

The order of this data package is as follows:

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

Comments:

[illegible]

[illegible]

[illegible]

Sampling Plan ID/Name: 11694

R-27i (R-27)

coc: 2018-2134

TEST - Explosives		YES	NO
Samples collected from a WFO area? (TAs -8, 9, 11, 16, 37, 14, 15, 36, 22, 39, 40, and 49)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Field Test for Explosives Results		YES	NO NA
HE SPOT test result positive. If YES - Do not transport.		<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

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

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

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

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

Hazard Assessment Completed	Date/Time
(Printed Name) Tanya Vander Vis (Signature) Tanya Vander Vis	3-9-18 1340

Hazard Assessment Reviewed	Date/Time
(Printed Name) D. Sherwood (Signature) D. Sherwood	3-9-18 1340

ER-SOP-10094, R1, Attachment 1



Sampling Plan ID/Name: 11694 R-27i, R-27

COC: 2018-2134

TEST - Explosives		YES	NO
Samples collected from a WFO area? (TAs -8, 9, 11, 16, 37, 14, 15, 36, 22, 39, 40, and 49)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Field Test for Explosives Results		YES	NO NA
HE SPOT test result positive. If YES - Do not transport.		<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

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

TEST - Location				YES	NO
Prior analytical measurements of radioactive isotopes are available?				<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample Activity (pCi/g)	Shipment Activity (pCi)			YES	NO NA
Am-241 ≥ 27 pCi/g	AND Am-241 ≥ 270,000 pCi Total			<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cs-137 ≥ 270 pCi/g	AND Cs-137 ≥ 270,000 pCi Total			<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pu-238 ≥ 27 pCi/g	AND Pu-238 ≥ 270,000 pCi Total			<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pu-239/240 ≥ 27 pCi/g	AND Pu-239/240 ≥ 270,000 pCi Total			<input checked="" type="checkbox"/>	<input type="checkbox"/>
Th-228 ≥ 27 pCi/g	AND Th-228 ≥ 270,000 pCi Total			<input checked="" type="checkbox"/>	<input type="checkbox"/>
U-234 ≥ 270 pCi/g	AND U-234 ≥ 1,600,000,000 pCi Total			<input checked="" type="checkbox"/>	<input type="checkbox"/>
U-238 ≥ 270 pCi/g	AND U-238 ≥ unlimited			<input checked="" type="checkbox"/>	<input type="checkbox"/>
H-3 ≥ 27,000,000 pCi/g	AND H-3 ≥ 27,000,000,000 pCi Total			<input checked="" type="checkbox"/>	<input 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"/>	<input type="checkbox"/>
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled <i>Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910</i> , based on prior analytical measurements of radioactive isotopes.				<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

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

Hazard Assessment Completed	Date/Time
(Printed Name) Tanya VanderVis (Signature) Tanya VanderVis	3-9-18 1340

Hazard Assessment Reviewed	Date/Time
(Printed Name) Sherwood (Signature) Sherwood	3-9-18 1340

ER-SOP-10094, R1, Attachment 1



## DATA VALIDATION REPORT

Chain Of Custody No. 2018-2134

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
445726	EPA:120.1	2				
445726	EPA:150.1	2				
445726	EPA:160.1	2				
445726	EPA:170.0	4		2	1	
445726	EPA:245.2	4				
445726	EPA:300.0	2				
445726	EPA:310.1	2				
445726	EPA:335.4	2				
445726	EPA:350.1	2				
445726	EPA:351.2	2				
445726	EPA:353.2	2				
445726	EPA:365.4	2				
445726	EPA:900	2				
445726	EPA:901.1	2				
445726	EPA:905.0	2				
445726	HASL-300:AM-241	2				
445726	HASL-300:ISOPU	2				
445726	HASL-300:ISOU	2				
445726	SM:A2340B	2				
445726	SW-846:6010C	2				
445726	SW-846:6020	2				
445726	SW-846:6850	2				
445726	SW-846:8260B	2		2	1	
445726	SW-846:8270D	2			1	
445726	SW-846:9060	2				

## DATA VALIDATION REPORT

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
445726	EPA:120.1	1748271	1748271	2										1			1				
445726	EPA:150.1	1748189	1748189	2										1			1				
445726	EPA:160.1	1748000	1748000	2					1					1			1				
445726	EPA:170.0	NA	NA	4		2	1														
445726	EPA:245.2	1746986	1746985	4					1	1				1			1				
445726	EPA:300.0	1746778	1746778	2					1					1			1				
445726	EPA:310.1	1748188	1748188	2						1				1			1				
445726	EPA:335.4	1746923	1746922	2					1	1				1			1				
445726	EPA:350.1	1746883	1746882	2					1	1				1			1				
445726	EPA:351.2	1746248	1746247	2					1	1				1			1				
445726	EPA:353.2	1746884	1746884	2					1					1			1				
445726	EPA:365.4	1746246	1746245	2					1	1				1			1				
445726	EPA:900	1746730	1746730	2					1	1	1			1			1				
445726	EPA:901.1	1746657	1746657	2					1					1			1				
445726	EPA:905.0	1746698	1746698	2					1	1				1			1				
445726	HASL-300:AM-241	1747065	1747065	2					1					1			1				
445726	HASL-300:ISOPU	1747066	1747066	2					1					1			1				
445726	HASL-300:ISOU	1747067	1747067	2					1					1			1				
445726	SM:A2340B	1753085	1753085	2																	
445726	SW-846:6010C	1746663	1746662	2					1	1				1			1				
445726	SW-846:6020	1746678	1746677	2					1	1				1			1				
445726	SW-846:6850	1746747	1746744	2					1	1	1			1							
445726	SW-846:8260B	1747241	1747241	2		2	1		2					4							
445726	SW-846:8270D	1746893	1746892	2			1		1	1	1			1							
445726	SW-846:9060	1746313	1746313	2					1					1			1				

### 2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAWA-18-151436	1203992010	DUP	1	0	0	0

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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	CAWA-18-151436	445726001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-18-151438	445726005	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203992008	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-18-151474	1203991834	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-18-151436	445726001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-18-151438	445726005	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203991833	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-18-151436	1203991457	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-18-151436	445726001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-18-151438	445726005	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203991455	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203991454	MB	1	0	0	0
EPA:170.0	VOC	CAWA-18-151436	445726001	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-151437	445726002	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-151438	445726005	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-151439	445726006	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-151440	445726003	FB	1	0	0	0
EPA:170.0	VOC	CAWA-18-151441	445726004	FTB	1	0	0	0
EPA:170.0	VOC	CAWA-18-151442	445726007	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-151436	1203989324	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-151436	1203989325	MS	0	0	1	0
EPA:245.2	INORGANIC	CAWA-18-151436	445726001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-151437	445726002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-151438	445726005	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-151439	445726006	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203989323	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203989322	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-18-151436	1203988859	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-18-151436	445726001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-18-151438	445726005	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203988858	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203988857	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-151474	1203991831	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-18-151474	1203991832	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-151436	445726001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-151438	445726005	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203991830	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAWA-18-151437	1203989176	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAWA-18-151437	1203989178	MS	0	0	1	0

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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:335.4	INORGANIC	CAWA-18-151437	445726002	REG	1	0	0	0
EPA:335.4	INORGANIC	CAWA-18-151439	445726006	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203989175	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203989174	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-151436	1203989095	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-151436	1203989096	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-151436	445726001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-151438	445726005	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203989094	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203989093	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-18-151479	1203987681	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-18-151479	1203987682	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-151437	445726002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-151439	445726006	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203987680	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203987679	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-18-151436	1203989099	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-18-151436	445726001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-18-151438	445726005	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203989098	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203989097	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-151436	1203989089	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-151436	1203989091	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-151436	445726001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-151438	445726005	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203987676	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203987675	MB	1	0	0	0
EPA:900	RAD	CAAN-18-151479	1203988748	DUP	2	0	0	0
EPA:900	RAD	CAAN-18-151479	1203988749	MS	0	0	2	0
EPA:900	RAD	CAAN-18-151479	1203988750	MSD	0	0	2	0
EPA:900	RAD	CAWA-18-151437	445726002	REG	2	0	0	0
EPA:900	RAD	CAWA-18-151439	445726006	REG	2	0	0	0
EPA:900	RAD	LCS	1203988751	LCS	0	0	2	0
EPA:900	RAD	MB	1203988747	MB	2	0	0	0
EPA:901.1	RAD	CAWA-18-151437	1203988574	DUP	5	0	0	0
EPA:901.1	RAD	CAWA-18-151437	445726002	REG	5	0	0	0
EPA:901.1	RAD	CAWA-18-151439	445726006	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203988575	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203988573	MB	5	0	0	0

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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:905.0	RAD	CAAN-18-151491	1203988670	DUP	1	0	0	0
EPA:905.0	RAD	CAAN-18-151491	1203988671	MS	0	0	1	0
EPA:905.0	RAD	CAWA-18-151437	445726002	REG	1	0	0	0
EPA:905.0	RAD	CAWA-18-151439	445726006	REG	1	0	0	0
EPA:905.0	RAD	LCS	1203988672	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203988669	MB	1	0	0	0
HASL-300:AM-241	RAD	CAWA-18-151437	1203989458	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAWA-18-151437	445726002	REG	1	0	0	0
HASL-300:AM-241	RAD	CAWA-18-151439	445726006	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203989459	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203989457	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAWA-18-151437	1203989461	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAWA-18-151437	445726002	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAWA-18-151439	445726006	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203989462	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203989460	MB	2	0	0	0
HASL-300:ISOU	RAD	CAWA-18-151437	1203989464	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAWA-18-151437	445726002	REG	3	0	0	0
HASL-300:ISOU	RAD	CAWA-18-151439	445726006	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203989465	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203989463	MB	3	0	0	0
SM:A2340B	INORGANIC	CAWA-18-151436	445726001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAWA-18-151438	445726005	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAWA-18-151436	1203988592	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-18-151436	1203988593	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAWA-18-151436	445726001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-18-151438	445726005	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203988591	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203988590	MB	17	0	0	0
SW-846:6020	INORGANIC	CAWA-18-151436	1203988626	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAWA-18-151436	1203988627	MS	0	0	11	0
SW-846:6020	INORGANIC	CAWA-18-151436	445726001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAWA-18-151438	445726005	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203988625	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203988624	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-18-151436	445726001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-18-151438	445726005	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CTUA-17-151330	1203988799	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CTUA-17-151330	1203988800	MSD	0	0	1	0

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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
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203988798	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203988797	MB	1	0	0	0
SW-846:8260B	VOC	CAWA-18-151437	445726002	REG	80	3	0	0
SW-846:8260B	VOC	CAWA-18-151439	445726006	REG	80	3	0	0
SW-846:8260B	VOC	CAWA-18-151440	445726003	FB	80	3	0	0
SW-846:8260B	VOC	CAWA-18-151441	445726004	FTB	80	3	0	0
SW-846:8260B	VOC	CAWA-18-151442	445726007	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203990249	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203990254	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203994757	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203994758	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203990252	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203994756	MB	80	3	0	0
SW-846:8270D	SVOC	CAAN-18-151479	1203989123	MS	0	6	76	0
SW-846:8270D	SVOC	CAAN-18-151479	1203989124	MSD	0	6	76	0
SW-846:8270D	SVOC	CAWA-18-151437	445726002	REG	80	6	0	0
SW-846:8270D	SVOC	CAWA-18-151439	445726006	REG	80	6	0	0
SW-846:8270D	SVOC	CAWA-18-151440	445726003	FB	80	6	0	0
SW-846:8270D	SVOC	LCS	1203989122	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203989121	MB	80	6	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-18-151437	1203988644	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-18-151437	445726002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-18-151439	445726006	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203988643	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203988642	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

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## DATA VALIDATION REPORT

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	1203987679	METHOD BLANK	EPA:351.2	W	Total Kjeldahl Nitrogen	0.0477	J	mg/L	0.100
MB	1203988590	METHOD BLANK	SW-846:6010C	W	Potassium	102	J	ug/L	150
CAWA-18-151440	445726003	FIELD BLANK	EPA:170.0	W	Temperature	2		Deg C	
CAWA-18-151441	445726004	TRIP BLANK	EPA:170.0	W	Temperature	2		Deg C	
CAWA-18-151442	445726007	TRIP BLANK	EPA:170.0	W	Temperature	2		Deg C	

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAWA-18-151439	1203987679	METHOD BLANK	EPA:351.2	Total Kjeldahl Nitrogen	0.0477	mg/L	0.115		0.100	Y	5	100	Y
CAWA-18-151436	1203988590	METHOD BLANK	SW-846:6010C	Potassium	102	ug/L	1460		150	Y	5	100	Y
CAWA-18-151438	1203988590	METHOD BLANK	SW-846:6010C	Potassium	102	ug/L	950		150	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

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

No.

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

## DATA VALIDATION REPORT

LCS Lab Sample	LCSD Lab	Analytical Method	Parameter Name	Lab Lot ID	Analysis	Sample Matrix	LCS Spike Recovery	LCSD Spike Recovery	Upper Limit	Lower Limit	Upper Rejection Limit	Lower Rejection Limit	RPD	RPD Limit
1203989459		HASL-300:AM-241	Americium-243	1747065	03-17-2018	W	109		105	50		10		

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

Field Sample ID	Lab Sample ID	LD Lab Sample ID	Analytical Method	Parameter Name	Sample Matrix	Lab Result	LD Lab Result	Lab Units	Detect Flag	LD Detect Flag	RPD	RPD Limit
CAWA-18-151436	445726001	1203991457	EPA:160.1	Total Dissolved	W	177	203	mg/L	Y	Y	16.8	5

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-27	2018-2134	CAWA-18-151436	REG	INIT	INORGANIC	SW-846:6010C	Potassium		U+	I4a	Y	1460	ug/L	1.46	mg/L			W	03/09/2018		1746663	VAL	Y
R-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00000000869	pCi/L	0.00000000869	pCi/L	0.0325	0.00492	W	03/09/2018		1747065	VAL	Y
R-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.968	pCi/L	0.968	pCi/L	6.06	1.57	W	03/09/2018		1746657	VAL	Y
R-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.366	pCi/L	-0.366	pCi/L	6.17	1.58	W	03/09/2018		1746657	VAL	Y
R-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	-0.0622	pCi/L	-0.0622	pCi/L	2.30	0.456	W	03/09/2018		1746730	VAL	Y

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## 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-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	0.326	pCi/L	0.326	pCi/L	2.45	0.682	W	03/09/2018		1746730	VAL	Y
R-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-3.19	pCi/L	-3.19	pCi/L	10.7	3.03	W	03/09/2018		1746657	VAL	Y
R-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0	pCi/L	0	pCi/L	0.0462	0.00534	W	03/09/2018		1747066	VAL	Y
R-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0131	pCi/L	-0.0131	pCi/L	0.0498	0.00815	W	03/09/2018		1747066	VAL	Y
R-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-29.9	pCi/L	-29.9	pCi/L	76.9	20.4	W	03/09/2018		1746657	VAL	Y
R-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.169	pCi/L	-0.169	pCi/L	6.25	1.72	W	03/09/2018		1746657	VAL	Y
R-27	2018-2134	CAWA-18-151437	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.00923	pCi/L	-0.00923	pCi/L	0.410	0.110	W	03/09/2018		1746698	VAL	Y
R-27i	2018-2134	CAWA-18-151438	REG	INIT	INORGANIC	SW-846:6010C	Potassium		J+	I4a	Y	950	ug/L	0.95	mg/L			W	03/09/2018		1746663	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	-0.00194	pCi/L	-0.00194	pCi/L	0.0363	0.007	W	03/09/2018		1747065	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.373	pCi/L	0.373	pCi/L	5.94	1.81	W	03/09/2018		1746657	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.684	pCi/L	-0.684	pCi/L	6.30	1.70	W	03/09/2018		1746657	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.094	pCi/L	0.094	pCi/L	2.35	0.516	W	03/09/2018		1746730	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	4.25	pCi/L	4.25	pCi/L	10.5	3.49	W	03/09/2018		1746657	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.00405	pCi/L	-0.00405	pCi/L	0.043	0.00859	W	03/09/2018		1747066	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0081	pCi/L	-0.0081	pCi/L	0.0463	0.0095	W	03/09/2018		1747066	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	7.37	pCi/L	7.37	pCi/L	78.6	20.0	W	03/09/2018		1746657	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-1.08	pCi/L	-1.08	pCi/L	6.00	1.65	W	03/09/2018		1746657	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.262	pCi/L	-0.262	pCi/L	0.474	0.0952	W	03/09/2018		1746698	VAL	Y
R-27i	2018-2134	CAWA-18-151439	REG	INIT	GENERAL CHEMISTRY	EPA:351.2	Total Kjeldahl Nitrogen		U	I4	N	0.115	mg/L	0.115	mg/L			W	03/09/2018		1746248	VAL	Y

### Reason Code

### Description

I4	the sample result is =<5x the concentration of related analyte in the method blank.
I4a	The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was >5x
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualify. The analyte is detected in the sample.
R5	Analyte is not detected because the amount reported is less than the MDC.
U_LAB	The analytical laboratory qualified the analyte as not detected.

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## DATA VALIDATION REPORT

### 14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-18-151436	R-27	REG	EPA:120.1	0	1
CAWA-18-151436	R-27	REG	EPA:150.1	0	1
CAWA-18-151436	R-27	REG	EPA:160.1	0	1
CAWA-18-151436	R-27	REG	EPA:170.0	0	1
CAWA-18-151436	R-27	REG	EPA:245.2	0	1
CAWA-18-151436	R-27	REG	EPA:300.0	0	4
CAWA-18-151436	R-27	REG	EPA:310.1	0	2
CAWA-18-151436	R-27	REG	EPA:350.1	0	1
CAWA-18-151436	R-27	REG	EPA:353.2	0	1
CAWA-18-151436	R-27	REG	EPA:365.4	0	1
CAWA-18-151436	R-27	REG	SM:A2340B	0	1
CAWA-18-151436	R-27	REG	SW-846:6010C	0	17
CAWA-18-151436	R-27	REG	SW-846:6020	0	11
CAWA-18-151436	R-27	REG	SW-846:6850	0	1
CAWA-18-151437	R-27	REG	EPA:170.0	0	1
CAWA-18-151437	R-27	REG	EPA:245.2	0	1
CAWA-18-151437	R-27	REG	EPA:335.4	0	1
CAWA-18-151437	R-27	REG	EPA:351.2	0	1
CAWA-18-151437	R-27	REG	EPA:900	0	2
CAWA-18-151437	R-27	REG	EPA:901.1	0	5
CAWA-18-151437	R-27	REG	EPA:905.0	0	1
CAWA-18-151437	R-27	REG	HASL-300:AM-241	0	1
CAWA-18-151437	R-27	REG	HASL-300:ISOPU	0	2
CAWA-18-151437	R-27	REG	HASL-300:ISOU	0	3
CAWA-18-151437	R-27	REG	SW-846:8260B	0	80
CAWA-18-151437	R-27	REG	SW-846:8270D	0	80
CAWA-18-151437	R-27	REG	SW-846:9060	0	1
CAWA-18-151438	R-27i	REG	EPA:120.1	0	1
CAWA-18-151438	R-27i	REG	EPA:150.1	0	1
CAWA-18-151438	R-27i	REG	EPA:160.1	0	1
CAWA-18-151438	R-27i	REG	EPA:170.0	0	1
CAWA-18-151438	R-27i	REG	EPA:245.2	0	1
CAWA-18-151438	R-27i	REG	EPA:300.0	0	4
CAWA-18-151438	R-27i	REG	EPA:310.1	0	2
CAWA-18-151438	R-27i	REG	EPA:350.1	0	1

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## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-18-151438	R-27i	REG	EPA:353.2	0	1
CAWA-18-151438	R-27i	REG	EPA:365.4	0	1
CAWA-18-151438	R-27i	REG	SM:A2340B	0	1
CAWA-18-151438	R-27i	REG	SW-846:6010C	0	17
CAWA-18-151438	R-27i	REG	SW-846:6020	0	11
CAWA-18-151438	R-27i	REG	SW-846:6850	0	1
CAWA-18-151439	R-27i	REG	EPA:170.0	0	1
CAWA-18-151439	R-27i	REG	EPA:245.2	0	1
CAWA-18-151439	R-27i	REG	EPA:335.4	0	1
CAWA-18-151439	R-27i	REG	EPA:351.2	0	1
CAWA-18-151439	R-27i	REG	EPA:900	0	2
CAWA-18-151439	R-27i	REG	EPA:901.1	0	5
CAWA-18-151439	R-27i	REG	EPA:905.0	0	1
CAWA-18-151439	R-27i	REG	HASL-300:AM-241	0	1
CAWA-18-151439	R-27i	REG	HASL-300:ISOPU	0	2
CAWA-18-151439	R-27i	REG	HASL-300:ISOU	0	3
CAWA-18-151439	R-27i	REG	SW-846:8260B	0	80
CAWA-18-151439	R-27i	REG	SW-846:8270D	0	80
CAWA-18-151439	R-27i	REG	SW-846:9060	0	1
CAWA-18-151440	R-27	FB	EPA:170.0	0	1
CAWA-18-151440	R-27	FB	SW-846:8260B	0	80
CAWA-18-151440	R-27	FB	SW-846:8270D	0	80
CAWA-18-151441	R-27	FTB	EPA:170.0	0	1
CAWA-18-151441	R-27	FTB	SW-846:8260B	0	80
CAWA-18-151442	R-27i	FTB	EPA:170.0	0	1
CAWA-18-151442	R-27i	FTB	SW-846:8260B	0	80



April 05, 2018

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

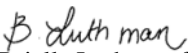
Re: LANL- WQH Water Samples  
Work Order: 445726  
SDG: 2018-2134

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on March 13, 2018, and analyzed for GC/MS Semivolatile, GC/MS Volatile, General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

  
Brielle Luthman for  
Valerie Davis  
Project Manager

Chain of Custody: 2018-2134  
Enclosures



**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 445726**  
**SDG: 2018-2134**

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# Case Narrative

**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 445726  
SDG # : 2018-2134**

**April 05, 2018**

**Laboratory Identification:**

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

**Summary**

**Sample receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on March 13, 2018 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). Sample ID CAWA-18-151442 was received with headspace. 445726007(CAWA-18-151442).

**Sample Identification** The laboratory received the following samples:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
445726001	CAWA-18-151436
445726002	CAWA-18-151437
445726003	CAWA-18-151440
445726004	CAWA-18-151441
445726005	CAWA-18-151438
445726006	CAWA-18-151439
445726007	CAWA-18-151442

**Case Narrative**

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

**Data Package**

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

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



*B Luthman*  
Brielle Luthman for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 05 April 2018**

<b>State</b>	<b>Certification</b>
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# **Chain of Custody and Supporting Documentation**

# Chain of Custody/Analysis Request

General Engineering		COC/Lab Request #:	
Charleston SC		2018-2134	
		Page 1 of 1	
Chain of Custody/Analysis Request		Site Name: Los Alamos National Laboratory	
Client Contact:		Lab Agreement #: _____	
Project Number: ADEP		Analysis Turnaround Time:	
24 Hour - <input type="checkbox"/> Other - <input type="checkbox"/>		7 Days - <input type="checkbox"/>	
14 Days - <input type="checkbox"/>		21 Days - <input type="checkbox"/>	
28 Days - <input checked="" type="checkbox"/>			
Field Sample ID	Sample Date	Sample Time	Sample Matrix
CAWA-18-151436	Mar 9 2018	11:18	W
CAWA-18-151437	Mar 9 2018	11:18	W
CAWA-18-151440	Mar 9 2018	11:18	W
CAWA-18-151441	Mar 9 2018	11:18	W
CAWA-18-151438	Mar 9 2018	12:00	W
CAWA-18-151439	Mar 9 2018	12:00	W
CAWA-18-151442	Mar 9 2018	12:00	W
Special Instructions:			
Relinquished by: _____			
Relinquished by: _____			
Relinquished by: _____			

**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>LANC</u>		SDG/AR/COC/Work Order: <u>445726</u>	
Received By: <u>MEL</u>		Date Received: <u>03/13/18</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 1783 6090 - 2°C</u> <u>5908 1783 6080 - 2°C</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?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____	

Sample Receipt Criteria	Yes	NA	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>TEMP: 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>183-16</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 <input type="checkbox"/> No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A (If unknown, select No) VOA vials free of headspace? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Sample ID's and containers affected: <u>NEW 3/13/18 WSP SA CAWA-18-151442</u>
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 type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: <u>Missing 1 VOA VIAL CAWA-18-151442</u> <u>Missing 1 VOA VIAL CAWA-18-151441</u>
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 TMC Date 3/14/18 Page 1 of 1

RE: Samples received at GEL 3/13/18

**Subject:** RE: Samples received at GEL 3/13/18  
**From:** "Patel, Nita" <npatel@lanl.gov>  
**Date:** 3/13/2018 1:54 PM  
**To:** Taylor Cannon <taylor.cannon@gel.com>  
**CC:** "team.davis" <team.davis@gel.com>

Lets see if they arrive today.

Yes, please analyze and document in case narrative.

**From:** Taylor Cannon [mailto:taylor.cannon@gel.com]  
**Sent:** Tuesday, March 13, 2018 9:59 AM  
**To:** Patel, Nita <npatel@lanl.gov>  
**Cc:** team.davis <team.davis@gel.com>  
**Subject:** Samples received at GEL 3/13/18

Good morning,

The samples we received today were missing the following containers:

Sample ID CAWA-18-151442 was missing one VOA vial

Sample ID CAWA-18-151441 was missing one VOA vial

The remaining vial for Sample ID CAWA--18-151442 also contained headspace. Would you like us to proceed with running the sample?

Thanks,

Taylor

--  
**Taylor Cannon**  
**Project Manager Assistant**



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E-Mail: [taylor.cannon@gel.com](mailto:taylor.cannon@gel.com) | Website: [www.gel.com](http://www.gel.com)  
**Analytical Testing | Environmental | Engineering | Surveying**



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<http://www.gellaboratories.com>



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

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP D  
ACTW  
CAP

B1.

RT 257  
ST F2

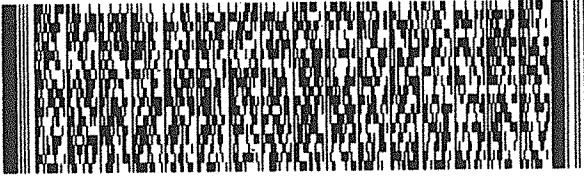
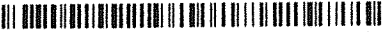
53RC1/07F5/3298

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

**CHARLESTON SC 29407**

(843) 558-8171

REF: 21PD0ASRGW04BAGWEO



FedEx  
Express



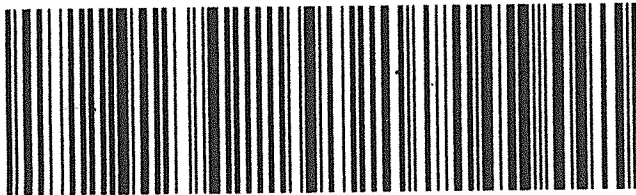
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1 of 2  
TRK# 5908 1783 6080  
0201  
## MASTER ##

**TUE - 13 MAR 10:30A**  
**PRIORITY OVERNIGHT**

**X7 RBWA**

29407  
SC-US CHS



Part # 156148V-434 RT2 EXP 02/18 \*\*\*

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

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 12MAR18  
ACTWGT: 47.0 LB MAN  
CAD: 0014176/CAFE2916

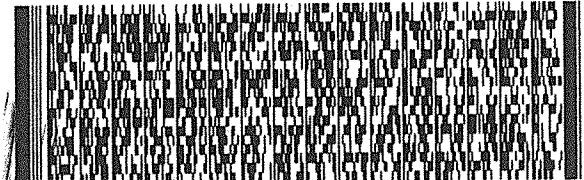
BILL SENDER

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

**CHARLESTON SC 29407**

(843) 558-8171

REF: 21PD0ASRGW04BAGWEO



FedEx  
Express



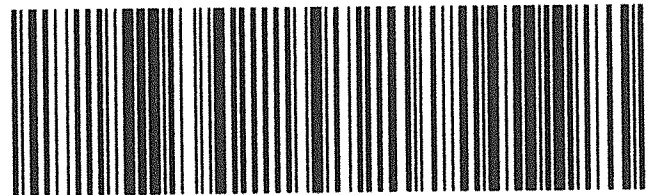
2 of 2

MPS# 5908 1783 6090  
0263  
Mstr# 5908 1783 6080

**TUE - 13 MAR 10:30A**  
**PRIORITY OVERNIGHT**

**X7 RBWA**

29407  
SC-US CHS



Part # 156148V-434 RT2 EXP 02/18 \*\*\*

# **Data Review Qualifier Flag Definition Sheet**

## Data Review Qualifier Definitions

Qualifier	Explanation
-----------	-------------

*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

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

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

# **Volatile Analysis**

# Case Narrative



**GC/MS Volatile  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-2134  
Work Order #: 445726**

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

**Analytical Method:** SW-846:8260B

**Analytical Procedure:** GL-OA-E-038 REV# 26

**Analytical Batch:** 1747241

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726003	CAWA-18-151440
445726004	CAWA-18-151441
445726006	CAWA-18-151439
445726007	CAWA-18-151442
1203989764	445726007(CAWA-18-151442) Post Spike (PS)
1203989765	445726007(CAWA-18-151442) Post Spike Duplicate (PSD)
1203990249	Laboratory Control Sample (LCS)
1203990250	445726007(CAWA-18-151442) Post Spike (PS)
1203990251	445726007(CAWA-18-151442) Post Spike Duplicate (PSD)
1203990252	Method Blank (MB)
1203990254	Laboratory Control Sample (LCS)
1203994756	Method Blank (MB)
1203994757	Laboratory Control Sample (LCS)
1203994758	Laboratory Control Sample (LCS)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Quality Control (QC) Information**

**Blank (MB) Statement**

Target analytes were detected in the blanks 1203990252 (MB) and 1203994756 (MB) below the reporting limit.

**Miscellaneous Information**

**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.

**Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2018-2134 GEL Work Order: 445726

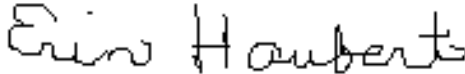
#### The Qualifiers in this report are defined as follows:

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

#### Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 05 APR 2018

Title: Data Validator

# **Sample Data Summary**

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

Page 1 of 3

SDG Number: 2018-2134

Lab Sample ID: 445726002

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client ID: CAWA-18-151437

Batch ID: 1747241

Run Date: 03/21/2018 15:17

Prep Date: 03/21/2018 15:17

Data File: 032118V6\6L313.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

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

**SDG Number:** 2018-2134  
**Lab Sample ID:** 445726002  
  
**Client ID:** CAWA-18-151437  
**Batch ID:** 1747241  
**Run Date:** 03/21/2018 15:17  
**Prep Date:** 03/21/2018 15:17  
**Data File:** 032118V6\6L313.D

**Date Collected:** 03/09/2018 11:18  
**Date Received:** 03/13/2018 09:05  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

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

**Volatile  
Certificate of Analysis  
Sample Summary**

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SDG Number: 2018-2134

Lab Sample ID: 445726002

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1747241

Inst: VOA6.I

Dilution: 1

Run Date: 03/21/2018 15:17

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/21/2018 15:17

Data File: 032118V6\6L313.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.7	50.0	ug/L 103	(71%-134%)
Bromofluorobenzene	52.2	50.0	ug/L 104	(70%-131%)
Toluene-d8	47.6	50.0	ug/L 95	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.592	5.42	ug/L	0	J
	unknown siloxane	11.348	18.4	ug/L	0	J
	unknown siloxane	13.744	21.2	ug/L	0	J
	unknown	15.671	15	ug/L	0	J



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

Page 1 of 3

SDG Number: 2018-2134

Lab Sample ID: 445726003

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client ID: CAWA-18-151440

Batch ID: 1747241

Run Date: 03/21/2018 15:44

Prep Date: 03/21/2018 15:44

Data File: 032118V6\6L314.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

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

**SDG Number:** 2018-2134  
**Lab Sample ID:** 445726003  
  
**Client ID:** CAWA-18-151440  
**Batch ID:** 1747241  
**Run Date:** 03/21/2018 15:44  
**Prep Date:** 03/21/2018 15:44  
**Data File:** 032118V6\6L314.D

**Date Collected:** 03/09/2018 11:18  
**Date Received:** 03/13/2018 09:05  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

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

**Volatile  
Certificate of Analysis  
Sample Summary**

Page 3 of 3

SDG Number: 2018-2134

Lab Sample ID: 445726003

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAWA-18-151440

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1747241

Inst: VOA6.I

Dilution: 1

Run Date: 03/21/2018 15:44

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/21/2018 15:44

Column: DB-624

Data File: 032118V6\6L314.D

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	52.1	50.0	ug/L 104	(70%-131%)
Toluene-d8	47.8	50.0	ug/L 96	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	11.348	8.62	ug/L	0	J
	unknown siloxane	13.75	15.9	ug/L	0	J

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

Page 1 of 3

SDG Number: 2018-2134

Lab Sample ID: 445726004

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client ID: CAWA-18-151441

Batch ID: 1747241

Run Date: 03/21/2018 16:12

Prep Date: 03/21/2018 16:12

Data File: 032118V6\6L315.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

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

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SDG Number: 2018-2134

Lab Sample ID: 445726004

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client ID: CAWA-18-151441

Batch ID: 1747241

Run Date: 03/21/2018 16:12

Prep Date: 03/21/2018 16:12

Data File: 032118V6\6L315.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

**Volatile  
Certificate of Analysis  
Sample Summary**

Page 3 of 3

SDG Number: 2018-2134

Lab Sample ID: 445726004

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client: ARSL004

Project: ESHL00114

Batch ID: 1747241

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 03/21/2018 16:12

Inst: VOA6.I

Dilution: 1

Prep Date: 03/21/2018 16:12

Analyst: JP1

Purge Vol: 5 mL

Data File: 032118V6\6L315.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	51.1	50.0	ug/L 102	(71%-134%)
Bromofluorobenzene	54.2	50.0	ug/L 108	(70%-131%)
Toluene-d8	49.7	50.0	ug/L 99	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	11.348	10.3	ug/L	0	J
	unknown siloxane	13.75	17.2	ug/L	0	J

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

Page 1 of 3

SDG Number: 2018-2134

Lab Sample ID: 445726006

Date Collected: 03/09/2018 12:00

Date Received: 03/13/2018 09:05

Matrix: W

Client: ARSL004

Method: SW-846:8260B

Project: ESHL00114

Inst: VOA6.I

Analyst: JP1

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Prep Date: 03/22/2018 13:43

Data File: 032218V6\6L410.D

Column: DB-624

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

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

**SDG Number:** 2018-2134  
**Lab Sample ID:** 445726006  
  
**Client ID:** CAWA-18-151439  
**Batch ID:** 1747241  
**Run Date:** 03/22/2018 13:43  
**Prep Date:** 03/22/2018 13:43  
**Data File:** 032218V6\6L410.D

**Date Collected:** 03/09/2018 12:00  
**Date Received:** 03/13/2018 09:05  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

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



Volatile  
Certificate of Analysis  
Sample Summary

Page 3 of 3

SDG Number: 2018-2134

Lab Sample ID: 445726006

Date Collected: 03/09/2018 12:00

Date Received: 03/13/2018 09:05

Matrix: W

Client: ARSL004

Project: ESHL00114

Batch ID: 1747241

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 03/22/2018 13:43

Inst: VOA6.I

Dilution: 1

Prep Date: 03/22/2018 13:43

Analyst: JP1

Purge Vol: 5 mL

Data File: 032218V6\6L410.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	52.1	50.0	ug/L 104	(71%-134%)
Bromofluorobenzene	52.5	50.0	ug/L 105	(70%-131%)
Toluene-d8	49.2	50.0	ug/L 98	(74%-124%)

## Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	11.348	12.2	ug/L	0	J
	unknown siloxane	13.744	18.2	ug/L	0	J
	unknown	15.671	9.84	ug/L	0	J

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

Page 1 of 3

SDG Number: 2018-2134

Lab Sample ID: 445726007

Date Collected: 03/09/2018 12:00

Date Received: 03/13/2018 09:05

Matrix: W

Client: ARSL004

Method: SW-846:8260B

Project: ESHL00114

Inst: VOA6.I

Analyst: JP1

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Prep Date: 03/21/2018 16:40

Data File: 032118V6\6L316.D

Column: DB-624

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

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

SDG Number: 2018-2134

Lab Sample ID: 445726007

Date Collected: 03/09/2018 12:00

Date Received: 03/13/2018 09:05

Matrix: W

Client ID: CAWA-18-151442

Batch ID: 1747241

Run Date: 03/21/2018 16:40

Prep Date: 03/21/2018 16:40

Data File: 032118V6\6L316.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

**Volatile  
Certificate of Analysis  
Sample Summary**

Page 3 of 3

SDG Number: 2018-2134

Lab Sample ID: 445726007

Date Collected: 03/09/2018 12:00

Date Received: 03/13/2018 09:05

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1747241

Inst: VOA6.I

Dilution: 1

Run Date: 03/21/2018 16:40

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/21/2018 16:40

Data File: 032118V6\6L316.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	50.9	50.0	ug/L 102	(71%-134%)
Bromofluorobenzene	52.6	50.0	ug/L 105	(70%-131%)
Toluene-d8	49.3	50.0	ug/L 99	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	11.348	12.3	ug/L	0	J
	unknown siloxane	13.744	17.5	ug/L	0	J

# **Quality Control Summary**

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

Page 1 of 1

**SDG Number: 2018-2134****Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203990249	LCS for batch 1747241	105	103	106
1203990254	LCS for batch 1747241	102	97	100
1203990252	MB for batch 1747241	101	100	102
445726002	CAWA-18-151437	103	95	104
445726003	CAWA-18-151440	101	96	104
445726004	CAWA-18-151441	102	99	108
445726007	CAWA-18-151442	102	99	105
1203989764	CAWA-18-151442PS	101	100	103
1203989765	CAWA-18-151442PSD	89	89	92
1203990250	CAWA-18-151442PS	100	97	102
1203990251	CAWA-18-151442PSD	100	95	101
1203994757	LCS for batch 1747241	98	99	100
1203994758	LCS for batch 1747241	97	98	102
1203994756	MB for batch 1747241	99	98	102
445726006	CAWA-18-151439	104	98	105

**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 8

SDG Number: 2018-2134

Sample Type: Post Spike

Client ID: CAWA-18-151442PS

Matrix: W

Lab Sample ID 1203989764

Instrument: VOA6.I

Analysis Date: 03/21/2018 19:56

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	84.9	85	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1320	105	56-131
67-64-1	PS Acetone	250	0.00 U	150	60	25-155
74-88-4	PS Iodomethane	250	0.00 U	264	106	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	279	112	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	271	109	48-133
78-93-3	PS 2-Butanone	250	0.00 U	190	76	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	259	104	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	226	91	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	57.4	115	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	58.0	116	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	55.7	111	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	56.0	112	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	58.3	117	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	58.7	117	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	45.7	91	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	57.1	114	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	51.9	104	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	54.4	109	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	56.2	112	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	55.6	111	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	55.1	110	69-127

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-2134

Sample Type: Post Spike

Client ID: CAWA-18-151442PS

Matrix: W

Lab Sample ID 1203989764

Instrument: VOA6.I

Analysis Date: 03/21/2018 19:56

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	57.3	115	66-137
74-97-5	PS	Bromochloromethane	50.0	0.00	U	54.8	110	71-130
67-66-3	PS	Chloroform	50.0	0.00	U	53.7	107	71-129
71-55-6	PS	1,1,1-Trichloroethane	50.0	0.00	U	54.8	110	69-139
563-58-6	PS	1,1-Dichloropropene	50.0	0.00	U	51.2	102	67-130
56-23-5	PS	Carbon tetrachloride	50.0	0.00	U	57.2	114	66-143
107-06-2	PS	1,2-Dichloroethane	50.0	0.00	U	54.2	108	69-130
71-43-2	PS	Benzene	50.0	0.00	U	51.3	103	66-125
79-01-6	PS	Trichloroethylene	50.0	0.00	U	51.8	104	65-131
78-87-5	PS	1,2-Dichloropropane	50.0	0.00	U	53.1	106	67-127
74-95-3	PS	Dibromomethane	50.0	0.00	U	52.8	106	72-129
75-27-4	PS	Bromodichloromethane	50.0	0.00	U	58.0	116	70-138
10061-01-5	PS	cis-1,3-Dichloropropylene	50.0	0.00	U	55.5	111	70-134
108-88-3	PS	Toluene	50.0	0.00	U	47.3	95	60-126
10061-02-6	PS	trans-1,3-Dichloropropylene	50.0	0.00	U	57.2	114	69-135
79-00-5	PS	1,1,2-Trichloroethane	50.0	0.00	U	52.9	106	66-125
142-28-9	PS	1,3-Dichloropropane	50.0	0.00	U	49.9	100	67-124
127-18-4	PS	Tetrachloroethylene	50.0	0.00	U	44.9	90	60-130
124-48-1	PS	Dibromochloromethane	50.0	0.00	U	49.9	100	68-143
106-93-4	PS	1,2-Dibromoethane	50.0	0.00	U	54.2	108	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	43.7	87	61-130



Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Post Spike

Client ID: CAWA-18-151442PS

Matrix: W

Lab Sample ID 1203989764

Instrument: VOA6.I

Analysis Date: 03/21/2018 19:56

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	44.0	88	62-131
100-42-5	PS Styrene	50.0	0.00 U	46.5	93	59-135
75-25-2	PS Bromoform	50.0	0.00 U	63.8	128	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	42.4	85	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	53.5	107	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	52.4	105	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	44.2	88	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	38.4	77	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	40.6	81	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	41.1	82	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	39.7	79	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	40.4	81	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	39.7	79	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	37.5	75	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	36.1	72	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	38.9	78	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	38.3	77	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	32.7	65	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	47.5	95	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	28.4	57	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	46.1	92	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	38.1	76	52-135

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Post Spike

Client ID: CAWA-18-151442PS

Matrix: W

Lab Sample ID 1203989764

Instrument: VOA6.I

Analysis Date: 03/21/2018 19:56

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	37.3	75	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	53.9	108	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	41.2	82	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	5920	118	60-140

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Post Spike Duplicate

Client ID: CAWA-18-151442PSD

Matrix: W

Lab Sample ID 1203989765

Instrument: VOA6.I

Analysis Date: 03/21/2018 20:24

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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 79.9	80	59-132	6	0-20
75-05-8	PSD Acetonitrile	1250	0.00	U 1140	91	56-131	14	0-20
67-64-1	PSD Acetone	250	0.00	U 130	52	25-155	15	0-20
74-88-4	PSD Iodomethane	250	0.00	U 235	94	66-133	12	0-20
75-15-0	PSD Carbon disulfide	250	0.00	U 247	99	61-141	12	0-20
108-05-4	PSD Vinyl acetate	250	0.00	U 236	94	48-133	14	0-20
78-93-3	PSD 2-Butanone	250	0.00	U 167	67	25-143	13	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00	U 228	91	61-127	13	0-20
591-78-6	PSD 2-Hexanone	250	0.00	U 198	79	33-138	13	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00	U 50.7	101	33-164	12	0-20
74-87-3	PSD Chloromethane	50.0	0.00	U 51.2	102	53-139	12	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00	U 49.5	99	58-140	12	0-20
74-83-9	PSD Bromomethane	50.0	0.00	U 49.9	100	59-146	12	0-20
75-00-3	PSD Chloroethane	50.0	0.00	U 51.1	102	65-129	13	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00	U 51.4	103	65-141	13	0-20
60-29-7	PSD Ethyl ether	50.0	0.00	U 40.3	81	69-127	12	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00	U 50.4	101	59-130	12	0-20
75-09-2	PSD Methylene chloride	50.0	0.00	U 46.3	93	62-123	11	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00	U 48.6	97	69-132	11	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00	U 50.0	100	65-127	12	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00	U 49.5	99	67-127	12	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00	U 49.5	99	69-127	11	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Post Spike Duplicate

Client ID: CAWA-18-151442PSD

Matrix: W

Lab Sample ID 1203989765

Instrument: VOA6.I

Analysis Date: 03/21/2018 20:24

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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 50.8	102	66-137	12	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 49.0	98	71-130	11	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 48.1	96	71-129	11	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 48.5	97	69-139	12	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 45.8	92	67-130	11	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 50.6	101	66-143	12	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 48.3	97	69-130	11	0-20
71-43-2	PSD Benzene	50.0	0.00	U 45.6	91	66-125	12	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 46.4	93	65-131	11	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 47.7	95	67-127	11	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 47.2	94	72-129	11	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 52.3	105	70-138	10	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 49.8	100	70-134	11	0-20
108-88-3	PSD Toluene	50.0	0.00	U 42.4	85	60-126	11	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 51.7	103	69-135	10	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 47.4	95	66-125	11	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 44.7	89	67-124	11	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 40.9	82	60-130	9	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 44.9	90	68-143	10	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 48.8	98	71-127	11	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 41.7	83	64-124	8	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 40.7	81	61-130	7	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Post Spike Duplicate

Client ID: CAWA-18-151442PSD

Matrix: W

Lab Sample ID 1203989765

Instrument: VOA6.I

Analysis Date: 03/21/2018 20:24

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
95-47-6	PSD o-Xylene	50.0	0.00 U	41.3	83	62-131	6	0-20
100-42-5	PSD Styrene	50.0	0.00 U	44.0	88	59-135	5	0-20
75-25-2	PSD Bromoform	50.0	0.00 U	58.0	116	64-138	9	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00 U	40.5	81	55-133	5	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00 U	48.3	97	62-129	10	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00 U	46.4	93	70-124	12	0-20
108-86-1	PSD Bromobenzene	50.0	0.00 U	41.6	83	62-124	6	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00 U	38.2	76	50-133	1	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00 U	40.0	80	53-135	1	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00 U	39.8	80	56-128	3	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00 U	39.1	78	53-130	1	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00 U	40.1	80	55-135	1	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00 U	40.0	80	53-132	1	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00 U	38.1	76	50-138	2	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00 U	37.7	75	49-138	4	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00 U	39.1	78	56-126	1	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00 U	38.2	76	55-125	0	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00 U	35.6	71	43-142	9	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00 U	42.5	85	62-141	11	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00 U	32.6	65	40-147	14	0-20
91-20-3	PSD Naphthalene	50.0	0.00 U	44.5	89	62-134	4	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00 U	38.8	78	52-135	2	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Post Spike Duplicate

Client ID: CAWA-18-151442PSD

Matrix: W

Lab Sample ID 1203989765

Instrument: VOA6.I

Analysis Date: 03/21/2018 20:24

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

			Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
CAS No	Parmname									
120-82-1	PSD	1,2,4-Trichlorobenzene	50.0	0.00	U	38.3	77	50-133	3	0-20
630-20-6	PSD	1,1,1,2-Tetrachloroethane	50.0	0.00	U	49.3	99	71-133	9	0-20
95-50-1	PSD	1,2-Dichlorobenzene	50.0	0.00	U	40.4	81	60-125	2	0-20
71-36-3	PSD	n-Butyl alcohol	5000	0.00	U	5090	102	60-140	15	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1747241

Matrix: WATER

Lab Sample ID 1203990249

Instrument: VOA6.I

Analysis Date: 03/21/2018 10:35

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	87.3	87	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1110	89	61-125
67-64-1	LCS Acetone	250	0.0	323	129	48-157
74-88-4	LCS Iodomethane	250	0.0	217	87	72-128
75-15-0	LCS Carbon disulfide	250	0.0	229	92	69-138
108-05-4	LCS Vinyl acetate	250	0.0	252	101	67-125
78-93-3	LCS 2-Butanone	250	0.0	322	129	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	260	104	66-124
591-78-6	LCS 2-Hexanone	250	0.0	341	136	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	41.0	82	40-160
74-87-3	LCS Chloromethane	50.0	0.0	45.5	91	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	45.5	91	65-137
74-83-9	LCS Bromomethane	50.0	0.0	47.2	94	63-137
75-00-3	LCS Chloroethane	50.0	0.0	49.9	100	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	50.8	102	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	40.0	80	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	46.7	93	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	43.4	87	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	45.2	90	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	47.7	95	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	46.6	93	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	46.8	94	75-123

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1747241

Matrix: WATER

Lab Sample ID 1203990249

Instrument: VOA6.I

Analysis Date: 03/21/2018 10:35

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	LCS 2,2-Dichloropropane	50.0	0.0	48.8	98	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	45.8	92	76-125
67-66-3	LCS Chloroform	50.0	0.0	45.3	91	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	46.1	92	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	44.6	89	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	48.6	97	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	46.0	92	74-122
71-43-2	LCS Benzene	50.0	0.0	43.8	88	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	46.6	93	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	45.3	91	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	45.6	91	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	49.9	100	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	49.2	98	78-131
108-88-3	LCS Toluene	50.0	0.0	43.3	87	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	50.2	100	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	45.7	91	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	43.2	86	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	43.4	87	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	43.8	88	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	47.0	94	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	43.4	87	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	44.2	88	73-125



Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1747241

Matrix: WATER

Lab Sample ID 1203990249

Instrument: VOA6.I

Analysis Date: 03/21/2018 10:35

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	43.8	88	74-126
100-42-5	LCS Styrene	50.0	0.0	47.0	94	72-130
75-25-2	LCS Bromoform	50.0	0.0	56.3	113	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	45.5	91	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	47.4	95	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	45.5	91	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	44.2	88	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	44.8	90	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	45.9	92	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	44.5	89	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	44.2	88	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	46.0	92	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	45.9	92	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	46.1	92	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	46.6	93	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	44.1	88	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	43.3	87	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	46.4	93	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	42.0	84	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	45.4	91	72-136
91-20-3	LCS Naphthalene	50.0	0.0	48.0	96	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	44.9	90	70-130

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1747241

Matrix: WATER

Lab Sample ID 1203990249

Instrument: VOA6.I

Analysis Date: 03/21/2018 10:35

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	45.4	91	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	49.4	99	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	44.3	89	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5090	102	63-138

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 2

SDG Number: 2018-2134

Sample Type: Post Spike

Client ID: CAWA-18-151442PS

Matrix: W

Lab Sample ID 1203990250

Instrument: VOA6.I

Analysis Date: 03/21/2018 20:52

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	272	109	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00 U	242	97	57-149
107-05-1	PS	Allyl chloride	250	0.00 U	246	99	54-128
107-13-1	PS	Acrylonitrile	250	0.00 U	241	96	59-129
107-12-0	PS	Propionitrile	250	0.00 U	233	93	58-131
126-98-7	PS	Methacrylonitrile	250	0.00 U	244	97	59-134
80-62-6	PS	Methyl methacrylate	250	0.00 U	238	95	62-135
97-63-2	PS	Ethyl methacrylate	250	0.00 U	225	90	60-136
78-83-1	PS	Isobutyl alcohol	2500	0.00 U	2470	99	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00 U	51.3	103	63-146

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 2

SDG Number: 2018-2134

Sample Type: Post Spike Duplicate

Client ID: CAWA-18-151442PSD

Matrix: W

Lab Sample ID 1203990251

Instrument: VOA6.I

Analysis Date: 03/21/2018 21:20

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD	Acrolein	250	0.00	U	300	120	49-141	10	0-20
76-13-1	PSD	Trichlorotrifluoroethane	250	0.00	U	265	106	57-149	9	0-20
107-05-1	PSD	Allyl chloride	250	0.00	U	261	105	54-128	6	0-20
107-13-1	PSD	Acrylonitrile	250	0.00	U	266	106	59-129	10	0-20
107-12-0	PSD	Propionitrile	250	0.00	U	258	103	58-131	10	0-20
126-98-7	PSD	Methacrylonitrile	250	0.00	U	263	105	59-134	8	0-20
80-62-6	PSD	Methyl methacrylate	250	0.00	U	256	102	62-135	7	0-20
97-63-2	PSD	Ethyl methacrylate	250	0.00	U	235	94	60-136	5	0-20
78-83-1	PSD	Isobutyl alcohol	2500	0.00	U	2690	108	60-143	9	0-20
126-99-8	PSD	2-Chloro-1,3-butadiene	50.0	0.00	U	55.6	111	63-146	8	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1747241

Matrix: WATER

Lab Sample ID 1203990254

Instrument: VOA6.I

Analysis Date: 03/21/2018 11:32

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	292	117	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	240	96	61-148
107-05-1	LCS	Allyl chloride	250	0.0	240	96	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	252	101	65-122
107-12-0	LCS	Propionitrile	250	0.0	245	98	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	254	102	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	251	100	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	232	93	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2660	106	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	50.1	100	66-147

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1747241

Matrix: WATER

Lab Sample ID 1203994757

Instrument: VOA6.I

Analysis Date: 03/22/2018 10:26

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	85.9	86	71-127
75-05-8	LCS Acetonitrile	1250	0.0	995	80	61-125
67-64-1	LCS Acetone	250	0.0	233	93	48-157
74-88-4	LCS Iodomethane	250	0.0	211	84	72-128
75-15-0	LCS Carbon disulfide	250	0.0	222	89	69-138
108-05-4	LCS Vinyl acetate	250	0.0	279	112	67-125
78-93-3	LCS 2-Butanone	250	0.0	233	93	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	205	82	66-124
591-78-6	LCS 2-Hexanone	250	0.0	234	94	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	54.1	108	40-160
74-87-3	LCS Chloromethane	50.0	0.0	56.0	112	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	54.7	109	65-137
74-83-9	LCS Bromomethane	50.0	0.0	55.5	111	63-137
75-00-3	LCS Chloroethane	50.0	0.0	56.4	113	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	56.9	114	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	43.3	87	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	45.1	90	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	42.0	84	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	42.4	85	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	46.5	93	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	45.3	91	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	46.0	92	75-123

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1747241

Matrix: WATER

Lab Sample ID 1203994757

Instrument: VOA6.I

Analysis Date: 03/22/2018 10:26

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	LCS 2,2-Dichloropropane	50.0	0.0	47.9	96	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	44.2	88	76-125
67-66-3	LCS Chloroform	50.0	0.0	44.1	88	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	45.1	90	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	43.7	87	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	47.6	95	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	43.8	88	74-122
71-43-2	LCS Benzene	50.0	0.0	43.1	86	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	45.6	91	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	44.4	89	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	43.3	87	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	49.4	99	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	47.9	96	78-131
108-88-3	LCS Toluene	50.0	0.0	42.7	85	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	48.3	97	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	43.5	87	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	41.5	83	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	42.4	85	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	42.0	84	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	44.7	89	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	42.7	85	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	43.5	87	73-125

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1747241

Matrix: WATER

Lab Sample ID 1203994757

Instrument: VOA6.I

Analysis Date: 03/22/2018 10:26

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	43.4	87	74-126
100-42-5	LCS Styrene	50.0	0.0	46.2	92	72-130
75-25-2	LCS Bromoform	50.0	0.0	52.4	105	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	44.5	89	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	43.7	87	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	42.2	84	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	43.0	86	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	44.2	88	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	45.2	90	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	43.5	87	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	43.8	88	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	45.4	91	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	45.3	91	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	45.1	90	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	45.4	91	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	42.8	86	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	42.5	85	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	45.4	91	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	37.2	74	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	43.9	88	72-136
91-20-3	LCS Naphthalene	50.0	0.0	43.3	87	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	41.8	84	70-130



Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1747241

Matrix: WATER

Lab Sample ID 1203994757

Instrument: VOA6.I

Analysis Date: 03/22/2018 10:26

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	43.0	86	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	48.1	96	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	42.8	86	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4470	89	63-138

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1747241

Matrix: WATER

Lab Sample ID 1203994758

Instrument: VOA6.I

Analysis Date: 03/22/2018 11:22

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1747241

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	250	100	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	229	92	61-148
107-05-1	LCS	Allyl chloride	250	0.0	235	94	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	212	85	65-122
107-12-0	LCS	Propionitrile	250	0.0	203	81	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	215	86	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	213	85	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	205	82	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2080	83	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	48.8	98	66-147

## Method Blank Summary

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SDG Number:	2018-2134	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1747241	Instrument ID:	VOA6.I	Data File:	032118V6\6L307A.D
Lab Sample ID:	1203990252	Prep Date:	03/21/2018 12:28	Analyzed:	03/21/18 12:28
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 1747241	1203990249	032118V6\6L303A.D	03/21/18	1035
02 LCS for batch 1747241	1203990254	032118V6\6L305A.D	03/21/18	1132
03 CAWA-18-151437	445726002	032118V6\6L313.D	03/21/18	1517
04 CAWA-18-151440	445726003	032118V6\6L314.D	03/21/18	1544
05 CAWA-18-151441	445726004	032118V6\6L315.D	03/21/18	1612
06 CAWA-18-151442	445726007	032118V6\6L316.D	03/21/18	1640
07 CAWA-18-151442PS	1203989764	032118V6\6L323.D	03/21/18	1956
08 CAWA-18-151442PSD	1203989765	032118V6\6L324.D	03/21/18	2024
09 CAWA-18-151442PS	1203990250	032118V6\6L325.D	03/21/18	2052
10 CAWA-18-151442PSD	1203990251	032118V6\6L326.D	03/21/18	2120

**Method Blank Summary**

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<b>SDG Number:</b>	<b>2018-2134</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Matrix:</b>	<b>WATER</b>
<b>Client ID:</b>	<b>MB for batch 1747241</b>	<b>Instrument ID:</b>	<b>VOA6.I</b>	<b>Data File:</b>	<b>032218V6\6L407A.D</b>
<b>Lab Sample ID:</b>	<b>1203994756</b>	<b>Prep Date:</b>	<b>03/22/2018 12:18</b>	<b>Analyzed:</b>	<b>03/22/18 12:18</b>
<b>Column:</b>	<b>DB-624</b>				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
12 LCS for batch 1747241	1203994757	032218V6\6L403A.D	03/22/18	1026
13 LCS for batch 1747241	1203994758	032218V6\6L405A.D	03/22/18	1122
14 CAWA-18-151439	445726006	032218V6\6L410.D	03/22/18	1343

# Quality Control Data

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

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<b>SDG Number:</b> 2018-2134	<b>Date Collected:</b> 03/09/2018 12:00	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203989764	<b>Date Received:</b> 03/13/2018 09:05	
<b>Client Sample:</b> QC for batch 1747241	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAWA-18-151442PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1747241	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/21/2018 19:56	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 03/21/2018 19:56		
<b>Data File:</b> 032118V6\6L323.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		53.9	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		54.8	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		53.5	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		52.9	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		55.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		57.1	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		51.2	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		38.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		52.4	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		37.3	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		39.7	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		47.5	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		54.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		41.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		54.2	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		53.1	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		40.6	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		38.9	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		49.9	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		38.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		57.3	ug/L	0.300	1.00
78-93-3	2-Butanone		190	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		41.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		226	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		39.7	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		36.1	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		259	ug/L	1.50	5.00
67-64-1	Acetone		150	ug/L	1.50	10.0
75-05-8	Acetonitrile		1320	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		51.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		44.2	ug/L	0.300	1.00
74-97-5	Bromochloromethane		54.8	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		58.0	ug/L	0.300	1.00
75-25-2	Bromoform		63.8	ug/L	0.300	1.00

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

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<b>SDG Number:</b> 2018-2134	<b>Date Collected:</b> 03/09/2018 12:00	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203989764	<b>Date Received:</b> 03/13/2018 09:05	
<b>Client Sample:</b> QC for batch 1747241	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAWA-18-151442PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1747241	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/21/2018 19:56	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 03/21/2018 19:56		
<b>Data File:</b> 032118V6\6L323.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		56.0	ug/L	0.300	1.00
75-15-0	Carbon disulfide		279	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		57.2	ug/L	0.300	1.00
108-90-7	Chlorobenzene		45.2	ug/L	0.300	1.00
75-00-3	Chloroethane		58.3	ug/L	0.300	1.00
67-66-3	Chloroform		53.7	ug/L	0.300	1.00
74-87-3	Chloromethane		58.0	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		49.9	ug/L	0.300	1.00
74-95-3	Dibromomethane		52.8	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		57.4	ug/L	0.300	1.00
60-29-7	Ethyl ether		45.7	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		43.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	28.4	ug/L	0.300	1.00
74-88-4	Iodomethane		264	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		42.4	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		51.9	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		46.5	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		44.9	ug/L	0.300	1.00
108-88-3	Toluene		47.3	ug/L	0.300	1.00
79-01-6	Trichloroethylene		51.8	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		58.7	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		271	ug/L	1.50	5.00
75-01-4	Vinyl chloride		55.7	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		55.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		55.5	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		84.9	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5920	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		32.7	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		38.4	ug/L	0.300	1.00
95-47-6	o-Xylene		44.0	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		37.5	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

SDG Number:	2018-2134	Date Collected:	03/09/2018 12:00	Matrix:	W
Lab Sample ID:	1203989764	Date Received:	03/13/2018 09:05		
Client Sample:	QC for batch 1747241	Client:	ARSL004	Project:	QC
Client ID:	CAWA-18-151442PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1747241	Inst:	VOA6.I	Dilution:	1
Run Date:	03/21/2018 19:56	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	03/21/2018 19:56				
Data File:	032118V6\6L323.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		54.4	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		40.4	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		56.2	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		57.2	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	51.7	50.0	ug/L	103	(70%-131%)
Toluene-d8	50.1	50.0	ug/L	100	(74%-124%)



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

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<b>SDG Number:</b> 2018-2134	<b>Date Collected:</b> 03/09/2018 12:00	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203989765	<b>Date Received:</b> 03/13/2018 09:05	
<b>Client Sample:</b> QC for batch 1747241	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAWA-18-151442PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1747241	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/21/2018 20:24	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 03/21/2018 20:24		
<b>Data File:</b> 032118V6\6L324.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		49.3	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		48.5	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		48.3	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.4	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		49.5	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		50.4	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		45.8	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		38.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		46.4	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		38.3	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		40.0	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		42.5	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		48.8	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		40.4	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		48.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		47.7	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		40.0	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		39.1	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		44.7	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		38.2	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		50.8	ug/L	0.300	1.00
78-93-3	2-Butanone		167	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		39.8	ug/L	0.300	1.00
591-78-6	2-Hexanone		198	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		39.1	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		37.7	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		228	ug/L	1.50	5.00
67-64-1	Acetone		130	ug/L	1.50	10.0
75-05-8	Acetonitrile		1140	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		45.6	ug/L	0.300	1.00
108-86-1	Bromobenzene		41.6	ug/L	0.300	1.00
74-97-5	Bromochloromethane		49.0	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		52.3	ug/L	0.300	1.00
75-25-2	Bromoform		58.0	ug/L	0.300	1.00

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

<b>SDG Number:</b> 2018-2134	<b>Date Collected:</b> 03/09/2018 12:00	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203989765	<b>Date Received:</b> 03/13/2018 09:05	
<b>Client Sample:</b> QC for batch 1747241	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAWA-18-151442PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1747241	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/21/2018 20:24	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 03/21/2018 20:24		
<b>Data File:</b> 032118V6\6L324.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		49.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		247	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		50.6	ug/L	0.300	1.00
108-90-7	Chlorobenzene		41.7	ug/L	0.300	1.00
75-00-3	Chloroethane		51.1	ug/L	0.300	1.00
67-66-3	Chloroform		48.1	ug/L	0.300	1.00
74-87-3	Chloromethane		51.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.9	ug/L	0.300	1.00
74-95-3	Dibromomethane		47.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		50.7	ug/L	0.300	1.00
60-29-7	Ethyl ether		40.3	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		40.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	32.6	ug/L	0.300	1.00
74-88-4	Iodomethane		235	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		40.5	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		46.3	ug/L	1.00	10.0
91-20-3	Naphthalene		44.5	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		44.0	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		40.9	ug/L	0.300	1.00
108-88-3	Toluene		42.4	ug/L	0.300	1.00
79-01-6	Trichloroethylene		46.4	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		51.4	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		236	ug/L	1.50	5.00
75-01-4	Vinyl chloride		49.5	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		49.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		49.8	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		79.9	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5090	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		35.6	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		38.2	ug/L	0.300	1.00
95-47-6	o-Xylene		41.3	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		38.1	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

SDG Number:	2018-2134	Date Collected:	03/09/2018 12:00	Matrix:	W
Lab Sample ID:	1203989765	Date Received:	03/13/2018 09:05		
Client Sample:	QC for batch 1747241	Client:	ARSL004	Project:	QC
Client ID:	CAWA-18-151442PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1747241	Inst:	VOA6.I	Dilution:	1
Run Date:	03/21/2018 20:24	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	03/21/2018 20:24				
Data File:	032118V6\6L324.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		48.6	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		40.1	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		50.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		51.7	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	44.7	50.0	ug/L	89	(71%-134%)
Bromofluorobenzene	46.2	50.0	ug/L	92	(70%-131%)
Toluene-d8	44.7	50.0	ug/L	89	(74%-124%)

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

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SDG Number: 2018-2134

Lab Sample ID: 1203990249

Client Sample: QC for batch 1747241

Client ID: LCS for batch 1747241

Batch ID: 1747241

Run Date: 03/21/2018 10:35

Prep Date: 03/21/2018 10:35

Data File: 032118V6\6L303A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		49.4	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		46.1	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		45.7	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		46.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		46.7	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		44.6	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		44.9	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		45.5	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		45.4	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		45.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		42.0	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		47.0	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		46.0	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		45.3	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		45.9	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		44.1	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		43.2	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		43.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		48.8	ug/L	0.300	1.00
78-93-3	2-Butanone		322	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		44.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		341	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		44.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		46.6	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		260	ug/L	1.50	5.00
67-64-1	Acetone		323	ug/L	1.50	10.0
75-05-8	Acetonitrile		1110	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		43.8	ug/L	0.300	1.00
108-86-1	Bromobenzene		44.2	ug/L	0.300	1.00
74-97-5	Bromochloromethane		45.8	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		49.9	ug/L	0.300	1.00
75-25-2	Bromoform		56.3	ug/L	0.300	1.00

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

**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203990249  
**Client Sample:** QC for batch 1747241  
**Client ID:** LCS for batch 1747241  
**Batch ID:** 1747241  
**Run Date:** 03/21/2018 10:35  
**Prep Date:** 03/21/2018 10:35  
**Data File:** 032118V6\6L303A.D

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

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		47.2	ug/L	0.300	1.00
75-15-0	Carbon disulfide		229	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		48.6	ug/L	0.300	1.00
108-90-7	Chlorobenzene		43.4	ug/L	0.300	1.00
75-00-3	Chloroethane		49.9	ug/L	0.300	1.00
67-66-3	Chloroform		45.3	ug/L	0.300	1.00
74-87-3	Chloromethane		45.5	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		43.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		45.6	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		41.0	ug/L	0.300	1.00
60-29-7	Ethyl ether		40.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		44.2	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	45.4	ug/L	0.300	1.00
74-88-4	Iodomethane		217	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		45.5	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		43.4	ug/L	1.00	10.0
91-20-3	Naphthalene		48.0	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		47.0	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		43.4	ug/L	0.300	1.00
108-88-3	Toluene		43.3	ug/L	0.300	1.00
79-01-6	Trichloroethylene		46.6	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		50.8	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		252	ug/L	1.50	5.00
75-01-4	Vinyl chloride		45.5	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		46.8	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		49.2	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		87.3	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5090	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		46.4	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		44.8	ug/L	0.300	1.00
95-47-6	o-Xylene		43.8	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		46.1	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

SDG Number:	2018-2134	Matrix:	WATER
Lab Sample ID:	1203990249		
Client Sample:	QC for batch 1747241	Client:	ARSL004
Client ID:	LCS for batch 1747241	Method:	SW-846:8260B
Batch ID:	1747241	Inst:	VOA6.I
Run Date:	03/21/2018 10:35	Analyst:	JP1
Prep Date:	03/21/2018 10:35		
Data File:	032118V6\6L303A.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		45.2	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		46.0	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		47.7	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		50.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.4	50.0	ug/L	105	(71%-134%)
Bromofluorobenzene	52.9	50.0	ug/L	106	(70%-131%)
Toluene-d8	51.4	50.0	ug/L	103	(74%-124%)

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

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203990250  
**Client Sample:** QC for batch 1747241  
**Client ID:** CAWA-18-151442PS  
**Batch ID:** 1747241  
**Run Date:** 03/21/2018 20:52  
**Prep Date:** 03/21/2018 20:52  
**Data File:** 032118V6\6L325.D

**Date Collected:** 03/09/2018 12:00  
**Date Received:** 03/13/2018 09:05  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		51.3	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		272	ug/L	1.50	5.00
107-13-1	Acrylonitrile		241	ug/L	1.50	5.00
107-05-1	Allyl chloride		246	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

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

**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203990250  
**Client Sample:** QC for batch 1747241  
**Client ID:** CAWA-18-151442PS  
**Batch ID:** 1747241  
**Run Date:** 03/21/2018 20:52  
**Prep Date:** 03/21/2018 20:52  
**Data File:** 032118V6\6L325.D

**Date Collected:** 03/09/2018 12:00  
**Date Received:** 03/13/2018 09:05  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA6.I  
**Analyst:** JP1  
  
**Column:** DB-624

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		225	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		2470	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		244	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		238	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		233	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		242	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00



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

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<b>SDG Number:</b>	<b>2018-2134</b>	<b>Date Collected:</b>	<b>03/09/2018 12:00</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203990250</b>	<b>Date Received:</b>	<b>03/13/2018 09:05</b>		
<b>Client Sample:</b>	<b>QC for batch 1747241</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAWA-18-151442PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1747241</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>03/21/2018 20:52</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>03/21/2018 20:52</b>				
<b>Data File:</b>	<b>032118V6\6L325.D</b>	<b>Column:</b>	<b>DB-624</b>		

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.0	50.0	ug/L 100	(71%-134%)
Bromofluorobenzene	50.9	50.0	ug/L 102	(70%-131%)
Toluene-d8	48.4	50.0	ug/L 97	(74%-124%)

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

<b>SDG Number:</b> 2018-2134	<b>Date Collected:</b> 03/09/2018 12:00	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203990251	<b>Date Received:</b> 03/13/2018 09:05	
<b>Client Sample:</b> QC for batch 1747241	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAWA-18-151442PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1747241	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/21/2018 21:20	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 03/21/2018 21:20		
<b>Data File:</b> 032118V6\6L326.D	<b>Column:</b> 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		55.6	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		300	ug/L	1.50	5.00
107-13-1	Acrylonitrile		266	ug/L	1.50	5.00
107-05-1	Allyl chloride		261	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

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

<b>SDG Number:</b> 2018-2134	<b>Date Collected:</b> 03/09/2018 12:00	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203990251	<b>Date Received:</b> 03/13/2018 09:05	
<b>Client Sample:</b> QC for batch 1747241	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAWA-18-151442PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1747241	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/21/2018 21:20	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 03/21/2018 21:20		
<b>Data File:</b> 032118V6\6L326.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		235	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		2690	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		263	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		256	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		258	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		265	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

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

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<b>SDG Number:</b>	<b>2018-2134</b>	<b>Date Collected:</b>	<b>03/09/2018 12:00</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203990251</b>	<b>Date Received:</b>	<b>03/13/2018 09:05</b>		
<b>Client Sample:</b>	<b>QC for batch 1747241</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAWA-18-151442PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1747241</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>03/21/2018 21:20</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>03/21/2018 21:20</b>				
<b>Data File:</b>	<b>032118V6\6L326.D</b>	<b>Column:</b>	<b>DB-624</b>		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.1	50.0	ug/L	100	(71%-134%)
Bromofluorobenzene	50.4	50.0	ug/L	101	(70%-131%)
Toluene-d8	47.6	50.0	ug/L	95	(74%-124%)

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

Page 1 of 3

SDG Number: 2018-2134

Lab Sample ID: 1203990252

Client Sample: QC for batch 1747241

Client ID: MB for batch 1747241

Batch ID: 1747241

Run Date: 03/21/2018 12:28

Prep Date: 03/21/2018 12:28

Data File: 032118V6\6L307A.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

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

**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203990252  
**Client Sample:** QC for batch 1747241  
**Client ID:** MB for batch 1747241  
**Batch ID:** 1747241  
**Run Date:** 03/21/2018 12:28  
**Prep Date:** 03/21/2018 12:28  
**Data File:** 032118V6\6L307A.D

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

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	J	0.370	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

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SDG Number: 2018-2134  
Lab Sample ID: 1203990252  
Client Sample: QC for batch 1747241  
Client ID: MB for batch 1747241  
Batch ID: 1747241  
Run Date: 03/21/2018 12:28  
Prep Date: 03/21/2018 12:28  
Data File: 032118V6\6L307A.D

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

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.6	50.0	ug/L 101	(71%-134%)
Bromofluorobenzene	50.9	50.0	ug/L 102	(70%-131%)
Toluene-d8	49.9	50.0	ug/L 100	(74%-124%)

## Tentatively Identified Compound Summary

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

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

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SDG Number: 2018-2134

Lab Sample ID: 1203990254

Client Sample: QC for batch 1747241

Client ID: LCS for batch 1747241

Batch ID: 1747241

Run Date: 03/21/2018 11:32

Prep Date: 03/21/2018 11:32

Data File: 032118V6\6L305A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		50.1	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		292	ug/L	1.50	5.00
107-13-1	Acrylonitrile		252	ug/L	1.50	5.00
107-05-1	Allyl chloride		240	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00



**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203990254  
**Client Sample:** QC for batch 1747241  
**Client ID:** LCS for batch 1747241  
**Batch ID:** 1747241  
**Run Date:** 03/21/2018 11:32  
**Prep Date:** 03/21/2018 11:32  
**Data File:** 032118V6\6L305A.D

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

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		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		2660	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		254	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		251	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		245	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		240	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

SDG Number:	2018-2134	Matrix:	WATER
Lab Sample ID:	1203990254		
Client Sample:	QC for batch 1747241	Client:	ARSL004
Client ID:	LCS for batch 1747241	Method:	SW-846:8260B
Batch ID:	1747241	Inst:	VOA6.I
Run Date:	03/21/2018 11:32	Analyst:	JP1
Prep Date:	03/21/2018 11:32		
Data File:	032118V6\6L305A.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	51.2	50.0	ug/L 102	(71%-134%)
Bromofluorobenzene	50.2	50.0	ug/L 100	(70%-131%)
Toluene-d8	48.3	50.0	ug/L 97	(74%-124%)

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

Page 1 of 3

SDG Number: 2018-2134

Lab Sample ID: 1203994756

Client Sample: QC for batch 1747241

Client ID: MB for batch 1747241

Batch ID: 1747241

Run Date: 03/22/2018 12:18

Prep Date: 03/22/2018 12:18

Data File: 032218V6\6L407A.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203994756  
**Client Sample:** QC for batch 1747241  
**Client ID:** MB for batch 1747241  
**Batch ID:** 1747241  
**Run Date:** 03/22/2018 12:18  
**Prep Date:** 03/22/2018 12:18  
**Data File:** 032218V6\6L407A.D

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

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	J	0.350	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

Page 3 of 3

SDG Number:	2018-2134	Matrix:	WATER
Lab Sample ID:	1203994756		
Client Sample:	QC for batch 1747241	Client:	ARSL004
Client ID:	MB for batch 1747241	Method:	SW-846:8260B
Batch ID:	1747241	Inst:	VOA6.I
Run Date:	03/22/2018 12:18	Analyst:	JP1
Prep Date:	03/22/2018 12:18		
Data File:	032218V6\6L407A.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	49.4	50.0	ug/L 99	(71%-134%)
Bromofluorobenzene	51.1	50.0	ug/L 102	(70%-131%)
Toluene-d8	48.9	50.0	ug/L 98	(74%-124%)

## Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	15.671	10.8	ug/L	0	J

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

Page 1 of 3

SDG Number: 2018-2134

Lab Sample ID: 1203994757

Client Sample: QC for batch 1747241

Client ID: LCS for batch 1747241

Batch ID: 1747241

Run Date: 03/22/2018 10:26

Prep Date: 03/22/2018 10:26

Data File: 032218V6\6L403A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		48.1	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		45.1	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		43.7	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		43.5	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		45.3	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		45.1	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		43.7	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		41.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		42.2	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		43.0	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		45.3	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		37.2	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		44.7	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		42.8	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		43.8	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		44.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		45.2	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		42.8	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		41.5	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		42.5	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		47.9	ug/L	0.300	1.00
78-93-3	2-Butanone		233	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		43.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		234	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		43.8	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		45.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		205	ug/L	1.50	5.00
67-64-1	Acetone		233	ug/L	1.50	10.0
75-05-8	Acetonitrile		995	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		43.1	ug/L	0.300	1.00
108-86-1	Bromobenzene		43.0	ug/L	0.300	1.00
74-97-5	Bromochloromethane		44.2	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		49.4	ug/L	0.300	1.00
75-25-2	Bromoform		52.4	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

SDG Number: 2018-2134

Lab Sample ID: 1203994757

Client Sample: QC for batch 1747241

Client ID: LCS for batch 1747241

Batch ID: 1747241

Run Date: 03/22/2018 10:26

Prep Date: 03/22/2018 10:26

Data File: 032218V6\6L403A.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		55.5	ug/L	0.300	1.00
75-15-0	Carbon disulfide		222	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		47.6	ug/L	0.300	1.00
108-90-7	Chlorobenzene		42.7	ug/L	0.300	1.00
75-00-3	Chloroethane		56.4	ug/L	0.300	1.00
67-66-3	Chloroform		44.1	ug/L	0.300	1.00
74-87-3	Chloromethane		56.0	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		42.0	ug/L	0.300	1.00
74-95-3	Dibromomethane		43.3	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		54.1	ug/L	0.300	1.00
60-29-7	Ethyl ether		43.3	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		43.5	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	43.9	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		44.5	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		42.0	ug/L	1.00	10.0
91-20-3	Naphthalene		43.3	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		46.2	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		42.4	ug/L	0.300	1.00
108-88-3	Toluene		42.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		45.6	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		56.9	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		279	ug/L	1.50	5.00
75-01-4	Vinyl chloride		54.7	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		46.0	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		47.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		85.9	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4470	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		45.4	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		44.2	ug/L	0.300	1.00
95-47-6	o-Xylene		43.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		45.1	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

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<b>SDG Number:</b>	2018-2134	<b>Matrix:</b>	WATER
<b>Lab Sample ID:</b>	1203994757		
<b>Client Sample:</b>	QC for batch 1747241	<b>Client:</b>	ARSL004
<b>Client ID:</b>	LCS for batch 1747241	<b>Method:</b>	SW-846:8260B
<b>Batch ID:</b>	1747241	<b>Inst:</b>	VOA6.I
<b>Run Date:</b>	03/22/2018 10:26	<b>Analyst:</b>	JP1
<b>Prep Date:</b>	03/22/2018 10:26		
<b>Data File:</b>	032218V6\6L403A.D	<b>Column:</b>	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		42.4	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		45.4	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		46.5	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		48.3	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.2	50.0	ug/L	98	(71%-134%)
Bromofluorobenzene	49.9	50.0	ug/L	100	(70%-131%)
Toluene-d8	49.5	50.0	ug/L	99	(74%-124%)



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

Page 1 of 3

SDG Number: 2018-2134

Lab Sample ID: 1203994758

Client Sample: QC for batch 1747241

Client ID: LCS for batch 1747241

Batch ID: 1747241

Run Date: 03/22/2018 11:22

Prep Date: 03/22/2018 11:22

Data File: 032218V6\6L405A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		48.8	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		250	ug/L	1.50	5.00
107-13-1	Acrylonitrile		212	ug/L	1.50	5.00
107-05-1	Allyl chloride		235	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203994758  
**Client Sample:** QC for batch 1747241  
**Client ID:** LCS for batch 1747241  
**Batch ID:** 1747241  
**Run Date:** 03/22/2018 11:22  
**Prep Date:** 03/22/2018 11:22  
**Data File:** 032218V6\6L405A.D

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

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		205	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2080	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		215	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		213	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		203	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		229	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b>	2018-2134	<b>Matrix:</b>	WATER
<b>Lab Sample ID:</b>	1203994758		
<b>Client Sample:</b>	QC for batch 1747241	<b>Client:</b>	ARSL004
<b>Client ID:</b>	LCS for batch 1747241	<b>Method:</b>	SW-846:8260B
<b>Batch ID:</b>	1747241	<b>Inst:</b>	VOA6.I
<b>Run Date:</b>	03/22/2018 11:22	<b>Analyst:</b>	JP1
<b>Prep Date:</b>	03/22/2018 11:22		
<b>Data File:</b>	032218V6\6L405A.D	<b>Column:</b>	DB-624
		<b>Project:</b>	QC
		<b>SOP Ref:</b>	GL-OA-E-038
		<b>Dilution:</b>	1
		<b>Purge Vol:</b>	5 mL

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.7	50.0	ug/L 97	(71%-134%)
Bromofluorobenzene	50.8	50.0	ug/L 102	(70%-131%)
Toluene-d8	48.8	50.0	ug/L 98	(74%-124%)

# **Semi-Volatile Analysis**

# Case Narrative

**GC/MS Semivolatile  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-2134  
Work Order #: 445726**

**Product:** Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry  
**Analytical Method:** SW846 3510C/8270D  
**Analytical Procedure:** GL-OA-E-009 REV# 40  
**Analytical Batch:** 1746893

**Preparation Method:** SW846 3510C  
**Preparation Procedure:** GL-OA-E-013 REV# 32  
**Preparation Batch:** 1746892

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726003	CAWA-18-151440
445726006	CAWA-18-151439
1203989121	Method Blank (MB)
1203989122	Laboratory Control Sample (LCS)
1203989123	445591003(CAAN-18-151479) Matrix Spike (MS)
1203989124	445591003(CAAN-18-151479) Matrix Spike Duplicate (MSD)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Calibration Information**

**CCV Requirements**

All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8270D for samples 445726002 (CAWA-18-151437), 445726003 (CAWA-18-151440) and 445726006 (CAWA-18-151439) 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.

**Miscellaneous Information**

**TIC Comment**

Tentatively identified compounds (TIC) were requested for samples 445726002 (CAWA-18-151437), 445726003 (CAWA-18-151440) and 445726006 (CAWA-18-151439) in this SDG in this batch.

**Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2018-2134 GEL Work Order: 445726

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

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

#### Review/Validation

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

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

Signature: 

Name: Barbara Bailey

Date: 06 APR 2018

Title: Data Validator



# **Sample Data Summary**

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

Page 1 of 3

SDG Number: 2018-2134

Lab Sample ID: 445726002

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client ID: CAWA-18-151437

Batch ID: 1746893

Run Date: 03/14/2018 18:41

Prep Date: 03/14/2018 08:20

Data File: 031418a.s\Ac1422.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.I

Analyst: JMB3

Aliquot: 960 mL

Column: DB-5ms

Project: ESHL00114

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	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**

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SDG Number: 2018-2134

Lab Sample ID: 445726002

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client ID: CAWA-18-151437

Batch ID: 1746893

Run Date: 03/14/2018 18:41

Prep Date: 03/14/2018 08:20

Data File: 031418a.s\Ac1422.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.I

Analyst: JMB3

Aliquot: 960 mL

Column: DB-5ms

Project: ESHL00114

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.313	ug/L	0.313	1.04
65-85-0	Benzoic acid	J	16.4	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	0.313	ug/L	0.313	10.4
218-01-9	Chrysene	U	0.313	ug/L	0.313	1.04
84-74-2	Di-n-butylphthalate	U	0.313	ug/L	0.313	10.4
117-84-0	Di-n-octylphthalate	U	0.313	ug/L	0.313	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	0.313	ug/L	0.313	10.4
131-11-3	Dimethylphthalate	U	0.313	ug/L	0.313	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	0.313	ug/L	0.313	1.04

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

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 445726002  
  
**Client ID:** CAWA-18-151437  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 18:41  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1422.D

**Date Collected:** 03/09/2018 11:18  
**Date Received:** 03/13/2018 09:05  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 960 mL  
**Column:** DB-5ms

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	77.8	104	ug/L	75 (32%-124%)
2-Fluorobiphenyl	35.7	52.1	ug/L	68 (32%-112%)
2-Fluorophenol	49.0	104	ug/L	47 (15%-88%)
Nitrobenzene-d5	36.9	52.1	ug/L	71 (36%-115%)
Phenol-d5	29.6	104	ug/L	28 (15%-91%)
p-Terphenyl-d14	44.7	52.1	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: 2018-2134

Lab Sample ID: 445726003

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSDA.I

Dilution: 1

Batch ID: 1746893

Analyst: JMB3

Inj. Vol: 1 uL

Run Date: 03/14/2018 19:08

Aliquot: 980 mL

Final Volume: 1 mL

Prep Date: 03/14/2018 08:20

Data File: 031418a.s\Ac1423.D

Column: DB-5ms

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

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

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SDG Number: 2018-2134

Lab Sample ID: 445726003

Date Collected: 03/09/2018 11:18

Date Received: 03/13/2018 09:05

Matrix: W

Client ID: CAWA-18-151440

Batch ID: 1746893

Run Date: 03/14/2018 19:08

Prep Date: 03/14/2018 08:20

Data File: 031418a.s\Ac1423.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.I

Analyst: JMB3

Aliquot: 980 mL

Column: DB-5ms

Project: ESHL00114

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

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

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

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 445726003  
  
**Client ID:** CAWA-18-151440  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 19:08  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1423.D

**Date Collected:** 03/09/2018 11:18  
**Date Received:** 03/13/2018 09:05  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 980 mL  
**Column:** DB-5ms

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

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	75.4	102	ug/L	74	(32%-124%)
2-Fluorobiphenyl	36.1	51.0	ug/L	71	(32%-112%)
2-Fluorophenol	48.9	102	ug/L	48	(15%-88%)
Nitrobenzene-d5	37.9	51.0	ug/L	74	(36%-115%)
Phenol-d5	29.6	102	ug/L	29	(15%-91%)
p-Terphenyl-d14	42.3	51.0	ug/L	83	(36%-121%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000079-01-6	Trichloroethylene	2.093	4.27	ug/L	98	NJ

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

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SDG Number: 2018-2134

Lab Sample ID: 445726006

Date Collected: 03/09/2018 12:00

Date Received: 03/13/2018 09:05

Matrix: W

Client ID: CAWA-18-151439

Batch ID: 1746893

Run Date: 03/14/2018 19:35

Prep Date: 03/14/2018 08:20

Data File: 031418a.s\Ac1424.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.I

Analyst: JMB3

Aliquot: 960 mL

Column: DB-5ms

Project: ESHL00114

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	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**

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SDG Number: 2018-2134

Lab Sample ID: 445726006

Date Collected: 03/09/2018 12:00

Date Received: 03/13/2018 09:05

Matrix: W

Client ID: CAWA-18-151439

Batch ID: 1746893

Run Date: 03/14/2018 19:35

Prep Date: 03/14/2018 08:20

Data File: 031418a.s\Ac1424.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.I

Analyst: JMB3

Aliquot: 960 mL

Column: DB-5ms

Project: ESHL00114

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	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	0.313	ug/L	0.313	10.4
218-01-9	Chrysene	U	0.313	ug/L	0.313	1.04
84-74-2	Di-n-butylphthalate	U	0.313	ug/L	0.313	10.4
117-84-0	Di-n-octylphthalate	U	0.313	ug/L	0.313	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	0.313	ug/L	0.313	10.4
131-11-3	Dimethylphthalate	U	0.313	ug/L	0.313	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	0.313	ug/L	0.313	1.04

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

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 445726006  
  
**Client ID:** CAWA-18-151439  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 19:35  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1424.D

**Date Collected:** 03/09/2018 12:00  
**Date Received:** 03/13/2018 09:05  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 960 mL  
**Column:** DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	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	67.0	104	ug/L	64	(32%-124%)
2-Fluorobiphenyl	30.4	52.1	ug/L	58	(32%-112%)
2-Fluorophenol	42.0	104	ug/L	40	(15%-88%)
Nitrobenzene-d5	30.9	52.1	ug/L	59	(36%-115%)
Phenol-d5	25.8	104	ug/L	25	(15%-91%)
p-Terphenyl-d14	42.1	52.1	ug/L	81	(36%-121%)

**Tentatively Identified Compound Summary**

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

# **Quality Control Summary**

Semi-Volatile  
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-2134

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203989121	MB for batch 1746892	48	28	74	73	76	89
1203989122	LCS for batch 1746892	43	26	69	57	80	77
1203989123	CAAN-18-151479MS	63	47	76	74	85	88
1203989124	CAAN-18-151479MSD	62	46	76	71	77	89
445726002	CAWA-18-151437	47	28	71	68	75	86
445726003	CAWA-18-151440	48	29	74	71	74	83
445726006	CAWA-18-151439	40	25	59	58	64	81

## Surrogate

## Acceptance Limits

2FP	= 2-Fluorophenol	(15%-88%)
PHL	= Phenol-d5	(15%-91%)
NBZ	= Nitrobenzene-d5	(36%-115%)
FBP	= 2-Fluorobiphenyl	(32%-112%)
TBP	= 2,4,6-Tribromophenol	(32%-124%)
TPH	= p-Terphenyl-d14	(36%-121%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746892

Matrix: WATER

Lab Sample ID 1203989122

Instrument: MSDA.I

Analysis Date: 03/14/2018 15:58

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
62-75-9	LCS N-Methyl-N-nitrosomethylamine	50.0	0.0	21.5	43	30-88
110-86-1	LCS Pyridine	50.0	0.0	23.0	46	27-89
62-53-3	LCS Aniline	50.0	0.0	34.8	70	49-112
108-95-2	LCS Phenol	50.0	0.0	13.6	27	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	35.9	72	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	33.7	67	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	28.4	57	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	28.6	57	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	29.6	59	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)ether	50.0	0.0	36.0	72	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	32.2	64	44-102
95-48-7	LCS o-Cresol	50.0	0.0	30.4	61	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	30.8	62	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	37.6	75	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	26.6	53	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	35.1	70	53-115
78-59-1	LCS Isophorone	50.0	0.0	33.3	67	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	36.2	72	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	30.1	60	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	35.1	70	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	36.3	73	53-109
65-85-0	LCS Benzoic acid	100	0.0	28.7	29	21-74

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746892

Matrix: WATER

Lab Sample ID 1203989122

Instrument: MSDA.I

Analysis Date: 03/14/2018 15:58

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	43.4	87	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	28.9	58	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	36.9	74	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	32.0	64	42-103
91-20-3	LCS Naphthalene	50.0	0.0	32.0	64	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	33.2	66	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	20.4	41	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	35.9	72	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	37.1	74	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	33.6	67	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	38.0	76	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	46.0	92	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	38.6	77	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	35.6	71	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	36.7	73	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	35.2	70	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	37.0	74	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	38.6	77	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	36.7	73	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	37.3	75	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	38.6	77	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	12.4	25	15-137

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746892

Matrix: WATER

Lab Sample ID 1203989122

Instrument: MSDA.I

Analysis Date: 03/14/2018 15:58

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	35.9	72	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	38.2	76	52-121
100-01-6	LCS 4-Nitroaniline	50.0	0.0	39.2	78	44-137
	<i>p</i> -Nitroaniline					
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	38.3	77	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	35.5	71	55-113
122-66-7	LCS Azobenzene	50.0	0.0	36.5	73	53-115
	<i>1,2</i> -Diphenylhydrazine					
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	37.0	74	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	36.9	74	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	43.8	88	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	35.4	71	55-110
120-12-7	LCS Anthracene	50.0	0.0	35.6	71	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	40.7	81	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	38.5	77	54-118
129-00-0	LCS Pyrene	50.0	0.0	32.5	65	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	40.9	82	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	46.8	94	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	36.0	72	57-112
218-01-9	LCS Chrysene	50.0	0.0	37.1	74	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	48.5	97	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	35.8	72	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	37.3	75	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	37.0	74	40-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746892

Matrix: WATER

Lab Sample ID 1203989122

Instrument: MSDA.I

Analysis Date: 03/14/2018 15:58

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	38.2	76	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	37.7	75	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	36.6	73	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	22.5	45	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	37.0	74	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	33.9	68	44-102
1912-24-9	LCS Atrazine	50.0	0.0	38.8	78	60-131
92-87-5	LCS Benzidine	100	0.0	74.9	75	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	37.0	74	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	31.5	63	39-99



Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Matrix Spike

Client ID: CAAN-18-151479MS

Matrix: W

Lab Sample ID 1203989123

Instrument: MSDA.I

Analysis Date: 03/14/2018 16:52

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
62-75-9	MS N-Methyl-N-nitrosomethylamine	109	0.00 U	64.6	59	25-106
110-86-1	MS Pyridine	109	0.00 U	70.3	65	24-93
62-53-3	MS Aniline	109	0.00 U	84.0	77	37-113
108-95-2	MS Phenol	109	0.00 U	52.8	49	23-82
111-44-4	MS bis(2-Chloroethyl) ether	109	0.00 U	82.2	76	39-114
95-57-8	MS 2-Chlorophenol	109	0.00 U	78.5	72	37-108
541-73-1	MS 1,3-Dichlorobenzene	109	0.00 U	68.3	63	27-97
106-46-7	MS 1,4-Dichlorobenzene	109	0.00 U	68.3	63	28-97
95-50-1	MS 1,2-Dichlorobenzene	109	0.00 U	70.5	65	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)ether	109	0.00 U	83.2	77	32-127
100-51-6	MS Benzyl alcohol	109	0.00 U	83.1	76	37-116
95-48-7	MS o-Cresol	109	0.00 U	77.8	72	34-109
65794-96-9	MS m,p-Cresols	109	0.00 U	85.1	78	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	109	0.00 U	87.5	81	42-118
67-72-1	MS Hexachloroethane	109	0.00 U	65.0	60	29-94
98-95-3	MS Nitrobenzene	109	0.00 U	80.7	74	38-123
78-59-1	MS Isophorone	109	0.00 U	77.5	71	43-120
88-75-5	MS 2-Nitrophenol	109	0.00 U	84.2	77	39-115
105-67-9	MS 2,4-Dimethylphenol	109	0.00 U	70.5	65	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	109	0.00 U	81.5	75	42-118
120-83-2	MS 2,4-Dichlorophenol	109	0.00 U	83.8	77	40-111
65-85-0	MS Benzoic acid	217	0.00 U	101	46	17-95

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Matrix Spike

Client ID: CAAN-18-151479MS

Matrix: W

Lab Sample ID 1203989123

Instrument: MSDA.I

Analysis Date: 03/14/2018 16:52

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	109	0.00 U	101	92	44-138
87-68-3	MS Hexachlorobutadiene	109	0.00 U	72.6	67	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	109	0.00 U	85.9	79	41-122
91-57-6	MS 2-Methylnaphthalene	109	0.00 U	74.8	69	29-109
91-20-3	MS Naphthalene	109	0.00 U	74.9	69	31-108
90-12-0	MS 1-Methylnaphthalene	109	0.00 U	77.8	72	33-112
77-47-4	MS Hexachlorocyclopentadiene	109	0.00 U	49.5	46	26-79
88-06-2	MS 2,4,6-Trichlorophenol	109	0.00 U	82.9	76	39-124
95-95-4	MS 2,4,5-Trichlorophenol	109	0.00 U	84.3	78	42-120
91-58-7	MS 2-Chloronaphthalene	109	0.00 U	79.1	73	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	109	0.00 U	86.8	80	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	109	0.00 U	106	97	42-144
131-11-3	MS Dimethylphthalate	109	0.00 U	89.4	82	45-128
606-20-2	MS 2,6-Dinitrotoluene	109	0.00 U	82.6	76	46-124
121-14-2	MS 2,4-Dinitrotoluene	109	0.00 U	85.4	79	45-125
208-96-8	MS Acenaphthylene	109	0.00 U	82.2	76	35-120
83-32-9	MS Acenaphthene	109	0.00 U	86.4	80	35-117
51-28-5	MS 2,4-Dinitrophenol	109	0.00 U	87.2	80	27-122
132-64-9	MS Dibenzofuran	109	0.00 U	85.2	78	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	109	0.00 U	87.1	80	40-128
84-66-2	MS Diethylphthalate	109	0.00 U	89.5	82	43-127
100-02-7	MS 4-Nitrophenol	109	0.00 U	47.7	44	17-85

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Matrix Spike

Client ID: CAAN-18-151479MS

Matrix: W

Lab Sample ID 1203989123

Instrument: MSDA.I

Analysis Date: 03/14/2018 16:52

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS Fluorene	109	0.00 U	83.6	77	39-117
7005-72-3	MS 4-Chlorophenylphenylether	109	0.00 U	89.1	82	39-121
100-01-6	MS 4-Nitroaniline	109	0.00 U	87.7	81	30-133
534-52-1	MS 2-Methyl-4,6-dinitrophenol	109	0.00 U	90.7	83	32-126
122-39-4	MS Diphenylamine	109	0.00 U	85.7	79	37-118
122-66-7	MS Azobenzene	109	0.00 U	87.3	80	38-120
101-55-3	MS 4-Bromophenylphenylether	109	0.00 U	87.9	81	39-121
118-74-1	MS Hexachlorobenzene	109	0.00 U	88.0	81	40-118
87-86-5	MS Pentachlorophenol	109	0.00 U	102	94	35-121
85-01-8	MS Phenanthrene	109	0.00 U	83.5	77	40-115
120-12-7	MS Anthracene	109	0.00 U	83.7	77	38-120
84-74-2	MS Di-n-butylphthalate	109	0.00 U	95.4	88	41-128
206-44-0	MS Fluoranthene	109	0.00 U	87.7	81	41-119
129-00-0	MS Pyrene	109	0.00 U	81.1	75	35-128
85-68-7	MS Butylbenzylphthalate	109	0.00 U	100	92	40-129
117-81-7	MS bis(2-Ethylhexyl)phthalate	109	0.00 U	114	105	38-131
56-55-3	MS Benzo(a)anthracene	109	0.00 U	85.4	79	39-120
218-01-9	MS Chrysene	109	0.00 U	87.2	80	41-124
117-84-0	MS Di-n-octylphthalate	109	0.00 U	114	105	37-134
205-99-2	MS Benzo(b)fluoranthene	109	0.00 U	84.6	78	31-122
207-08-9	MS Benzo(k)fluoranthene	109	0.00 U	86.5	80	33-123
50-32-8	MS Benzo(a)pyrene	109	0.00 U	87.5	80	32-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Matrix Spike

Client ID: CAAN-18-151479MS

Matrix: W

Lab Sample ID 1203989123

Instrument: MSDA.I

Analysis Date: 03/14/2018 16:52

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	MS Indeno(1,2,3-cd)pyrene	109	0.00 U	93.4	86	27-121
53-70-3	MS Dibenzo(a,h)anthracene	109	0.00 U	91.6	84	30-125
191-24-2	MS Benzo(ghi)perylene	109	0.00 U	90.1	83	24-126
123-91-1	MS 1,4-Dioxane	109	0.00 U	68.0	63	24-110
930-55-2	MS N-Nitrosopyrrolidine	109	0.00 U	89.1	82	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	109	0.00 U	80.9	74	32-101
1912-24-9	MS Atrazine	109	0.00 U	93.0	86	42-129
92-87-5	MS Benzidine	217	0.00 U	159	73	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	109	0.00 U	85.0	78	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	109	0.00 U	75.1	69	26-102

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151479MSD

Matrix: W

Lab Sample ID 1203989124

Instrument: MSDA.I

Analysis Date: 03/14/2018 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
62-75-9	MSD N-Methyl-N-nitrosomethylamine	109	0.00 U	64.2	59	25-106	1	0-30
110-86-1	MSD Pyridine	109	0.00 U	66.0	61	24-93	6	0-30
62-53-3	MSD Aniline	109	0.00 U	83.4	77	37-113	1	0-30
108-95-2	MSD Phenol	109	0.00 U	51.8	48	23-82	2	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	109	0.00 U	80.6	74	39-114	2	0-30
95-57-8	MSD 2-Chlorophenol	109	0.00 U	77.9	72	37-108	1	0-30
541-73-1	MSD 1,3-Dichlorobenzene	109	0.00 U	68.5	63	27-97	0	0-30
106-46-7	MSD 1,4-Dichlorobenzene	109	0.00 U	68.9	63	28-97	1	0-30
95-50-1	MSD 1,2-Dichlorobenzene	109	0.00 U	70.9	65	28-99	1	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)ether	109	0.00 U	82.3	76	32-127	1	0-30
100-51-6	MSD Benzyl alcohol	109	0.00 U	79.3	73	37-116	5	0-30
95-48-7	MSD o-Cresol	109	0.00 U	76.3	70	34-109	2	0-30
65794-96-9	MSD m,p-Cresols	109	0.00 U	83.0	76	36-120	3	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	109	0.00 U	83.6	77	42-118	5	0-30
67-72-1	MSD Hexachloroethane	109	0.00 U	66.3	61	29-94	2	0-30
98-95-3	MSD Nitrobenzene	109	0.00 U	78.9	73	38-123	2	0-30
78-59-1	MSD Isophorone	109	0.00 U	74.1	68	43-120	5	0-30
88-75-5	MSD 2-Nitrophenol	109	0.00 U	82.5	76	39-115	2	0-30
105-67-9	MSD 2,4-Dimethylphenol	109	0.00 U	67.9	62	39-107	4	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	109	0.00 U	79.2	73	42-118	3	0-30
120-83-2	MSD 2,4-Dichlorophenol	109	0.00 U	81.9	75	40-111	2	0-30
65-85-0	MSD Benzoic acid	217	0.00 U	116	53	17-95	14	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151479MSD

Matrix: W

Lab Sample ID 1203989124

Instrument: MSDA.I

Analysis Date: 03/14/2018 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
106-47-8	MSD 4-Chloroaniline	109	0.00 U	98.0	90	44-138	2	0-30
87-68-3	MSD Hexachlorobutadiene	109	0.00 U	73.1	67	26-98	1	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	109	0.00 U	82.3	76	41-122	4	0-30
91-57-6	MSD 2-Methylnaphthalene	109	0.00 U	73.4	68	29-109	2	0-30
91-20-3	MSD Naphthalene	109	0.00 U	74.5	69	31-108	0	0-30
90-12-0	MSD 1-Methylnaphthalene	109	0.00 U	75.3	69	33-112	3	0-30
77-47-4	MSD Hexachlorocyclopentadiene	109	0.00 U	50.0	46	26-79	1	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	109	0.00 U	80.1	74	39-124	3	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	109	0.00 U	81.7	75	42-120	3	0-30
91-58-7	MSD 2-Chloronaphthalene	109	0.00 U	76.7	71	29-113	3	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	109	0.00 U	83.4	77	41-121	4	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	109	0.00 U	99.2	91	42-144	6	0-30
131-11-3	MSD Dimethylphthalate	109	0.00 U	84.9	78	45-128	5	0-30
606-20-2	MSD 2,6-Dinitrotoluene	109	0.00 U	78.7	72	46-124	5	0-30
121-14-2	MSD 2,4-Dinitrotoluene	109	0.00 U	78.7	72	45-125	8	0-30
208-96-8	MSD Acenaphthylene	109	0.00 U	79.3	73	35-120	4	0-30
83-32-9	MSD Acenaphthene	109	0.00 U	83.2	77	35-117	4	0-30
51-28-5	MSD 2,4-Dinitrophenol	109	0.00 U	84.6	78	27-122	3	0-30
132-64-9	MSD Dibenzofuran	109	0.00 U	81.6	75	38-113	4	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	109	0.00 U	81.2	75	40-128	7	0-30
84-66-2	MSD Diethylphthalate	109	0.00 U	83.3	77	43-127	7	0-30
100-02-7	MSD 4-Nitrophenol	109	0.00 U	43.5	40	17-85	9	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151479MSD

Matrix: W

Lab Sample ID 1203989124

Instrument: MSDA.I

Analysis Date: 03/14/2018 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
86-73-7	MSD Fluorene	109	0.00 U	79.2	73	39-117	5	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	109	0.00 U	84.6	78	39-121	5	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	109	0.00 U	79.1	73	30-133	10	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	109	0.00 U	86.5	80	32-126	5	0-30
122-39-4	MSD Diphenylamine	109	0.00 U	84.6	78	37-118	1	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	109	0.00 U	86.6	80	38-120	1	0-30
101-55-3	MSD 4-Bromophenylphenylether	109	0.00 U	86.7	80	39-121	1	0-30
118-74-1	MSD Hexachlorobenzene	109	0.00 U	84.9	78	40-118	4	0-30
87-86-5	MSD Pentachlorophenol	109	0.00 U	97.8	90	35-121	5	0-30
85-01-8	MSD Phenanthrene	109	0.00 U	80.7	74	40-115	3	0-30
120-12-7	MSD Anthracene	109	0.00 U	80.0	74	38-120	5	0-30
84-74-2	MSD Di-n-butylphthalate	109	0.00 U	89.7	83	41-128	6	0-30
206-44-0	MSD Fluoranthene	109	0.00 U	80.0	74	41-119	9	0-30
129-00-0	MSD Pyrene	109	0.00 U	82.8	76	35-128	2	0-30
85-68-7	MSD Butylbenzylphthalate	109	0.00 U	101	93	40-129	1	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	109	0.00 U	113	104	38-131	0	0-30
56-55-3	MSD Benzo(a)anthracene	109	0.00 U	80.9	74	39-120	5	0-30
218-01-9	MSD Chrysene	109	0.00 U	83.6	77	41-124	4	0-30
117-84-0	MSD Di-n-octylphthalate	109	0.00 U	107	98	37-134	6	0-30
205-99-2	MSD Benzo(b)fluoranthene	109	0.00 U	82.5	76	31-122	3	0-30
207-08-9	MSD Benzo(k)fluoranthene	109	0.00 U	85.5	79	33-123	1	0-30
50-32-8	MSD Benzo(a)pyrene	109	0.00 U	82.7	76	32-118	6	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2134

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151479MSD

Matrix: W

Lab Sample ID 1203989124

Instrument: MSDA.I

Analysis Date: 03/14/2018 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
193-39-5	MSD Indeno(1,2,3-cd)pyrene	109	0.00	U	82.8	76	27-121	12 0-30
53-70-3	MSD Dibenzo(a,h)anthracene	109	0.00	U	82.7	76	30-125	10 0-30
191-24-2	MSD Benzo(ghi)perylene	109	0.00	U	80.2	74	24-126	12 0-30
123-91-1	MSD 1,4-Dioxane	109	0.00	U	66.6	61	24-110	2 0-30
930-55-2	MSD N-Nitrosopyrrolidine	109	0.00	U	85.2	78	47-119	5 0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	109	0.00	U	79.1	73	32-101	2 0-30
1912-24-9	MSD Atrazine	109	0.00	U	89.0	82	42-129	4 0-30
92-87-5	MSD Benzidine	217	0.00	U	128	59	15-130	22 0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	109	0.00	U	76.2	70	34-124	11 0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	109	0.00	U	74.9	69	26-102	0 0-30



## Method Blank Summary

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SDG Number:	2018-2134	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1746892	Instrument ID:	MSDA.I	Data File:	031418a.s\Ac1415.D
Lab Sample ID:	1203989121	Prep Date:	03/14/2018 08:20	Analyzed:	03/14/18 15:31
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 1746892	1203989122	031418a.s\Ac1416.D	03/14/18	1558
02 CAAN-18-151479MS	1203989123	031418a.s\Ac1418.D	03/14/18	1652
03 CAAN-18-151479MSD	1203989124	031418a.s\Ac1419.D	03/14/18	1719
04 CAWA-18-151437	445726002	031418a.s\Ac1422.D	03/14/18	1841
05 CAWA-18-151440	445726003	031418a.s\Ac1423.D	03/14/18	1908
06 CAWA-18-151439	445726006	031418a.s\Ac1424.D	03/14/18	1935

# Quality Control Data

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

Page 1 of 3

**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989121  
**Client Sample:** QC for batch 1746892  
**Client ID:** MB for batch 1746892  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 15:31  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1415.D

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

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.00	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene	U	3.00	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
122-66-7	Azobenzene	U	3.00	ug/L	3.00	10.0
541-73-1	<i>1,2-Diphenylhydrazine</i> 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
106-47-8	<i>4-Chloro-3-methylphenol</i> 4-Chloroaniline	U	3.30	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether	U	3.00	ug/L	3.00	10.0
100-02-7	4-Nitrophenol	U	3.00	ug/L	3.00	10.0
83-32-9	Acenaphthene	U	0.300	ug/L	0.300	1.00
208-96-8	Acenaphthylene	U	0.300	ug/L	0.300	1.00
62-53-3	Aniline	U	4.20	ug/L	4.20	10.0
120-12-7	Anthracene	U	0.300	ug/L	0.300	1.00
1912-24-9	Atrazine	U	3.00	ug/L	3.00	10.0
92-87-5	Benzidine	U	3.90	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene	U	0.300	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene	U	0.300	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene	U	0.300	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene	U	0.300	ug/L	0.300	1.00

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

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989121  
**Client Sample:** QC for batch 1746892  
**Client ID:** MB for batch 1746892  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 15:31  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1415.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	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	0.300	ug/L	0.300	10.0
218-01-9	Chrysene	U	0.300	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate	U	0.300	ug/L	0.300	10.0
117-84-0	Di-n-octylphthalate	U	0.300	ug/L	0.300	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	0.300	ug/L	0.300	10.0
131-11-3	Dimethylphthalate	U	0.300	ug/L	0.300	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	0.300	ug/L	0.300	1.00

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

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989121  
**Client Sample:** QC for batch 1746892  
**Client ID:** MB for batch 1746892  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 15:31  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1415.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
65794-96-9	m,p-Cresols	U	3.70	ug/L	3.70	10.0
99-09-2	3-Nitroaniline	U	3.00	ug/L	3.00	10.0
95-48-7	<i>m</i> -Nitroaniline o-Cresol	U	3.00	ug/L	3.00	10.0
88-74-4	2-Nitroaniline	U	3.00	ug/L	3.00	10.0
100-01-6	<i>o</i> -Nitroaniline 4-Nitroaniline <i>p</i> -Nitroaniline	U	3.00	ug/L	3.00	10.0

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	76.3	100	ug/L 76	(32%-124%)
2-Fluorobiphenyl	36.5	50.0	ug/L 73	(32%-112%)
2-Fluorophenol	48.1	100	ug/L 48	(15%-88%)
Nitrobenzene-d5	36.9	50.0	ug/L 74	(36%-115%)
Phenol-d5	28.5	100	ug/L 28	(15%-91%)
p-Terphenyl-d14	44.5	50.0	ug/L 89	(36%-121%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000079-01-6	Trichloroethylene	2.093	4.21	ug/L	98	NJ

**Semi-Volatile  
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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989122  
**Client Sample:** QC for batch 1746892  
**Client ID:** LCS for batch 1746892  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 15:58  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1416.D

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

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		33.9	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		31.5	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		29.6	ug/L	3.00	10.0
122-66-7	Azobenzene		36.5	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		28.4	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		28.6	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		22.5	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		33.2	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		37.3	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		37.1	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		35.9	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		36.3	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		30.1	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		38.6	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		36.7	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		35.6	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		33.6	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		33.7	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		38.3	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		32.0	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		36.2	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		37.0	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		37.0	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		36.9	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		43.4	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		38.2	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		12.4	ug/L	3.00	10.0
83-32-9	Acenaphthene		37.0	ug/L	0.300	1.00
208-96-8	Acenaphthylene		35.2	ug/L	0.300	1.00
62-53-3	Aniline		34.8	ug/L	4.20	10.0
120-12-7	Anthracene		35.6	ug/L	0.300	1.00
1912-24-9	Atrazine		38.8	ug/L	3.00	10.0
92-87-5	Benzidine		74.9	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		36.0	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		37.0	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		35.8	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		36.6	ug/L	0.300	1.00

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Sample Summary**

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989122  
**Client Sample:** QC for batch 1746892  
**Client ID:** LCS for batch 1746892  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 15:58  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1416.D

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

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		37.3	ug/L	0.300	1.00
65-85-0	Benzoic acid		28.7	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		32.2	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		40.9	ug/L	0.300	10.0
218-01-9	Chrysene		37.1	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		40.7	ug/L	0.300	10.0
117-84-0	Di-n-octylphthalate		48.5	ug/L	0.300	10.0
53-70-3	Dibenzo(a,h)anthracene		37.7	ug/L	0.300	1.00
132-64-9	Dibenzofuran		36.7	ug/L	3.00	10.0
84-66-2	Diethylphthalate		38.6	ug/L	0.300	10.0
131-11-3	Dimethylphthalate		38.6	ug/L	0.300	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		35.5	ug/L	3.00	10.0
206-44-0	Fluoranthene		38.5	ug/L	0.300	1.00
86-73-7	Fluorene		35.9	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		36.9	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		28.9	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		20.4	ug/L	3.00	10.0
67-72-1	Hexachloroethane		26.6	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		38.2	ug/L	0.300	1.00
78-59-1	Isophorone		33.3	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		21.5	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		37.6	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		37.0	ug/L	3.00	10.0
91-20-3	Naphthalene		32.0	ug/L	0.300	1.00
98-95-3	Nitrobenzene		35.1	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		43.8	ug/L	3.00	10.0
85-01-8	Phenanthrene		35.4	ug/L	0.300	1.00
108-95-2	Phenol		13.6	ug/L	3.00	10.0
129-00-0	Pyrene		32.5	ug/L	0.300	1.00
110-86-1	Pyridine		23.0	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		36.0	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		35.1	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		35.9	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		46.8	ug/L	0.300	1.00

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989122  
**Client Sample:** QC for batch 1746892  
**Client ID:** LCS for batch 1746892  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 15:58  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1416.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
65794-96-9	m,p-Cresols		30.8	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		46.0	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		30.4	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		38.0	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		39.2	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	79.7	100	ug/L	80	(32%-124%)
2-Fluorobiphenyl	28.7	50.0	ug/L	57	(32%-112%)
2-Fluorophenol	43.0	100	ug/L	43	(15%-88%)
Nitrobenzene-d5	34.6	50.0	ug/L	69	(36%-115%)
Phenol-d5	26.0	100	ug/L	26	(15%-91%)
p-Terphenyl-d14	38.5	50.0	ug/L	77	(36%-121%)



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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989123  
**Client Sample:** QC for batch 1746892  
**Client ID:** CAAN-18-151479MS  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 16:52  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1418.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 mL  
**Column:** DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		80.9	ug/L	6.52	21.7
120-82-1	1,2,4-Trichlorobenzene		75.1	ug/L	6.52	21.7
95-50-1	1,2-Dichlorobenzene		70.5	ug/L	6.52	21.7
122-66-7	Azobenzene		87.3	ug/L	6.52	21.7
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		68.3	ug/L	6.52	21.7
106-46-7	1,4-Dichlorobenzene		68.3	ug/L	6.52	21.7
123-91-1	1,4-Dioxane		68.0	ug/L	6.52	21.7
90-12-0	1-Methylnaphthalene		77.8	ug/L	0.652	2.17
58-90-2	2,3,4,6-Tetrachlorophenol		87.1	ug/L	6.52	21.7
95-95-4	2,4,5-Trichlorophenol		84.3	ug/L	6.52	21.7
88-06-2	2,4,6-Trichlorophenol		82.9	ug/L	6.52	21.7
120-83-2	2,4-Dichlorophenol		83.8	ug/L	6.52	21.7
105-67-9	2,4-Dimethylphenol		70.5	ug/L	6.52	21.7
51-28-5	2,4-Dinitrophenol		87.2	ug/L	10.9	43.5
121-14-2	2,4-Dinitrotoluene		85.4	ug/L	6.52	21.7
606-20-2	2,6-Dinitrotoluene		82.6	ug/L	6.52	21.7
91-58-7	2-Chloronaphthalene		79.1	ug/L	0.891	2.17
95-57-8	2-Chlorophenol		78.5	ug/L	6.52	21.7
534-52-1	2-Methyl-4,6-dinitrophenol		90.7	ug/L	6.52	21.7
91-57-6	2-Methylnaphthalene		74.8	ug/L	0.652	2.17
88-75-5	2-Nitrophenol		84.2	ug/L	6.52	21.7
91-94-1	3,3'-Dichlorobenzidine		85.0	ug/L	6.52	21.7
101-55-3	4-Bromophenylphenylether		87.9	ug/L	6.52	21.7
59-50-7	Parachlorometa cresol		85.9	ug/L	6.52	21.7
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		101	ug/L	7.17	21.7
7005-72-3	4-Chlorophenylphenylether		89.1	ug/L	6.52	21.7
100-02-7	4-Nitrophenol		47.7	ug/L	6.52	21.7
83-32-9	Acenaphthene		86.4	ug/L	0.652	2.17
208-96-8	Acenaphthylene		82.2	ug/L	0.652	2.17
62-53-3	Aniline		84.0	ug/L	9.13	21.7
120-12-7	Anthracene		83.7	ug/L	0.652	2.17
1912-24-9	Atrazine		93.0	ug/L	6.52	21.7
92-87-5	Benzidine		159	ug/L	8.48	21.7
56-55-3	Benzo(a)anthracene		85.4	ug/L	0.652	2.17
50-32-8	Benzo(a)pyrene		87.5	ug/L	0.652	2.17
205-99-2	Benzo(b)fluoranthene		84.6	ug/L	0.652	2.17
191-24-2	Benzo(ghi)perylene		90.1	ug/L	0.652	2.17

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989123  
**Client Sample:** QC for batch 1746892  
**Client ID:** CAAN-18-151479MS  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 16:52  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1418.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 mL  
**Column:** DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		86.5	ug/L	0.652	2.17
65-85-0	Benzoic acid		101	ug/L	13.0	43.5
100-51-6	Benzyl alcohol		83.1	ug/L	6.52	21.7
85-68-7	Butylbenzylphthalate		100	ug/L	0.652	21.7
218-01-9	Chrysene		87.2	ug/L	0.652	2.17
84-74-2	Di-n-butylphthalate		95.4	ug/L	0.652	21.7
117-84-0	Di-n-octylphthalate		114	ug/L	0.652	21.7
53-70-3	Dibenzo(a,h)anthracene		91.6	ug/L	0.652	2.17
132-64-9	Dibenzofuran		85.2	ug/L	6.52	21.7
84-66-2	Diethylphthalate		89.5	ug/L	0.652	21.7
131-11-3	Dimethylphthalate		89.4	ug/L	0.652	21.7
88-85-7	Dinoseb	U	6.52	ug/L	6.52	21.7
122-39-4	Diphenylamine		85.7	ug/L	6.52	21.7
206-44-0	Fluoranthene		87.7	ug/L	0.652	2.17
86-73-7	Fluorene		83.6	ug/L	0.652	2.17
118-74-1	Hexachlorobenzene		88.0	ug/L	6.52	21.7
87-68-3	Hexachlorobutadiene		72.6	ug/L	6.52	21.7
77-47-4	Hexachlorocyclopentadiene		49.5	ug/L	6.52	21.7
67-72-1	Hexachloroethane		65.0	ug/L	6.52	21.7
193-39-5	Indeno(1,2,3-cd)pyrene		93.4	ug/L	0.652	2.17
78-59-1	Isophorone		77.5	ug/L	7.61	21.7
62-75-9	N-Methyl-N-nitrosomethylamine		64.6	ug/L	6.52	21.7
924-16-3	N-Nitrosodi-n-butylamine	U	6.52	ug/L	6.52	21.7
55-18-5	N-Nitrosodiethylamine	U	6.52	ug/L	6.52	21.7
621-64-7	N-Nitrosodi-n-propylamine		87.5	ug/L	6.52	21.7
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		89.1	ug/L	6.52	21.7
91-20-3	Naphthalene		74.9	ug/L	0.652	2.17
98-95-3	Nitrobenzene		80.7	ug/L	6.52	21.7
608-93-5	Pentachlorobenzene	U	6.52	ug/L	6.52	21.7
87-86-5	Pentachlorophenol		102	ug/L	6.52	21.7
85-01-8	Phenanthrene		83.5	ug/L	0.652	2.17
108-95-2	Phenol		52.8	ug/L	6.52	21.7
129-00-0	Pyrene		81.1	ug/L	0.652	2.17
110-86-1	Pyridine		70.3	ug/L	6.52	21.7
108-60-1	bis(2-Chloro-1-methylethyl)ether		83.2	ug/L	6.52	21.7
111-91-1	bis(2-Chloroethoxy)methane		81.5	ug/L	6.52	21.7
111-44-4	bis(2-Chloroethyl) ether		82.2	ug/L	6.52	21.7
117-81-7	bis(2-Ethylhexyl)phthalate		114	ug/L	0.652	2.17

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989123  
**Client Sample:** QC for batch 1746892  
**Client ID:** CAAN-18-151479MS  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 16:52  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1418.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 mL  
**Column:** DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		85.1	ug/L	8.04	21.7
99-09-2	3-Nitroaniline		106	ug/L	6.52	21.7
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		77.8	ug/L	6.52	21.7
88-74-4	2-Nitroaniline		86.8	ug/L	6.52	21.7
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		87.7	ug/L	6.52	21.7
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	184	217	ug/L	85	(32%-124%)
2-Fluorobiphenyl	79.9	109	ug/L	74	(32%-112%)
2-Fluorophenol	137	217	ug/L	63	(15%-88%)
Nitrobenzene-d5	82.7	109	ug/L	76	(36%-115%)
Phenol-d5	103	217	ug/L	47	(15%-91%)
p-Terphenyl-d14	95.1	109	ug/L	88	(36%-121%)

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989124  
**Client Sample:** QC for batch 1746892  
**Client ID:** CAAN-18-151479MSD  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 17:19  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1419.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 mL  
**Column:** DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		79.1	ug/L	6.52	21.7
120-82-1	1,2,4-Trichlorobenzene		74.9	ug/L	6.52	21.7
95-50-1	1,2-Dichlorobenzene		70.9	ug/L	6.52	21.7
122-66-7	Azobenzene		86.6	ug/L	6.52	21.7
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		68.5	ug/L	6.52	21.7
106-46-7	1,4-Dichlorobenzene		68.9	ug/L	6.52	21.7
123-91-1	1,4-Dioxane		66.6	ug/L	6.52	21.7
90-12-0	1-Methylnaphthalene		75.3	ug/L	0.652	2.17
58-90-2	2,3,4,6-Tetrachlorophenol		81.2	ug/L	6.52	21.7
95-95-4	2,4,5-Trichlorophenol		81.7	ug/L	6.52	21.7
88-06-2	2,4,6-Trichlorophenol		80.1	ug/L	6.52	21.7
120-83-2	2,4-Dichlorophenol		81.9	ug/L	6.52	21.7
105-67-9	2,4-Dimethylphenol		67.9	ug/L	6.52	21.7
51-28-5	2,4-Dinitrophenol		84.6	ug/L	10.9	43.5
121-14-2	2,4-Dinitrotoluene		78.7	ug/L	6.52	21.7
606-20-2	2,6-Dinitrotoluene		78.7	ug/L	6.52	21.7
91-58-7	2-Chloronaphthalene		76.7	ug/L	0.891	2.17
95-57-8	2-Chlorophenol		77.9	ug/L	6.52	21.7
534-52-1	2-Methyl-4,6-dinitrophenol		86.5	ug/L	6.52	21.7
91-57-6	2-Methylnaphthalene		73.4	ug/L	0.652	2.17
88-75-5	2-Nitrophenol		82.5	ug/L	6.52	21.7
91-94-1	3,3'-Dichlorobenzidine		76.2	ug/L	6.52	21.7
101-55-3	4-Bromophenylphenylether		86.7	ug/L	6.52	21.7
59-50-7	Parachlorometa cresol		82.3	ug/L	6.52	21.7
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		98.0	ug/L	7.17	21.7
7005-72-3	4-Chlorophenylphenylether		84.6	ug/L	6.52	21.7
100-02-7	4-Nitrophenol		43.5	ug/L	6.52	21.7
83-32-9	Acenaphthene		83.2	ug/L	0.652	2.17
208-96-8	Acenaphthylene		79.3	ug/L	0.652	2.17
62-53-3	Aniline		83.4	ug/L	9.13	21.7
120-12-7	Anthracene		80.0	ug/L	0.652	2.17
1912-24-9	Atrazine		89.0	ug/L	6.52	21.7
92-87-5	Benzidine		128	ug/L	8.48	21.7
56-55-3	Benzo(a)anthracene		80.9	ug/L	0.652	2.17
50-32-8	Benzo(a)pyrene		82.7	ug/L	0.652	2.17
205-99-2	Benzo(b)fluoranthene		82.5	ug/L	0.652	2.17
191-24-2	Benzo(ghi)perylene		80.2	ug/L	0.652	2.17

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**SDG Number:** 2018-2134  
**Lab Sample ID:** 1203989124  
**Client Sample:** QC for batch 1746892  
**Client ID:** CAAN-18-151479MSD  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 17:19  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1419.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 mL  
**Column:** DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		85.5	ug/L	0.652	2.17
65-85-0	Benzoic acid		116	ug/L	13.0	43.5
100-51-6	Benzyl alcohol		79.3	ug/L	6.52	21.7
85-68-7	Butylbenzylphthalate		101	ug/L	0.652	21.7
218-01-9	Chrysene		83.6	ug/L	0.652	2.17
84-74-2	Di-n-butylphthalate		89.7	ug/L	0.652	21.7
117-84-0	Di-n-octylphthalate		107	ug/L	0.652	21.7
53-70-3	Dibenzo(a,h)anthracene		82.7	ug/L	0.652	2.17
132-64-9	Dibenzofuran		81.6	ug/L	6.52	21.7
84-66-2	Diethylphthalate		83.3	ug/L	0.652	21.7
131-11-3	Dimethylphthalate		84.9	ug/L	0.652	21.7
88-85-7	Dinoseb	U	6.52	ug/L	6.52	21.7
122-39-4	Diphenylamine		84.6	ug/L	6.52	21.7
206-44-0	Fluoranthene		80.0	ug/L	0.652	2.17
86-73-7	Fluorene		79.2	ug/L	0.652	2.17
118-74-1	Hexachlorobenzene		84.9	ug/L	6.52	21.7
87-68-3	Hexachlorobutadiene		73.1	ug/L	6.52	21.7
77-47-4	Hexachlorocyclopentadiene		50.0	ug/L	6.52	21.7
67-72-1	Hexachloroethane		66.3	ug/L	6.52	21.7
193-39-5	Indeno(1,2,3-cd)pyrene		82.8	ug/L	0.652	2.17
78-59-1	Isophorone		74.1	ug/L	7.61	21.7
62-75-9	N-Methyl-N-nitrosomethylamine		64.2	ug/L	6.52	21.7
924-16-3	N-Nitrosodi-n-butylamine	U	6.52	ug/L	6.52	21.7
55-18-5	N-Nitrosodiethylamine	U	6.52	ug/L	6.52	21.7
621-64-7	N-Nitrosodi-n-propylamine		83.6	ug/L	6.52	21.7
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		85.2	ug/L	6.52	21.7
91-20-3	Naphthalene		74.5	ug/L	0.652	2.17
98-95-3	Nitrobenzene		78.9	ug/L	6.52	21.7
608-93-5	Pentachlorobenzene	U	6.52	ug/L	6.52	21.7
87-86-5	Pentachlorophenol		97.8	ug/L	6.52	21.7
85-01-8	Phenanthrene		80.7	ug/L	0.652	2.17
108-95-2	Phenol		51.8	ug/L	6.52	21.7
129-00-0	Pyrene		82.8	ug/L	0.652	2.17
110-86-1	Pyridine		66.0	ug/L	6.52	21.7
108-60-1	bis(2-Chloro-1-methylethyl)ether		82.3	ug/L	6.52	21.7
111-91-1	bis(2-Chloroethoxy)methane		79.2	ug/L	6.52	21.7
111-44-4	bis(2-Chloroethyl) ether		80.6	ug/L	6.52	21.7
117-81-7	bis(2-Ethylhexyl)phthalate		113	ug/L	0.652	2.17

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

Page 3 of 3

<b>SDG Number:</b> 2018-2134	<b>Date Collected:</b> 03/07/2018 08:38	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203989124	<b>Date Received:</b> 03/09/2018 08:55	
<b>Client Sample:</b> QC for batch 1746892	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAAN-18-151479MSD	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1746893	<b>Inst:</b> MSDA.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/14/2018 17:19	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 03/14/2018 08:20	<b>Aliquot:</b> 460 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> 031418a.s\Ac1419.D	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		83.0	ug/L	8.04	21.7
99-09-2	3-Nitroaniline		99.2	ug/L	6.52	21.7
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		76.3	ug/L	6.52	21.7
88-74-4	2-Nitroaniline		83.4	ug/L	6.52	21.7
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		79.1	ug/L	6.52	21.7
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	168	217	ug/L	77	(32%-124%)
2-Fluorobiphenyl	77.5	109	ug/L	71	(32%-112%)
2-Fluorophenol	136	217	ug/L	62	(15%-88%)
Nitrobenzene-d5	82.1	109	ug/L	76	(36%-115%)
Phenol-d5	101	217	ug/L	46	(15%-91%)
p-Terphenyl-d14	96.5	109	ug/L	89	(36%-121%)

# **Perchlorates by LCMSMS Analysis**

# Case Narrative



**Perchlorates by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-2134  
Work Order #: 445726**

**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: 1746747

Prep Batch Number: 1746744

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
445726001	445726001 (CAWA-18-151436)
445726005	445726005 (CAWA-18-151438)
1203989263	Interference Check Sample (ICS)
1203988797	Method Blank (MB)
1203988798	Laboratory Control Sample (LCS)
1203988799	445469001(CTUA-17-151330) Matrix Spike (MS)
1203988800	445469001(CTUA-17-151330) 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 445469001 (NonSDG) was chosen for matrix spike and matrix spike duplicate analysis.

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

The MS recoveries were within the established acceptance limits.

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

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

### **Internal Standard Area Acceptance**

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

### **Retention Time**

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

## **Technical Information**

### **Holding Time Specifications**

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

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

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

All procedures were performed as stated in the SOP.

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

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

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

#### **Miscellaneous Information**

##### **Manual Integrations**

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

##### **Method Comments**

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

##### **Additional Comments**

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

##### **Perchlorate Isotope Ratio**

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

#### **System Configuration**

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

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

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

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

### **Chromatographic Columns**

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

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

Dionex: IonPac AG-16 2 x 50 mm.

### **Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2018-2134 GEL Work Order: 445726

#### 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: 16 MAR 2018

Title: Group Leader

# **Sample Data Summary**

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-18-151436Date Received: 13-MAR-18GEL Job No (SDG): 2018-2134GEL Sample ID: 445726001Date Filtered: 14-MAR-18Injection 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	0.214	ug/L		1	14-MAR-18 18:42	per0314026a
	Perchlorate Isotope Ratio			3.1			1	14-MAR-18 18:42	per0314026a
14797-73-0	Perchlorate-101	.05	.2	0.214	ug/L		1	14-MAR-18 18:42	per0314026a
	Perchlorate-O(18)			0.415	ug/L		1	14-MAR-18 18:42	per0314026a

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-18-151438Date Received: 13-MAR-18GEL Job No (SDG): 2018-2134GEL Sample ID: 445726005Date Filtered: 14-MAR-18Injection 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	0.117	ug/L	J	1	14-MAR-18 18:53	per0314027a
	Perchlorate Isotope Ratio			2.76			1	14-MAR-18 18:53	per0314027a
14797-73-0	Perchlorate-101	.05	.2	0.131	ug/L	J	1	14-MAR-18 18:53	per0314027a
	Perchlorate-O(18)			0.410	ug/L		1	14-MAR-18 18:53	per0314027a

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

\*Concentration =

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



# **Quality Control Summary**

**Perchlorate Laboratory Control Sample**

**Lab Name:** General Engineering Laboratories

**Lab Code:** GEL

**GEL Job No. (SDG):** 2018-2134

**Extract Batch Code:** 1746744

**Date Filtered:** 14-MAR-18

**Matrix:** WATER

**Sample ID:** 1203988798

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.203	ug/L	102		85 - 115
Perchlorate Isotope Ratio		3.11				-
Perchlorate-101	0.200	.203	ug/L	101		85 - 115
Perchlorate-O(18)		.482	ug/L			-

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

### Perchlorate Spike/Spike Duplicate Summary

**Lab Name:** General Engineering Laboratories

**Lab Code:** GEL

**GEL Job No (SDG):** 2018-2134

**Extract Batch Code:** 1746744

**Date Extracted:** 14-MAR-18

**GEL MS/PS ID:** 1203988799

**Client ID:** CTUA-17-151330

**GEL MSD/PSD ID:** 1203988800

**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	0.576	ug/L	0.754	89	.726	75	4	30	75 - 125
Perchlorate Isotope Ratio	0	3.15		3.05		2.93		4		-
Perchlorate-101	0.200	0.568	ug/L	0.768	100	.77	101	0	30	75 - 125
Perchlorate-O(18)	0	0.473	ug/L	0.476		.484		2		-

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

# Quality Control Data

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 14-MAR-18GEL Job No (SDG): 2018-2134GEL Sample ID: 1203988797Date Filtered: 14-MAR-18Injection 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	14-MAR-18 16:19	per0314013a
	Perchlorate Isotope Ratio						1	14-MAR-18 16:19	per0314013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	14-MAR-18 16:19	per0314013a
	Perchlorate-O(18)			0.473	ug/L		1	14-MAR-18 16:19	per0314013a

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 14-MAR-18GEL Job No (SDG): 2018-2134GEL Sample ID: 1203988798Date Filtered: 14-MAR-18Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.203	ug/L		1	14-MAR-18 16:30	per0314014a
	Perchlorate Isotope Ratio			3.11			1	14-MAR-18 16:30	per0314014a
14797-73-0	Perchlorate-101	.05	.2	0.203	ug/L		1	14-MAR-18 16:30	per0314014a
	Perchlorate-O(18)			0.482	ug/L		1	14-MAR-18 16:30	per0314014a

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-2134GEL Sample ID: 1203989263Date Filtered: 14-MAR-18Injection 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	0.222	ug/L		1	14-MAR-18 16:41	per0314015a
	Perchlorate Isotope Ratio			3.05			1	14-MAR-18 16:41	per0314015a
14797-73-0	Perchlorate-101	.05	.2	0.227	ug/L		1	14-MAR-18 16:41	per0314015a
	Perchlorate-O(18)			0.467	ug/L		1	14-MAR-18 16:41	per0314015a

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CTUA-17-151330MSDate Received: 08-MAR-18GEL Job No (SDG): 2018-2134GEL Sample ID: 1203988799Date Filtered: 14-MAR-18Injection 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	0.754	ug/L		1	14-MAR-18 17:03	per0314017a
	Perchlorate Isotope Ratio			3.05			1	14-MAR-18 17:03	per0314017a
14797-73-0	Perchlorate-101	.05	.2	0.768	ug/L		1	14-MAR-18 17:03	per0314017a
	Perchlorate-O(18)			0.476	ug/L		1	14-MAR-18 17:03	per0314017a

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CTUA-17-151330MSDDate Received: 08-MAR-18GEL Job No (SDG): 2018-2134GEL Sample ID: 1203988800Date Filtered: 14-MAR-18Injection 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	0.726	ug/L		1	14-MAR-18 17:14	per0314018a
	Perchlorate Isotope Ratio			2.93			1	14-MAR-18 17:14	per0314018a
14797-73-0	Perchlorate-101	.05	.2	0.770	ug/L		1	14-MAR-18 17:14	per0314018a
	Perchlorate-O(18)			0.484	ug/L		1	14-MAR-18 17:14	per0314018a

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

\*Concentration =

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

# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2018-2134**  
**Work Order #: 445726**

**Product:** Determination of Metals by ICP

**Analytical Method:** SW846 3005A/6010C

**Analytical Procedure:** GL-MA-E-013 REV# 30

**Analytical Batch:** 1746663

**Product:** Determination of Metals by ICP-MS

**Analytical Method:** SW846 3005A/6020A

**Analytical Procedure:** GL-MA-E-014 REV# 32

**Analytical Batch:** 1746678

**Product:** Inorganic Calculations

**Analytical Method:** SM:A2340B

**Analytical Procedure:** GL-GC-E-107 REV# 10

**Analytical Batch:** 1753085

**Product:** Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

**Analytical Method:** EPA 245.2 1974

**Analytical Procedure:** GL-MA-E-010 REV# 36

**Analytical Batch:** 1746986

**Preparation Method:** SW846 3005A

**Preparation Procedure:** GL-MA-E-006 REV# 14

**Preparation Batches:** 1746662 and 1746677

**Preparation Method:** EPA 245.1/245.2 Prep

**Preparation Procedure:** GL-MA-E-010 REV# 36

**Preparation Batch:** 1746985

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726001	CAWA-18-151436
445726002	CAWA-18-151437
445726005	CAWA-18-151438
445726006	CAWA-18-151439
1203988590	Method Blank (MB) <b>ICP</b>
1203988591	Laboratory Control Sample (LCS)
1203988594	445726001(CAWA-18-151436L) Serial Dilution (SD)
1203988592	445726001(CAWA-18-151436D) Sample Duplicate (DUP)
1203988593	445726001(CAWA-18-151436S) Matrix Spike (MS)
1203996945	445726001(CAWA-18-151436PS) Post Spike (PS)
1203988624	Method Blank (MB) <b>ICP-MS</b>
1203988625	Laboratory Control Sample (LCS)
1203988628	445726001(CAWA-18-151436L) Serial Dilution (SD)
1203988626	445726001(CAWA-18-151436D) Sample Duplicate (DUP)
1203988627	445726001(CAWA-18-151436S) Matrix Spike (MS)

1203989322	Method Blank (MB)CVAA
1203989323	Laboratory Control Sample (LCS)
1203989326	445726001(CAWA-18-151436L) Serial Dilution (SD)
1203989324	445726001(CAWA-18-151436D) Sample Duplicate (DUP)
1203989325	445726001(CAWA-18-151436S) Matrix Spike (MS)

Samples 445726001,002,005 and 006 in this SDG were analyzed for metals and mercury on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Calibration Information**

##### **CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 445726001 (CAWA-18-151436) and 445726005 (CAWA-18-151438)-ICP.

##### **ICSA/ICSAB Statement**

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

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

##### **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 MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203988593 (CAWA-18-151436MS)	Sodium	71* (75%-125%)

#### **Miscellaneous Information**

##### **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.

Hardness = 2.497 (Ca) + 4.118 (Mg)

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

#### **Certification Statement**

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

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

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

Client SDG: 2018-2134 GEL Work Order: 445726

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

- \* A quality control analyte recovery is outside of specified acceptance criteria
- J Value is estimated
- N Metals--The Matrix spike sample recovery is not within specified control limits
- 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: 06 APR 2018

Title: Data Validator

# Sample Data Summary



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

**SDG No:** 2018-2134**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445726001**BASIS:** As Received**DATE COLLECTED** 09-MAR-18**CLIENT ID:** CAWA-18-151436**LEVEL:** Low**DATE RECEIVED** 13-MAR-18**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	03/15/18 11:10	031518W4-5	1746986

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

SDG No: 2018-2134

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 445726001

BASIS: As Received

DATE COLLECTED 09-MAR-18

CLIENT ID: CAWA-18-151436

LEVEL: Low

DATE RECEIVED 13-MAR-18

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		JWJ	03/23/18 22:15	032318-1	1746663
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	03/21/18 20:53	180321-3	1746678
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 20:53	180321-3	1746678
7440-39-3	Barium	27.8	ug/L		1	5	5	1		JWJ	03/23/18 22:15	032318-1	1746663
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1		JWJ	03/23/18 22:15	032318-1	1746663
7440-42-8	Boron	15	ug/L	U	15	50	50	1		JWJ	03/23/18 22:15	032318-1	1746663
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 20:53	180321-3	1746678
7440-70-2	Calcium	10000	ug/L		50	200	200	1		JWJ	03/23/18 22:15	032318-1	1746663
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	03/21/18 20:53	180321-3	1746678
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1		JWJ	03/23/18 22:15	032318-1	1746663
7440-50-8	Copper	3	ug/L	U	3	10	10	1		JWJ	03/23/18 22:15	032318-1	1746663
7439-89-6	Iron	30	ug/L	U	30	100	100	1		JWJ	03/23/18 22:15	032318-1	1746663
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	03/21/18 20:53	180321-3	1746678
7439-95-4	Magnesium	3430	ug/L		110	300	300	1		JWJ	03/23/18 22:15	032318-1	1746663
7439-96-5	Manganese	2	ug/L	U	2	10	10	1		JWJ	03/23/18 22:15	032318-1	1746663
7439-98-7	Molybdenum	1.02	ug/L		0.2	0.5	0.5	1	MS	BAJ	03/21/18 20:53	180321-3	1746678
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/21/18 20:53	180321-3	1746678
7440-09-7	Potassium	1460	ug/L		50	150	150	1		JWJ	03/23/18 22:15	032318-1	1746663
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 20:53	180321-3	1746678
7631-86-9	Silica	67300	ug/L		53	213	213	1		JWJ	03/23/18 22:15	032318-1	1746663
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 20:53	180321-3	1746678
7440-23-5	Sodium	10100	ug/L	N	100	300	300	1		JWJ	03/23/18 22:15	032318-1	1746663
7440-24-6	Strontium	48.2	ug/L		1	5	5	1		JWJ	03/23/18 22:15	032318-1	1746663
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/21/18 20:53	180321-3	1746678
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1		JWJ	03/23/18 22:15	032318-1	1746663
7440-61-1	Uranium	0.514	ug/L		0.067	0.2	0.2	1	MS	BAJ	03/22/18 03:16	180321-4	1746678
7440-62-2	Vanadium	5.55	ug/L		1	5	5	1		JWJ	03/23/18 22:15	032318-1	1746663
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1		JWJ	03/23/18 22:15	032318-1	1746663

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

**SDG No:** 2018-2134**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 445726001**BASIS:** As Received**DATE COLLECTED** 09-MAR-18**CLIENT ID:** CAWA-18-151436**LEVEL:** Low**DATE RECEIVED** 13-MAR-18**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	39.2	mg/L		0.453	1.24	1.24	1		TXT1	04/04/18 13:54		1753085

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1746663	1746662	SW846 3005A	50	mL	50	mL	03/13/18	JXM8
1746678	1746677	SW846 3005A	50	mL	50	mL	03/13/18	JXM8
1746986	1746985	EPA 245.1/245.2 Prep	20	mL	20	mL	03/14/18	AXS5

**\*Analytical Methods:**

**MS** SW846 3005A/6020A  
**AV** EPA 245.2 1974

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

**SDG No:** 2018-2134**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445726002**BASIS:** As Received**DATE COLLECTED** 09-MAR-18**CLIENT ID:** CAWA-18-151437**LEVEL:** Low**DATE RECEIVED** 13-MAR-18**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	03/15/18 11:18	031518W4-5	1746986

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1746986	1746985	EPA 245.1/245.2 Prep	20	mL	20	mL	03/14/18	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974

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

**SDG No:** 2018-2134**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445726005**BASIS:** As Received**DATE COLLECTED** 09-MAR-18**CLIENT ID:** CAWA-18-151438**LEVEL:** Low**DATE RECEIVED** 13-MAR-18**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	03/15/18 11:20	031518W4-5	1746986

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

SDG No: 2018-2134

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 445726005

BASIS: As Received

DATE COLLECTED 09-MAR-18

CLIENT ID: CAWA-18-151438

LEVEL: Low

DATE RECEIVED 13-MAR-18

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		JWJ	03/23/18 22:28	032318-1	1746663
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	03/21/18 21:10	180321-3	1746678
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 21:10	180321-3	1746678
7440-39-3	Barium	9.52	ug/L		1	5	5	1		JWJ	03/23/18 22:28	032318-1	1746663
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1		JWJ	03/23/18 22:28	032318-1	1746663
7440-42-8	Boron	15	ug/L	U	15	50	50	1		JWJ	03/23/18 22:28	032318-1	1746663
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 21:10	180321-3	1746678
7440-70-2	Calcium	8080	ug/L		50	200	200	1		JWJ	03/23/18 22:28	032318-1	1746663
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	03/21/18 21:10	180321-3	1746678
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1		JWJ	03/23/18 22:28	032318-1	1746663
7440-50-8	Copper	3	ug/L	U	3	10	10	1		JWJ	03/23/18 22:28	032318-1	1746663
7439-89-6	Iron	30	ug/L	U	30	100	100	1		JWJ	03/23/18 22:28	032318-1	1746663
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	03/21/18 21:10	180321-3	1746678
7439-95-4	Magnesium	2640	ug/L		110	300	300	1		JWJ	03/23/18 22:28	032318-1	1746663
7439-96-5	Manganese	2	ug/L	U	2	10	10	1		JWJ	03/23/18 22:28	032318-1	1746663
7439-98-7	Molybdenum	1.52	ug/L		0.2	0.5	0.5	1	MS	BAJ	03/21/18 21:10	180321-3	1746678
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/21/18 21:10	180321-3	1746678
7440-09-7	Potassium	950	ug/L		50	150	150	1		JWJ	03/23/18 22:28	032318-1	1746663
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 21:10	180321-3	1746678
7631-86-9	Silica	68700	ug/L		53	213	213	1		JWJ	03/23/18 22:28	032318-1	1746663
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 21:10	180321-3	1746678
7440-23-5	Sodium	9780	ug/L	N	100	300	300	1		JWJ	03/23/18 22:28	032318-1	1746663
7440-24-6	Strontium	44.9	ug/L		1	5	5	1		JWJ	03/23/18 22:28	032318-1	1746663
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/21/18 21:10	180321-3	1746678
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1		JWJ	03/23/18 22:28	032318-1	1746663
7440-61-1	Uranium	0.248	ug/L		0.067	0.2	0.2	1	MS	BAJ	03/22/18 03:33	180321-4	1746678
7440-62-2	Vanadium	1.5	ug/L	J	1	5	5	1		JWJ	03/23/18 22:28	032318-1	1746663
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1		JWJ	03/23/18 22:28	032318-1	1746663

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

**SDG No:** 2018-2134**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 445726005**BASIS:** As Received**DATE COLLECTED** 09-MAR-18**CLIENT ID:** CAWA-18-151438**LEVEL:** Low**DATE RECEIVED** 13-MAR-18**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	31.1	mg/L		0.453	1.24	1.24	1		TXT1	04/04/18 13:54		1753085

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1746663	1746662	SW846 3005A	50	mL	50	mL	03/13/18	JXM8
1746678	1746677	SW846 3005A	50	mL	50	mL	03/13/18	JXM8
1746986	1746985	EPA 245.1/245.2 Prep	20	mL	20	mL	03/14/18	AXS5

**\*Analytical Methods:**

**MS**      **SW846 3005A/6020A**  
**AV**      **EPA 245.2 1974**

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

**SDG No:** 2018-2134**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445726006**BASIS:** As Received**DATE COLLECTED** 09-MAR-18**CLIENT ID:** CAWA-18-151439**LEVEL:** Low**DATE RECEIVED** 13-MAR-18**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	03/15/18 11:22	031518W4-5	1746986

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1746986	1746985	EPA 245.1/245.2 Prep	20	mL	20	mL	03/14/18	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974



# **Quality Control Summary**

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

SDG NO. 2018-2134

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>
1203988590	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	102	ug/L	+/-150	J	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203988624	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
1203989322	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

## \*Analytical Methods:

P SW846 3005A/6010C  
MS SW846 3005A/6020A  
AV EPA 245.1/245.2

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2018-2134 Client ID: CAWA-18-151436S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 445726001 Spike ID: 1203988593

<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>
Zinc	ug/L	75-125	445		3.3	U	500	88.9		P
Aluminum	ug/L	75-125	4680		68	U	5000	93.5		P
Barium	ug/L	75-125	481		27.8		500	90.7		P
Beryllium	ug/L	75-125	479		1	U	500	95.8		P
Boron	ug/L	75-125	484		15	U	500	94.3		P
Calcium	ug/L	75-125	14800		10000		5000	96		P
Cobalt	ug/L	75-125	491		1	U	500	98.1		P
Copper	ug/L	75-125	462		3	U	500	92.4		P
Iron	ug/L	75-125	4880		30	U	5000	97.6		P
Magnesium	ug/L	75-125	7740		3430		5000	86.1		P
Manganese	ug/L	75-125	449		2	U	500	89.8		P
Potassium	ug/L	75-125	6000		1460		5000	90.9		P
Silica	ug/L		75600		67300		10700	77.5	N/A	P
Sodium	ug/L	75-125	13700		10100		5000	71	N	P
Strontium	ug/L	75-125	504		48.2		500	91.2		P
Tin	ug/L	75-125	482		2.5	U	500	96.4		P
Vanadium	ug/L	75-125	467		5.55		500	92.2		P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2018-2134 Client ID: CAWA-18-151436S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 445726001 Spike ID: 1203988627

<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	46.9		1	U	50	93.6		MS
Arsenic	ug/L	75-125	48.8		2	U	50	95.1		MS
Cadmium	ug/L	75-125	47.7		0.3	U	50	95.4		MS
Chromium	ug/L	75-125	49.1		3	U	50	94		MS
Lead	ug/L	75-125	46.9		0.5	U	50	93.7		MS
Molybdenum	ug/L	75-125	49.6		1.02		50	97.2		MS
Nickel	ug/L	75-125	47.6		0.6	U	50	94.9		MS
Selenium	ug/L	75-125	50.3		2	U	50	99.8		MS
Silver	ug/L	75-125	48.7		0.3	U	50	97.4		MS
Thallium	ug/L	75-125	44.9		0.6	U	50	89.8		MS
Uranium	ug/L	75-125	46.1		0.514		50	91.2		MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2018-2134 Client ID CAWA-18-151436S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 445726001 Spike ID: 1203989325

<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	2.04		0.067	U	2	102		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-5a-

## Spike Summary

**SDG NO.** 2018-2134 **Client ID:** CAWA-18-151436PS**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 445726001 **Spike ID:** 1203996945

<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>
Sodium	ug/L	80-120	14100		10100		5000	80.5		P

## \*Analytical Methods:

P SW846 3005A/6010C

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

SDG No.: 2018-2134

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-18-151436D

Matrix: WATER

Level: Low

Sample ID: 445726001

Duplicate ID: 1203988592

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-20%	27.8		28.2		1.33		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	10000		10200		2.14		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	3430		3450		.369		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1460		1460		.261		P
Silica	ug/L	+/-20%	67300		68300		1.42		P
Sodium	ug/L	+/-20%	10100		10300		2.15		P
Strontium	ug/L	+/-20%	48.2		49.2		2.08		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	5.55		5.68		2.34		P
Zinc	ug/L		3.3 U		3.3 U				P

\*Analytical Methods:

P SW846 3005A/6010C

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

SDG No.: 2018-2134

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-18-151436D

Matrix: WATER

Level: Low

Sample ID: 445726001

Duplicate ID: 1203988626

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	1.02		0.939		8.56		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	0.514		0.482		6.43		MS

\*Analytical Methods:

MS SW846 3005A/6020A



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

**SDG No.:** 2018–2134**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAWA–18–151436D**Matrix:** WATER**Level:** Low**Sample ID:** 445726001**Duplicate ID:** 1203989324**Percent Solids for Dup:** N/A

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

\*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-2134

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>
1203988591								
	Aluminum	ug/L	5000	4860		97.3	80-120	P
	Barium	ug/L	500	468		93.6	80-120	P
	Beryllium	ug/L	500	481		96.3	80-120	P
	Boron	ug/L	500	480		96	80-120	P
	Calcium	ug/L	5000	4800		96	80-120	P
	Cobalt	ug/L	500	506		101	80-120	P
	Copper	ug/L	500	462		92.3	80-120	P
	Iron	ug/L	5000	5010		100	80-120	P
	Magnesium	ug/L	5000	5030		101	80-120	P
	Manganese	ug/L	500	454		90.7	80-120	P
	Potassium	ug/L	5000	4890		97.7	80-120	P
	Silica	ug/L	10700	9950		92.9	80-120	P
	Sodium	ug/L	5000	4950		98.9	80-120	P
	Strontium	ug/L	500	493		98.7	80-120	P
	Tin	ug/L	500	479		95.8	80-120	P
	Vanadium	ug/L	500	467		93.5	80-120	P
	Zinc	ug/L	500	449		89.7	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-2134

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>
1203988625								
	Antimony	ug/L	50	48.1		96.3	80-120	MS
	Arsenic	ug/L	50	49.9		99.8	80-120	MS
	Cadmium	ug/L	50	51.2		102	80-120	MS
	Chromium	ug/L	50	47.7		95.5	80-120	MS
	Lead	ug/L	50	49.2		98.4	80-120	MS
	Molybdenum	ug/L	50	50.8		102	80-120	MS
	Nickel	ug/L	50	50		100	80-120	MS
	Selenium	ug/L	50	50.4		101	80-120	MS
	Silver	ug/L	50	51.9		104	80-120	MS
	Thallium	ug/L	50	46.3		92.7	80-120	MS
	Uranium	ug/L	50	47.8		95.5	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-2134

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>
1203989323	Mercury	ug/L	2	2.06		103	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-9-

## Serial Dilution Sample Summary

SDG NO. 2018-2134

Client ID: CAWA-18-151436L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 445726001

Serial Dilution ID: 1203988594

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	27.8		31.2		12.045			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	10000		10300		3.081		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3430		3450		.597			P
Manganese	2	U	10	U				P
Potassium	1460		2070		42.308			P
Silica	67300		73600		9.363		10	P
Sodium	10100		10800		7.149		10	P
Strontium	48.2		50.3		4.417			P
Tin	2.5	U	12.5	U				P
Vanadium	5.55		6.14	J	10.722			P
Zinc	3.3	U	16.5	U				P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 2018-2134 **Client ID:** CAWA-18-151436L

**Contract:** ESHL00114

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

**Sample ID:** 445726001 **Serial Dilution ID:** 1203988628

<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	1.02		1.25	J	22.19			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	.514		.54	J	5.058			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 2018-2134 **Client ID:** CAWA-18-151436L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 445726001 **Serial Dilution ID:** 1203989326

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Mercury	.067	U	.335	U				AV

## \*Analytical Methods:

AV EPA 245.1/245.2

# **General Chem Analysis**



# Case Narrative

**General Chemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-2134  
Work Order #: 445726**

**Product:** Carbon, Total Organic

**Analytical Method:** SW-846:9060

**Analytical Procedure:** GL-GC-E-093 REV# 15

**Analytical Batch:** 1746313

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726006	CAWA-18-151439
1203988642	Method Blank (MB)
1203988643	Laboratory Control Sample (LCS)
1203988644	445726002(CAWA-18-151437) Sample Duplicate (DUP)
1203988647	445726002(CAWA-18-151437) Post Spike (PS)

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

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Cyanide, Total

**Analytical Method:** EPA 335.4 1993

**Analytical Procedure:** GL-GC-E-095 REV# 21

**Analytical Batches:** 1746923 and 1746922

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726006	CAWA-18-151439
1203989174	Method Blank (MB)
1203989175	Laboratory Control Sample (LCS)
1203989176	445726002(CAWA-18-151437) Sample Duplicate (DUP)
1203989178	445726002(CAWA-18-151437) Matrix Spike (MS)

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

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Ion Chromatography

**Analytical Method:** EPA:300.0

**Analytical Procedure:** GL-GC-E-086 REV# 25

**Analytical Batch:** 1746778

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726001	CAWA-18-151436
445726005	CAWA-18-151438
1203988857	Method Blank (MB)
1203988858	Laboratory Control Sample (LCS)
1203988859	445726001(CAWA-18-151436) Sample Duplicate (DUP)
1203988860	445726001(CAWA-18-151436) Post Spike (PS)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Miscellaneous Information**

**Manual Integrations**

Samples 1203988859 (CAWA-18-151436DUP), 1203988860 (CAWA-18-151436PS), 445726001 (CAWA-18-151436) and 445726005 (CAWA-18-151438) were manually integrated to correctly position the baseline as set in the calibration standards.

**Product:** Ammonia Nitrogen

**Preparation Method:** EPA:350.1

**Preparation Procedure:** GL-GC-E-106 REV# 10

**Preparation Batch:** 1746883

**Preparation Method:** EPA 350.1 Prep

**Preparation Procedure:** GL-GC-E-072 REV# 17

**Preparation Batch:** 1746882

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726001	CAWA-18-151436
445726005	CAWA-18-151438
1203989093	Method Blank (MB)
1203989094	Laboratory Control Sample (LCS)
1203989095	445726001(CAWA-18-151436) Sample Duplicate (DUP)
1203989096	445726001(CAWA-18-151436) Matrix Spike (MS)

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

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Total Kjeldahl Nitrogen

**Preparation Method:** EPA:351.2

**Preparation Procedure:** GL-GC-E-104 REV# 15

**Preparation Batch:** 1746248

**Preparation Method:** EPA 351.2 Prep

**Preparation Procedure:** GL-GC-E-071 REV# 16

**Preparation Batch:** 1746247

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726006	CAWA-18-151439
1203987679	Method Blank (MB)
1203987680	Laboratory Control Sample (LCS)
1203987681	445591003(CAAN-18-151479) Sample Duplicate (DUP)
1203987682	445591003(CAAN-18-151479) Matrix Spike (MS)

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

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Nitrate Nitrite by Cadmium Reduction

**Analytical Method:** EPA:353.2

**Analytical Procedure:** GL-GC-E-128 REV# 10

**Analytical Batch:** 1746884

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726001	CAWA-18-151436
445726005	CAWA-18-151438
1203989097	Method Blank (MB)
1203989098	Laboratory Control Sample (LCS)
1203989099	445726001(CAWA-18-151436) Sample Duplicate (DUP)
1203989101	445726001(CAWA-18-151436) Post Spike (PS)

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

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Total Phosphorus

**Analytical Method:** EPA 365.4 1974

**Analytical Procedure:** GL-GC-E-103 REV# 11

**Analytical Batch:** 1746246

**Preparation Method:** EPA 365.4 Prep

**Preparation Procedure:** GL-GC-E-071 REV# 16

**Preparation Batch:** 1746245

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726001	CAWA-18-151436
445726005	CAWA-18-151438
1203987675	Method Blank (MB)
1203987676	Laboratory Control Sample (LCS)
1203989089	445726001(CAWA-18-151436) Sample Duplicate (DUP)
1203989091	445726001(CAWA-18-151436) Matrix Spike (MS)

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

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.



**Product:** Solids, Total Dissolved

**Analytical Method:** EPA:160.1

**Analytical Procedure:** GL-GC-E-001 REV# 15

**Analytical Batch:** 1748000

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726001	CAWA-18-151436
445726005	CAWA-18-151438
1203991454	Method Blank (MB)
1203991455	Laboratory Control Sample (LCS)
1203991457	445726001(CAWA-18-151436) Sample Duplicate (DUP)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Quality Control (QC) Information**

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

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

Analyte	Sample	Value
Total Dissolved Solids	1203991457 (CAWA-18-151436DUP)	16.8* (0%-5%)

**Product:** Specific Conductivity

**Analytical Method:** EPA:120.1

**Analytical Procedure:** GL-GC-E-009 REV# 16

**Analytical Batch:** 1748271

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726001	CAWA-18-151436
445726005	CAWA-18-151438
1203992008	Laboratory Control Sample (LCS)
1203992010	445726001(CAWA-18-151436) Sample Duplicate (DUP)

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

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** pH

**Analytical Method:** EPA 150.1 1982

**Analytical Procedure:** GL-GC-E-008 REV# 23

**Analytical Batch:** 1748189

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726001	CAWA-18-151436
445726005	CAWA-18-151438
1203991833	Laboratory Control Sample (LCS)
1203991834	446089003(CAMO-18-151474) Sample Duplicate (DUP)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Holding Times**

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

Sample	Analyte	Value
1203991834 (CAMO-18-151474DUP)	pH	Received 17-MAR-18, out of holding 15-MAR-18
445726001 (CAWA-18-151436)	pH	Received 13-MAR-18, out of holding 09-MAR-18
445726005 (CAWA-18-151438)	pH	Received 13-MAR-18, out of holding 09-MAR-18

**Product:** Alkalinity

**Analytical Method:** EPA:310.1

**Analytical Procedure:** GL-GC-E-033 REV# 13

**Analytical Batch:** 1748188

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726001	CAWA-18-151436
445726005	CAWA-18-151438
1203991830	Laboratory Control Sample (LCS)
1203991831	446089003(CAMO-18-151474) Sample Duplicate (DUP)
1203991832	446089003(CAMO-18-151474) Matrix Spike (MS)

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

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Certification Statement**

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

## **GEL LABORATORIES LLC**

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

### **Qualifier Definition Report for**

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

Client SDG: 2018-2134 GEL Work Order: 445726

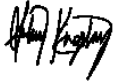
#### **The Qualifiers in this report are defined as follows:**

- \* 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:** 29 MAR 2018

**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: March 29, 2018

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

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

Client SDG: 2018-2134

Client Sample ID: CAWA-18-151436  
Sample ID: 445726001  
Matrix: W  
Collect Date: 09-MAR-18 11:18  
Receive Date: 13-MAR-18  
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	LXA2	03/13/18	2259	1746778	1
Chloride		1.52	0.067	0.200	mg/L		1					
Fluoride		0.184	0.033	0.100	mg/L		1					
Sulfate		1.42	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	U	ND	0.017	0.050	mg/L	1.00	1	KLP1	03/20/18	1317	1746883	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.286	0.017	0.050	mg/L		1	AXH3	03/16/18	1046	1746884	3
PO4 "As Received"												
Phosphorus, Total as P	U	ND	0.020	0.050	mg/L	1.00	1	KLP1	03/19/18	1450	1746246	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		177	3.40	14.3	mg/L			KLP1	03/16/18	1354	1748000	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		58.4	1.45	4.00	mg/L			RXB5	03/17/18	1639	1748188	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		120	1.00	1.00	umhos/cm		1	HXC1	03/20/18	1140	1748271	7
PH "As Received"												
pH at Temp 16.1C	H	7.92	0.010	0.100	SU		1	RXB5	03/17/18	1637	1748189	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	03/20/18	1237	1746882
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	03/19/18	1200	1746245

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: March 29, 2018

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

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

Client SDG: 2018-2134

Client Sample ID: CAWA-18-151436  
Sample ID: 445726001

Project: ESHL00114  
Client ID: ARSL004

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

### Notes:

#### Column headers are defined as follows:

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



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## Certificate of Analysis

Report Date: March 29, 2018

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-2134

Project: LANL- WQH Water Samples

Client Sample ID: CAWA-18-151437

Project: ESHL00114

Sample ID: 445726002

Client ID: ARSL004

Matrix: W

Collect Date: 09-MAR-18 11:18

Receive Date: 13-MAR-18

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.967	0.330	1.00	mg/L		1	TSM	03/16/18	0143	1746313	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	03/15/18	0827	1746923	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	03/16/18	1536	1746248	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	03/15/18	0703	1746922
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	03/16/18	1200	1746247

The following Analytical Methods were performed:

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

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: March 29, 2018

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

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

Client SDG: 2018-2134

Client Sample ID: CAWA-18-151438  
Sample ID: 445726005  
Matrix: W  
Collect Date: 09-MAR-18 12:00  
Receive Date: 13-MAR-18  
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	LXA2	03/14/18	0026	1746778	1
Chloride		1.26	0.067	0.200	mg/L		1					
Fluoride		0.158	0.033	0.100	mg/L		1					
Sulfate		1.59	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	U	ND	0.017	0.050	mg/L	1.00	1	KLP1	03/20/18	1320	1746883	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.0997	0.017	0.050	mg/L		1	AXH3	03/16/18	1050	1746884	3
PO4 "As Received"												
Phosphorus, Total as P	U	ND	0.020	0.050	mg/L	1.00	1	KLP1	03/19/18	1452	1746246	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		157	3.40	14.3	mg/L			KLP1	03/16/18	1354	1748000	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		50.6	1.45	4.00	mg/L			RXB5	03/17/18	1642	1748188	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		104	1.00	1.00	umhos/cm		1	HXC1	03/20/18	1141	1748271	7
PH "As Received"												
pH at Temp 15.8C	H	7.29	0.010	0.100	SU		1	RXB5	03/17/18	1641	1748189	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	03/20/18	1237	1746882
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	03/19/18	1200	1746245

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: March 29, 2018

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

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

Client SDG: 2018-2134

Client Sample ID: CAWA-18-151438  
Sample ID: 445726005

Project: ESHL00114  
Client ID: ARSL004

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

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: March 29, 2018

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

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

Client SDG: 2018-2134

Client Sample ID: CAWA-18-151439  
Sample ID: 445726006  
Matrix: W  
Collect Date: 09-MAR-18 12:00  
Receive Date: 13-MAR-18  
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	03/16/18	0343	1746313	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	03/15/18	0834	1746923	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.115	0.033	0.100	mg/L	1.00	1	KLP1	03/16/18	1536	1746248	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	03/15/18	0703	1746922
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	03/16/18	1200	1746247

The following Analytical Methods were performed:

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

### Notes:

Column headers are defined as follows:

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

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: March 29, 2018

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

Contact: Ms. Nita Patel

Workorder: 445726

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1746313										
QC1203988644	445726002	DUP									
Total Organic Carbon Average	J	0.967	J	0.970	mg/L	0.31	^	(+/-1.00)	TSM	03/16/18	02:23
QC1203988643	LCS										
Total Organic Carbon Average	10.0			9.67	mg/L			(80%-120%)		03/15/18	13:48
QC1203988642	MB										
Total Organic Carbon Average			U	ND	mg/L					03/15/18	13:38
QC1203988647	445726002	PS									
Total Organic Carbon Average	10.0	J	0.967	11.2	mg/L			(75%-125%)		03/16/18	03:03
<b>Flow Injection Analysis</b>											
Batch	1746923										
QC1203989176	445726002	DUP									
Cyanide, Total	U	ND	U	ND	ug/L	N/A			AXH3	03/15/18	08:28
QC1203989175	LCS										
Cyanide, Total	50.0			52.9	ug/L			(90%-110%)		03/15/18	08:11
QC1203989174	MB										
Cyanide, Total			U	ND	ug/L					03/15/18	08:10
QC1203989178	445726002	MS									
Cyanide, Total	100	U	ND	106	ug/L			(90%-110%)		03/15/18	08:33
<b>Ion Chromatography</b>											
Batch	1746778										
QC1203988859	445726001	DUP									
Bromide	U	ND	U	ND	mg/L	N/A			LXA2	03/13/18	23:28

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## QC Summary

Workorder: 445726

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1746778										
Chloride		1.52		1.52	mg/L	0.0461		(0%-20%)	LXA2	03/13/18	23:28
Fluoride		0.184		0.175	mg/L	4.9	^	(+/-0.100)			
Sulfate		1.42		1.41	mg/L	0.602	^	(+/-0.400)			
QC1203988858 LCS											
Bromide	1.25			1.22	mg/L		97.5	(80%-120%)		03/13/18	22:30
Chloride	5.00			4.73	mg/L		94.7	(80%-120%)			
Fluoride	2.50			2.47	mg/L		99	(80%-120%)			
Sulfate	10.0			9.76	mg/L		97.6	(80%-120%)			
QC1203988857 MB											
Bromide			U	ND	mg/L					03/13/18	22:01
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203988860 445726001 PS											
Bromide	1.25	U	ND	1.22	mg/L		97.8	(75%-125%)		03/13/18	23:57
Chloride	5.00		1.52	6.33	mg/L		96.2	(75%-125%)			
Fluoride	2.50		0.184	2.56	mg/L		94.8	(75%-125%)			
Sulfate	10.0		1.42	11.0	mg/L		95.8	(75%-125%)			

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## QC Summary

Workorder: 445726

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1746246										
QC1203989089	445726001	DUP									
Phosphorus, Total as P		U	ND	U	ND	mg/L	N/A		KLP1	03/19/18	14:51
QC1203987676	LCS										
Phosphorus, Total as P	1.00				1.02	mg/L	102	(80%-124%)		03/19/18	14:47
QC1203987675	MB										
Phosphorus, Total as P			U		ND	mg/L				03/19/18	14:46
QC1203989091	445726001	MS									
Phosphorus, Total as P	1.00	U	ND		1.04	mg/L	104	(63%-139%)		03/19/18	14:51
Batch	1746248										
QC1203987681	445591003	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	03/16/18	15:32
QC1203987680	LCS										
Nitrogen, Total Kjeldahl	1.00				1.01	mg/L	101	(90%-110%)		03/16/18	15:31
QC1203987679	MB										
Nitrogen, Total Kjeldahl			J		0.0477	mg/L				03/16/18	15:30
QC1203987682	445591003	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND		1.02	mg/L	102	(90%-110%)		03/16/18	15:33
Batch	1746883										
QC1203989095	445726001	DUP									
Nitrogen, Ammonia		U	ND	U	ND	mg/L	N/A		KLP1	03/20/18	13:18
QC1203989094	LCS										
Nitrogen, Ammonia	1.00				1.03	mg/L	103	(90%-110%)		03/20/18	13:16
QC1203989093	MB										
Nitrogen, Ammonia			U		ND	mg/L				03/20/18	13:15



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## QC Summary

Workorder: 445726

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1746883										
QC1203989096	445726001	MS									
Nitrogen, Ammonia	1.00	U	ND	0.986	mg/L		97.8	(90%-110%)	KLP1	03/20/18	13:19
Batch	1746884										
QC1203989099	445726001	DUP									
Nitrogen, Nitrate/Nitrite			0.286	0.286	mg/L	0		(0%-20%)	AXH3	03/16/18	10:47
QC1203989098	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.03	mg/L		103	(90%-110%)		03/16/18	10:29
QC1203989097	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					03/16/18	10:27
QC1203989101	445726001	PS									
Nitrogen, Nitrate/Nitrite	1.00		0.286	1.31	mg/L		102	(90%-110%)		03/16/18	10:49
<b>Solids Analysis</b>											
Batch	1748000										
QC1203991457	445726001	DUP									
Total Dissolved Solids			177	203	mg/L	16.8*		(0%-5%)	KLP1	03/16/18	13:54
QC1203991455	LCS										
Total Dissolved Solids	300			287	mg/L		95.7	(95%-105%)		03/16/18	13:54
QC1203991454	MB										
Total Dissolved Solids			U	ND	mg/L					03/16/18	13:54
<b>Titration and Ion Analysis</b>											
Batch	1748188										
QC1203991831	446089003	DUP									
Alkalinity, Total as CaCO3			59.4	60.0	mg/L	1.01		(0%-20%)	RXB5	03/17/18	16:30
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				

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## QC Summary

Workorder: 445726

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1748188										
QC1203991830	LCS										
Alkalinity, Total as CaCO3	100			107	mg/L		107	(90%-110%)	RXB5	03/17/18	16:25
QC1203991832	446089003	MS									
Alkalinity, Total as CaCO3	100	59.4		164	mg/L		104	(80%-120%)		03/17/18	16:33
Batch	1748189										
QC1203991834	446089003	DUP									
pH		H	7.88	H	7.87	SU	0.127	(0%-5%)	RXB5	03/17/18	16:31
QC1203991833	LCS										
pH	7.00			6.98	SU		99.7	(99%-101%)		03/17/18	16:24
Batch	1748271										
QC1203992010	445726001	DUP									
Conductivity		120		122	umhos/cm	1.08		(0%-10%)	HXC1	03/20/18	11:41
QC1203992008	LCS										
Conductivity	1410			1420	umhos/cm		100	(95%-105%)		03/20/18	11:30

### Notes:

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

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## QC Summary

Workorder: 445726

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
d	5-day BOD--The 2:1 depletion requirement was not met for this sample										
e	5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes										
h	Preparation or preservation holding time was exceeded										

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

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

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

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

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

# **Radiological Analysis**

# Case Narrative

**Radiochemistry**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2018-2134**  
**Work Order #: 445726**

**Product:** Alphaspec Am241 Liquid

**Analytical Method:** HASL-300:AM-241

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1747065

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726006	CAWA-18-151439
1203989457	Method Blank (MB)
1203989458	445726002(CAWA-18-151437) Sample Duplicate (DUP)
1203989459	Laboratory Control Sample (LCS)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Quality Control (QC) Information**

**Blank Information**

Aliquots for samples 1203989457 (MB) and 1203989459 (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.

**CSU**

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

Sample	Analyte	Value
1203989457 (MB)	Americium-241	Blank result > 1.65 CSU

**Tracer/Carrier Yield**

Samples, (see below), did not meet the client tracer yield requirements, however they are 110 percent or less and do meet the GEL standard tracer yield requirements.

Sample	Analyte	Value
1203989458 (CAWA-18-151437DUP)	Americium-243 Tracer	108* (50%-105%)
1203989459 (LCS)	Americium-243 Tracer	109* (50%-105%)
445726002 (CAWA-18-151437)	Americium-243 Tracer	110* (50%-105%)

**Product:** ISOPU

**Analytical Method:** HASL-300:ISOPU

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1747066

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726006	CAWA-18-151439
1203989460	Method Blank (MB)
1203989461	445726002(CAWA-18-151437) Sample Duplicate (DUP)
1203989462	Laboratory Control Sample (LCS)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Quality Control (QC) Information**

**Blank Information**

Aliquots for samples 1203989460 (MB) and 1203989462 (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.

**Blank Decision Level**

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

Sample	Analyte	Value
1203989460 (MB)	Plutonium-238	Blank result > DL

**RDL Met**

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

Sample	Analyte	Value
1203989461 (CAWA-18-151437DUP)	Plutonium-238	Result 0.0243 < MDA 0.0573 > RDL 0.05 pCi/L
	Plutonium-239/240	Result 0.0162 < MDA 0.0617 > RDL 0.05 pCi/L

**Product:** IsoU

**Analytical Method:** HASL-300:ISOU

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1747067

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726006	CAWA-18-151439
1203989463	Method Blank (MB)
1203989464	445726002(CAWA-18-151437) Sample Duplicate (DUP)
1203989465	Laboratory Control Sample (LCS)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Quality Control (QC) Information**

**Blank Information**

Aliquots for samples 1203989463 (MB) and 1203989465 (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.

**CSU**

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

Sample	Analyte	Value
1203989463 (MB)	Uranium-233/234, Uranium-235/236 and Uranium-238	Blank result > 1.65 CSU

**Blank Decision Level**

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

Sample	Analyte	Value
1203989463 (MB)	Uranium-233/234 and Uranium-235/236	Blank result > DL

**Miscellaneous Information**

**Additional Comments**

The tracer peak centroid for sample 1203989464 (CAWA-18-151437DUP) is greater than 50 keV from the expected library energy value for the tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.



**Product:** Gammaspec

**Analytical Method:** EPA:901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1746657

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726006	CAWA-18-151439
1203988573	Method Blank (MB)
1203988574	445726002(CAWA-18-151437) Sample Duplicate (DUP)
1203988575	Laboratory Control Sample (LCS)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Quality Control (QC) Information**

**CSU**

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

Sample	Analyte	Value
1203988573 (MB)	Neptunium-237	Blank result > 1.65 CSU

**Blank Decision Level**

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

Sample	Analyte	Value
1203988573 (MB)	Neptunium-237	Blank result > DL

**Qualifier Information**

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high peak-width.	Potassium-40	1203988574	CAWA-18-151437(445726002DUP)

**Product:** GFPC, Sr90, liquid

**Analytical Method:** EPA:905.0

**Analytical Procedure:** GL-RAD-A-004 REV# 19

**Analytical Batch:** 1746698

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726006	CAWA-18-151439
1203988669	Method Blank (MB)
1203988670	445591005(CAAN-18-151491) Sample Duplicate (DUP)
1203988671	445591005(CAAN-18-151491) Matrix Spike (MS)
1203988672	Laboratory Control Sample (LCS)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Quality Control (QC) Information**

**Blank Information**

Aliquots for samples 1203988669 (MB) and 1203988672 (LCS) were changed to 1.0 per client request.

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

The QC Sample and the Duplicate, (See Below), did not meet the relative error ratio requirement; however, both sample and duplicate results are less than the minimum detectable concentration.

Sample	Analyte	Value
1203988670 (CAAN-18-151491DUP)	Strontium-90	RPD 0 N/A RER 1.03* (0-1)

**Technical Information**

**Recounts**

Sample 1203988672 (LCS) was recounted due to low recovery. The recount is reported. Sample 1203988671 (CAAN-18-151491MS) was recounted due to high recovery. The recount is reported. Sample 445726002 (CAWA-18-151437) was recounted due to high MDC. The recount is reported. Sample 1203988670 (CAAN-18-151491DUP) was recounted due to a suspected false positive. The recount is reported.

**Miscellaneous Information**

**Additional Comments**

The matrix spike, 1203988671 (CAAN-18-151491MS), aliquot was reduced to conserve sample volume.

**Product:** WSP-GrossA/B

**Analytical Method:** EPA 900.0/SW846 9310

**Analytical Procedure:** GL-RAD-A-001 REV# 19

**Analytical Batch:** 1746730

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445726002	CAWA-18-151437
445726006	CAWA-18-151439
1203988747	Method Blank (MB)
1203988748	445591003(CAAN-18-151479) Sample Duplicate (DUP)
1203988749	445591003(CAAN-18-151479) Matrix Spike (MS)
1203988750	445591003(CAAN-18-151479) Matrix Spike Duplicate (MSD)
1203988751	Laboratory Control Sample (LCS)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Quality Control (QC) Information**

**Blank Information**

Aliquots for samples 1203988747 (MB) and 1203988751 (LCS) were changed to 1.0 per client request.

**Blank Decision Level**

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

Sample	Analyte	Value
1203988747 (MB)	BETA	Blank result > DL

**Technical Information**

**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.

**Miscellaneous Information**

**Additional Comments**

The matrix spike and matrix spike duplicate, 1203988749 (CAAN-18-151479MS) and 1203988750 (CAAN-18-151479MSD), aliquots were reduced to conserve sample volume.

**Certification Statement**

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

## GEL LABORATORIES LLC

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### Qualifier Definition Report for

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

Client SDG: 2018-2134 GEL Work Order: 445726

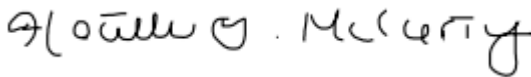
#### The Qualifiers in this report are defined as follows:

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

#### Review/Validation

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

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

Signature: 

Name: Heather McCarty

Date: 31 MAR 2018

Title: Analyst II

# **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: March 31, 2018

Client Sample ID: CAWA-18-151437  
Sample ID: 445726002  
Matrix: W  
Collect Date: 09-MAR-18  
Receive Date: 13-MAR-18  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	8.69E-10	+/-0.00492	0.0325	0.0139	+/-0.00492	0.050	pCi/L			BXA4	03/17/18	1536	1747065	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.00	+/-0.00534	0.0462	0.0202	+/-0.00534	0.050	pCi/L			BXA4	03/17/18	1536	1747066	2
Plutonium-239/240	U	-0.0131	+/-0.00815	0.0498	0.022	+/-0.00815	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.329	+/-0.0303	0.0964	0.0446	+/-0.0346	1.00	pCi/L			BXA4	03/19/18	1011	1747067	3
Uranium-235/236		0.062	+/-0.0149	0.0457	0.0184	+/-0.0153	1.00	pCi/L							
Uranium-238		0.243	+/-0.0266	0.059	0.0259	+/-0.0292	0.500	pCi/L							
<b>Rad Gamma Spec Analysis</b>															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	0.968	+/-1.57	6.06	2.69	+/-1.59	8.00	pCi/L			BSW1	03/14/18	0858	1746657	4
Cobalt-60	U	-0.366	+/-1.58	6.17	2.57	+/-1.59	8.00	pCi/L							
Neptunium-237	U	-3.19	+/-3.03	10.7	4.89	+/-3.12		pCi/L							
Potassium-40	U	-29.9	+/-20.4	76.9	33.3	+/-21.6		pCi/L							
Sodium-22	U	-0.169	+/-1.72	6.25	2.63	+/-1.72		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.00923	+/-0.110	0.410	0.181	+/-0.110	0.500	pCi/L			KSD1	03/19/18	1051	1746698	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	0.326	+/-0.682	2.45	1.07	+/-0.682	3.00	pCi/L			AXH4	03/23/18	1231	1746730	6
Alpha	U	-0.0622	+/-0.456	2.30	0.776	+/-0.456	3.00	pCi/L			AXH4	03/26/18	1138	1746730	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"	1747065	110 *	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1747066	81	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1747067	84.4	(50%-105%)

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAWA-18-151437

Sample ID: 445726002

Project: ESHL00114

Client ID: ARSL004

Report Date: March 31, 2018

Parameter	Qualifier	Result Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Strontium Carrier		GFPC, Sr90, liquid "As Received"						1746698	65.1	(50%-105%)				

### Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty



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## 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: CAWA-18-151439

Sample ID: 445726006

Matrix: W

Collect Date: 09-MAR-18

Receive Date: 13-MAR-18

Collector: Client

Report Date: March 31, 2018

Project: ESHL00114

Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	-0.00194	+/-0.007	0.0363	0.0155	+/-0.007	0.050	pCi/L			BXA4	03/17/18	1536	1747065	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	-0.00405	+/-0.00859	0.043	0.0187	+/-0.0086	0.050	pCi/L			BXA4	03/17/18	1536	1747066	2
Plutonium-239/240	U	-0.0081	+/-0.0095	0.0463	0.0204	+/-0.0095	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.257	+/-0.027	0.0961	0.0445	+/-0.0299	1.00	pCi/L			BXA4	03/19/18	1011	1747067	3
Uranium-235/236		0.0553	+/-0.0142	0.0456	0.0184	+/-0.0144	1.00	pCi/L							
Uranium-238		0.100	+/-0.0182	0.0588	0.0258	+/-0.0189	0.500	pCi/L							
<b>Rad Gamma Spec Analysis</b>															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	0.373	+/-1.81	5.94	2.66	+/-1.81	8.00	pCi/L			BSW1	03/14/18	0858	1746657	4
Cobalt-60	U	-0.684	+/-1.70	6.30	2.67	+/-1.71	8.00	pCi/L							
Neptunium-237	U	4.25	+/-3.49	10.5	4.85	+/-3.63		pCi/L							
Potassium-40	U	7.37	+/-20.0	78.6	34.5	+/-20.0		pCi/L							
Sodium-22	U	-1.08	+/-1.65	6.00	2.53	+/-1.67		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.262	+/-0.0952	0.474	0.202	+/-0.0952	0.500	pCi/L			KSD1	03/17/18	1339	1746698	5
<i>WSP-GrossA/B "As Received"</i>															
Beta		4.02	+/-0.845	2.11	0.902	+/-0.909	3.00	pCi/L			AXH4	03/23/18	1231	1746730	6
Alpha	U	0.094	+/-0.516	2.35	0.809	+/-0.516	3.00	pCi/L			AXH4	03/26/18	1138	1746730	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"	1747065	84.6	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1747066	82	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1747067	83.6	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1746698	81.4	(50%-105%)

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAWA-18-151439

Sample ID: 445726006

Report Date: March 31, 2018

Project: ESHL00114

Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test											Batch ID	Recovery%	Acceptable Limits	

### Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

# **Quality Control Summary**

# GEL LABORATORIES LLC

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## QC Summary

Report Date: March 31, 2018

Page 1 of 6

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

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 445726

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1747065										
QC1203989458	445726002	DUP									
Americium-241	U	8.69E-10	U	0.00933	pCi/L	0.5		(0-1)	BXA4	03/17/18	15:36
	Uncert:	+/-0.00492		+/-0.0044							
	TPU:	+/-0.00492		+/-0.00441							
**Americium-243 Tracer	2.62	2.89		2.84	pCi/L		108 *	(50%-105%)			
	Uncert:	+/-0.0672		+/-0.0637							
	TPU:	+/-0.130		+/-0.126							
QC1203989459	LCS										
Americium-241	1.97			1.70	pCi/L		86.5	(80%-120%)	BXA4	03/17/18	15:37
	Uncert:			+/-0.052							
	TPU:			+/-0.0904							
**Americium-243 Tracer	2.10			2.28	pCi/L		109 *	(50%-105%)			
	Uncert:			+/-0.0573							
	TPU:			+/-0.108							
QC1203989457	MB										
Americium-241			U	0.0101	pCi/L				BXA4	03/17/18	15:36
	Uncert:			+/-0.00523							
	TPU:			+/-0.00524							
**Americium-243 Tracer	2.10			2.14	pCi/L		102	(50%-105%)			
	Uncert:			+/-0.0551							
	TPU:			+/-0.105							
Batch	1747066										
QC1203989461	445726002	DUP									
Plutonium-238	U	0.00	U	0.0243	pCi/L	0.735		(0-1)	BXA4	03/17/18	15:51
	Uncert:	+/-0.00534		+/-0.0111							
	TPU:	+/-0.00534		+/-0.0112							
Plutonium-239/240	U	-0.0131	U	0.0162	pCi/L	0.875		(0-1)			
	Uncert:	+/-0.00815		+/-0.00854							
	TPU:	+/-0.00815		+/-0.00856							
**Plutonium-242 Tracer	2.47	2.00		1.99	pCi/L		80.6	(50%-105%)			
	Uncert:	+/-0.0738		+/-0.0823							
	TPU:	+/-0.125		+/-0.136							
QC1203989462	LCS										
Plutonium-238			U	0.0117	pCi/L			(80%-120%)	BXA4	03/17/18	15:37
	Uncert:			+/-0.00552							
	TPU:			+/-0.00555							
Plutonium-239/240	1.98			2.09	pCi/L		106	(80%-120%)			
	Uncert:			+/-0.064							
	TPU:			+/-0.109							
**Plutonium-242 Tracer	1.98			1.72	pCi/L		86.9	(50%-105%)			
	Uncert:			+/-0.0624							
	TPU:			+/-0.104							

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## QC Summary

Workorder: 445726

Page 2 of 6

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1747066										
QC1203989460	MB										
Plutonium-238			U	0.0267	pCi/L				BXA4	03/17/18	15:51
				Uncert:							
				+/-0.0175							
				TPU:							
				+/-0.0175							
Plutonium-239/240			U	-0.0114	pCi/L						
				Uncert:							
				+/-0.00852							
				TPU:							
				+/-0.00852							
**Plutonium-242 Tracer	1.98			1.71	pCi/L		86.6	(50%-105%)			
				Uncert:							
				+/-0.0622							
				TPU:							
				+/-0.104							
Batch	1747067										
QC1203989464	445726002	DUP									
Uranium-234		0.329		0.375	pCi/L	0.312		(0-1)	BXA4	03/19/18	10:11
		Uncert:		+/-0.0329							
		TPU:		+/-0.0379							
Uranium-235/236		0.062		0.0588	pCi/L	0.0519		(0-1)			
		Uncert:		+/-0.0153							
		TPU:		+/-0.0156							
Uranium-238		0.243		0.232	pCi/L	0.0886		(0-1)			
		Uncert:		+/-0.0267							
		TPU:		+/-0.029							
**Uranium-232 Tracer	2.61	2.20		2.24	pCi/L		85.7	(50%-105%)			
		Uncert:		+/-0.084							
		TPU:		+/-0.154							
QC1203989465	LCS										
Uranium-234				2.76	pCi/L				BXA4	03/19/18	10:11
		Uncert:		+/-0.0766							
		TPU:		+/-0.156							
Uranium-235/236				0.204	pCi/L						
		Uncert:		+/-0.0237							
		TPU:		+/-0.0258							
Uranium-238	2.70			2.88	pCi/L		107	(80%-120%)			
		Uncert:		+/-0.0784							
		TPU:		+/-0.162							
**Uranium-232 Tracer	2.09			1.73	pCi/L		82.9	(50%-105%)			
		Uncert:		+/-0.0671							
		TPU:		+/-0.123							
QC1203989463	MB										
Uranium-234			U	0.0551	pCi/L				BXA4	03/19/18	10:11
		Uncert:		+/-0.013							
		TPU:		+/-0.0134							
Uranium-235/236			U	0.0153	pCi/L						
		Uncert:		+/-0.0072							
		TPU:		+/-0.00724							
Uranium-238			U	0.0185	pCi/L						
		Uncert:		+/-0.00683							
		TPU:		+/-0.00689							

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1747067										
**Uranium-232 Tracer											
	2.09			1.80	pCi/L		86.3	(50%-105%)			
	Uncert:			+/-0.0658							
	TPU:			+/-0.121							
<b>Rad Gamma Spec</b>											
Batch	1746657										
QC1203988574 445726002 DUP											
Cesium-137	U	0.968	U	1.02	pCi/L	0.00804		(0-1)	BSW1	03/14/18	12:44
	Uncert:	+/-1.57		+/-1.36							
	TPU:	+/-1.59		+/-1.38							
Cobalt-60	U	-0.366	U	-0.0129	pCi/L	0.0548		(0-1)			
	Uncert:	+/-1.58		+/-1.64							
	TPU:	+/-1.59		+/-1.64							
Neptunium-237	U	-3.19	U	-0.712	pCi/L	0.224		(0-1)			
	Uncert:	+/-3.03		+/-2.39							
	TPU:	+/-3.12		+/-2.40							
Potassium-40	U	-29.9	UI	55.4	pCi/L	1.01		(0-1)			
	Uncert:	+/-20.4		+/-20.4							
	TPU:	+/-21.6		+/-20.6							
Sodium-22	U	-0.169	U	1.84	pCi/L	0.303		(0-1)			
	Uncert:	+/-1.72		+/-1.54							
	TPU:	+/-1.72		+/-1.60							
QC1203988575 LCS											
Americium-241	34300			38700	pCi/L		113	(80%-120%)	BSW1	03/14/18	13:59
	Uncert:			+/-893							
	TPU:			+/-2190							
Cesium-137	12900			13200	pCi/L		102	(80%-120%)			
	Uncert:			+/-170							
	TPU:			+/-589							
Cobalt-60	10800			11200	pCi/L		104	(80%-120%)			
	Uncert:			+/-185							
	TPU:			+/-567							
Neptunium-237			U	63.0	pCi/L						
	Uncert:			+/-61.0							
	TPU:			+/-62.8							
Potassium-40			U	111	pCi/L						
	Uncert:			+/-108							
	TPU:			+/-111							
Sodium-22			U	16.7	pCi/L						
	Uncert:			+/-17.0							
	TPU:			+/-17.4							
QC1203988573 MB											
Cesium-137			U	1.21	pCi/L				BSW1	03/14/18	09:00
	Uncert:			+/-1.13							
	TPU:			+/-1.17							
Cobalt-60			U	0.0362	pCi/L						
	Uncert:			+/-1.66							

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Parname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1746657										
Neptunium-237	TPU:			+/-1.66							
			U	4.43	pCi/L						
	Uncert:			+/-2.37							
Potassium-40	TPU:			+/-2.59							
			U	-4.77	pCi/L						
	Uncert:			+/-19.3							
Sodium-22	TPU:			+/-19.3							
			U	0.491	pCi/L						
	Uncert:			+/-1.36							
	TPU:			+/-1.36							
<b>Rad Gas Flow</b>											
Batch	1746698										
QC1203988670	445591005	DUP									
Strontium-90	U	-0.199	U	0.258	pCi/L	1.03		(0-1)	KSD1	03/19/18	10:51
	Uncert:	+/-0.114		+/-0.107							
	TPU:	+/-0.114		+/-0.109							
**Strontium Carrier	4.30	3.60		3.40	mg		79.1	(50%-105%)			
QC1203988672	LCS										
Strontium-90	23.5			24.3	pCi/L		103	(80%-120%)	KSD1	03/19/18	10:51
	Uncert:			+/-0.589							
	TPU:			+/-2.03							
**Strontium Carrier	4.30			3.30	mg		76.7	(50%-105%)			
QC1203988669	MB										
Strontium-90			U	0.0481	pCi/L				KSD1	03/17/18	13:39
	Uncert:			+/-0.118							
	TPU:			+/-0.118							
**Strontium Carrier	4.30			3.20	mg		74.4	(50%-105%)			
QC1203988671	445591005	MS									
Strontium-90	235	U	-0.199	288	pCi/L		122	(75%-125%)	KSD1	03/19/18	10:51
	Uncert:		+/-0.114	+/-6.91							
	TPU:		+/-0.114	+/-24.8							
**Strontium Carrier	4.30	3.60		2.80	mg		65.1	(50%-105%)			
Batch	1746730										
QC1203988748	445591003	DUP									
Alpha	U	-0.626	U	-0.36	pCi/L	0.245		(0-1)	AXH4	03/26/18	11:38
	Uncert:	+/-0.224		+/-0.318							
	TPU:	+/-0.225		+/-0.319							
Beta	U	0.911	U	0.766	pCi/L	0.0569		(0-1)		03/23/18	12:30
	Uncert:	+/-0.668		+/-0.598							
	TPU:	+/-0.672		+/-0.602							
QC1203988751	LCS										
Alpha	12.1			13.5	pCi/L		112	(80%-120%)	AXH4	03/26/18	11:38
	Uncert:			+/-0.606							
	TPU:			+/-1.31							
Beta	47.0			50.3	pCi/L		107	(80%-120%)		03/23/18	12:30

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1746730										
				Uncert:							
				TPU:							
QC1203988747	MB										
Alpha			U	-0.01	pCi/L				AXH4	03/26/18	11:38
				Uncert:							
				TPU:							
Beta			U	0.134	pCi/L					03/23/18	12:30
				Uncert:							
				TPU:							
QC1203988749	445591003	MS									
Alpha		403	U	-0.626	398	pCi/L		98.8	(75%-125%)	AXH4	03/26/18
				Uncert:							
				TPU:							
Beta		1570	U	0.911	1680	pCi/L		107	(75%-125%)		03/23/18
				Uncert:							
				TPU:							
QC1203988750	445591003	MSD									
Alpha		403	U	-0.626	408	pCi/L	0.0625	101	(0-1)	AXH4	03/26/18
				Uncert:							
				TPU:							
Beta		1570	U	0.911	1640	pCi/L	0.0687	105	(0-1)		03/23/18
				Uncert:							
				TPU:							

### Notes:

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

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMF Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.



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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.