:		+/-0.106								
		TPU:		+/-0.106								
QC1203883807	433484003	MS										
Alpha		483	U	2.27	432	pCi/L		89.3	(75%-125%)	AXH4	09/30/17	10:54
		Uncert:		+/-1.17								
		TPU:		+/-1.20								
Beta		1900		5.54	1810	pCi/L		94.7	(75%-125%)		09/29/17	08:09
		Uncert:		+/-0.971								
		TPU:		+/-1.08								
QC1203883808	433484003	MSD										
Alpha		483	U	2.27	457	pCi/L	0.14	94.5	(0-1)	AXH4	09/30/17	10:54
		Uncert:		+/-1.17								
		TPU:		+/-1.20								
Beta		1900		5.54	1910	pCi/L	0.158	100	(0-1)		09/29/17	08:09
		Uncert:		+/-0.971								
		TPU:		+/-1.08								

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.
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.

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