

## APPENDICES

## APPENDIX A

### Project Sample Count Tables per Round

Laboratory Parameters	First Sample Round											
	Total Sampling Frequency			No. of Field Duplicates <sup>1</sup>			No of Other QC Samples <sup>2</sup>			Total No. of Samples to Laboratory		
	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington
Biochemical Oxygen Demand	1	1	1	1	1	1	0	0	0	2	2	2
Enterococci	1	1	1	1	1	1	0	0	0	2	2	2
Fecal Coliform	1	1	1	1	1	1	0	0	0	2	2	2
Total Suspended Solids	1	1	1	1	1	1	0	0	0	2	2	2
Ammonia as N	1	1	1	1	1	1	0	0	0	2	2	2
Total Residual Chlorine	0	1	1	0	1	1	0	0	0	0	2	2
Total Kjeldhal Nitrogen	1	1	1	1	1	1	0	0	0	2	2	2
Nitrate plus Nitrite Nitrogen	1	1	1	1	1	1	0	0	0	2	2	2
Oil and Grease	1	1	1	1	1	1	0	0	0	2	2	2
Total Phosphorus	1	1	1	1	1	1	0	0	0	2	2	2
Total Dissolved Solids	1	1	1	1	1	1	0	0	0	2	2	2
Turbidity (NTU)	1	1	1	1	1	1	0	0	0	2	2	2
<b>Metals</b>	1	1	1	1	1	1	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	4	4	4
Cyanide	1	1	1	1	1	1	2 <sup>4</sup>	1 <sup>5</sup>	1 <sup>5</sup>	4	3	3
Total Phenolic Compounds	1	1	1	1	1	1	2 <sup>4</sup>	1 <sup>5</sup>	1 <sup>5</sup>	4	3	3
<b>Volatile Organic Compounds</b>	1	1	1	1	1	1	2 <sup>4</sup>	1 <sup>5</sup>	1 <sup>5</sup>	4	3	3
<b>Acid Extactable Compounds</b>	1	1	1	1	1	1	2 <sup>4</sup>	1 <sup>5</sup>	1 <sup>5</sup>	4	3	3
<b>Base-Neutral Compounds</b>	1	1	1	1	1	1	2 <sup>4</sup>	1 <sup>5</sup>	1 <sup>5</sup>	4	3	3
Field Parameters	First Sample Round											
	Total Sampling Frequency			No. Field Replicates <sup>1</sup>			No of Other QC Samples <sup>2</sup>			Total No. of Samples in Field		
	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington
Dissolved Oxygen	1	1	1	1	1	1	0	0	0	2	2	2
pH	1	1	1	1	1	1	0	0	0	2	2	2
Conductivity	1	1	1	1	1	1	0	0	0	2	2	2
Temperature	1	1	1	1	1	1	0	0	0	2	2	2

<sup>1</sup> - Includes Field Duplicates for Laboratory Samples and Field Replicates for Field Samples (In-situ)<sup>2</sup> - Includes Trip Blanks (T), Equipment blanks (E), and Matrix Spike/Matrix Spike Duplicates(S)<sup>3</sup> - Includes Equipment blank (E), and Matrix Spike/Matrix Spike Duplicates(S)<sup>4</sup> - Includes Trip Blank (T) and Equipment blank (E)<sup>5</sup> - Includes Equipment blank (E)

Laboratory Parameters	Second Sample Round											
	Total Sampling Frequency			No. of Field Duplicates <sup>1</sup>			No of Other QC Samples <sup>2</sup>			Total No. of Samples to Laboratory		
	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington
Biochemical Oxygen Demand	1	1	1	0	0	0	0	0	0	1	1	1
Enterococci	1	1	1	0	0	0	0	0	0	1	1	1
Fecal Coliform	1	1	1	0	0	0	0	0	0	1	1	1
Total Suspended Solids	1	1	1	0	0	0	0	0	0	1	1	1
Ammonia as N	1	1	1	1	1	1	0	0	0	2	2	2
Total Residual Chlorine	0	1	1	0	0	0	0	0	0	0	1	1
Total Kjeldhal Nitrogen	1	1	1	1	1	1	0	0	0	2	2	2
Nitrate plus Nitrite Nitrogen	1	1	1	1	1	1	0	0	0	2	2	2
Oil and Grease	1	1	1	0	0	0	0	0	0	1	1	1
Total Phosphorus	1	1	1	1	1	1	0	0	0	2	2	2
Total Dissolved Solids	1	1	1	0	0	0	0	0	0	1	1	1
Turbidity (NTU)	1	1	1	0	0	0	0	0	0	1	1	1
<b>Metals</b>	1	1	1	1	1	1	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	4	4	4
Cyanide	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
Total Phenolic Compounds	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
<b>Volatile Organic Compounds</b>	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
<b>Acid Extactable Compounds</b>	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
<b>Base-Neutral Compounds</b>	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
Field Parameters	Second Sample Round											
	Total Sampling Frequency			No. Field Replicates <sup>1</sup>			No of Other QC Samples <sup>2</sup>			Total No. of Samples in Field		
	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington
Dissolved Oxygen	1	1	1	1	1	1	0	0	0	2	2	2
pH	1	1	1	1	1	1	0	0	0	2	2	2
Conductivity	1	1	1	1	1	1	0	0	0	2	2	2
Temperature	1	1	1	1	1	1	0	0	0	2	2	2

<sup>1</sup> - Includes Field Duplicates for Laboratory Samples and Field Replicates for Field Samples (In-situ)

<sup>2</sup> - Includes Trip Blanks (T), Equipment blanks (E), and Matrix Spike/Matrix Spike Duplicates(S)

<sup>3</sup> - Includes Equipment blank (E), and Matrix Spike/Matrix Spike Duplicates(S)

<sup>4</sup> - Includes Trip Blank (T) and Equipment blank (E)

<sup>5</sup> - Includes Equipment blank (E)

<sup>6</sup> - Includes Trip blank (T)



Laboratory Parameters	Third Sample Round											
	Total Sampling Frequency			No. of Field Duplicates <sup>1</sup>			No of Other QC Samples <sup>2</sup>			Total No. of Samples to Laboratory		
	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington
Biochemical Oxygen Demand	1	1	1	0	0	0	0	0	0	1	1	1
Enterococci	1	1	1	0	0	0	0	0	0	1	1	1
Fecal Coliform	1	1	1	0	0	0	0	0	0	1	1	1
Total Suspended Solids	1	1	1	0	0	0	0	0	0	1	1	1
Ammonia as N	1	1	1	1	1	1	0	0	0	2	2	2
Total Residual Chlorine	0	1	1	0	0	0	0	0	0	0	1	1
Total Kjeldhal Nitrogen	1	1	1	1	1	1	0	0	0	2	2	2
Nitrate plus Nitrite Nitrogen	1	1	1	1	1	1	0	0	0	2	2	2
Oil and Grease	1	1	1	0	0	0	0	0	0	1	1	1
Total Phosphorus	1	1	1	1	1	1	0	0	0	2	2	2
Total Dissolved Solids	1	1	1	0	0	0	0	0	0	1	1	1
Turbidity (NTU)	1	1	1	0	0	0	0	0	0	1	1	1
<b>Metals</b>	1	1	1	1	1	1	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	4	4	4
Cyanide	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
Total Phenolic Compounds	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
<b>Volatile Organic Compounds</b>	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
<b>Acid Extactable Compounds</b>	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
<b>Base-Neutral Compounds</b>	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
Field Parameters	Third Sample Round											
	Total Sampling Frequency			No. Field Replicates <sup>1</sup>			No of Other QC Samples <sup>2</sup>			Total No. of Samples in Field		
	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington
Dissolved Oxygen	1	1	1	1	1	1	0	0	0	2	2	2
pH	1	1	1	1	1	1	0	0	0	2	2	2
Conductivity	1	1	1	1	1	1	0	0	0	2	2	2
Temperature	1	1	1	1	1	1	0	0	0	2	2	2

<sup>1</sup> - Includes Field Duplicates for Laboratory Samples and Field Replicates for Field Samples (In-situ)

<sup>2</sup> - Includes Trip Blanks (T), Equipment blanks (E), and Matrix Spike/Matrix Spike Duplicates(S)

<sup>3</sup> - Includes Equipment blank (E), and Matrix Spike/Matrix Spike Duplicates(S)

<sup>4</sup> - Includes Trip Blank (T) and Equipment blank (E)

<sup>5</sup> - Includes Equipment blank (E)

<sup>6</sup> - Includes Trip blank (T)

Laboratory Parameters	Fourth Sample Round											
	Total Sampling Frequency			No. of Field Duplicates <sup>1</sup>			No of Other QC Samples <sup>2</sup>			Total No. of Samples to Laboratory		
	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington
Biochemical Oxygen Demand	1	1	1	0	0	0	0	0	0	1	1	1
Enterococci	1	1	1	0	0	0	0	0	0	1	1	1
Fecal Coliform	1	1	1	0	0	0	0	0	0	1	1	1
Total Suspended Solids	1	1	1	0	0	0	0	0	0	1	1	1
Ammonia as N	1	1	1	1	1	1	0	0	0	2	2	2
Total Residual Chlorine	0	1	1	0	0	0	0	0	0	0	1	1
Total Kjeldhal Nitrogen	1	1	1	1	1	1	0	0	0	2	2	2
Nitrate plus Nitrite Nitrogen	1	1	1	1	1	1	0	0	0	2	2	2
Oil and Grease	1	1	1	0	0	0	0	0	0	1	1	1
Total Phosphorus	1	1	1	1	1	1	0	0	0	2	2	2
Total Dissolved Solids	1	1	1	0	0	0	0	0	0	1	1	1
Turbidity (NTU)	1	1	1	0	0	0	0	0	0	1	1	1
<b>Metals</b>	1	1	1	1	1	1	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	4	4	4
Cyanide	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
Total Phenolic Compounds	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
<b>Volatile Organic Compounds</b>	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
<b>Acid Extactable Compounds</b>	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
<b>Base-Neutral Compounds</b>	1	1	1	0	0	0	1 <sup>6</sup>	0	0	2	1	1
Field Parameters	Fourth Sample Round											
	Total Sampling Frequency			No. Field Replicates <sup>1</sup>			No of Other QC Samples <sup>2</sup>			Total No. of Samples in Field		
	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newington
Dissolved Oxygen	1	1	1	1	1	1	0	0	0	2	2	2
pH	1	1	1	1	1	1	0	0	0	2	2	2
Conductivity	1	1	1	1	1	1	0	0	0	2	2	2
Temperature	1	1	1	1	1	1	0	0	0	2	2	2

<sup>1</sup> - Includes Field Duplicates for Laboratory Samples and Field Replicates for Field Samples (In-situ)

<sup>2</sup> - Includes Trip Blanks (T), Equipment blanks (E), and Matrix Spike/Matrix Spike Duplicates(S)

<sup>3</sup> - Includes Equipment blank (E), and Matrix Spike/Matrix Spike Duplicates(S)

<sup>4</sup> - Includes Trip Blank (T) and Equipment blank (E)

<sup>5</sup> - Includes Equipment blank (E)

<sup>6</sup> - Includes Trip blank (T)

Laboratory Parameters	Project Total Sample Count												Total
	Total Sampling Frequency			No. of Field Duplicates <sup>1</sup>			No of Other QC Samples <sup>2</sup>			Total No. of Samples to Laboratory			
	River	WWTF Pease	WWTF Newingto n	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newingto n	River	WWTF Pease	WWTF Newington	
Biochemical Oxygen Demand	4	4	4	1	1	1	0	0	0	5	5	5	15
Enterococci	4	4	4	1	1	1	0	0	0	5	5	5	15
Fecal Coliform	4	4	4	1	1	1	0	0	0	5	5	5	15
Total Suspended Solids	4	4	4	1	1	1	0	0	0	5	5	5	15
Ammonia as N	4	4	4	4	4	4	0	0	0	8	8	8	24
Total Residual Chlorine	0	4	4	0	1	1	0	0	0	0	5	5	10
Total Kjeldhal Nitrogen	4	4	4	4	4	4	0	0	0	8	8	8	24
Nitrate plus Nitrite Nitrogen	4	4	4	4	4	4	0	0	0	8	8	8	24
Oil and Grease	4	4	4	1	1	1	0	0	0	5	5	5	15
Total Phosphorus	4	4	4	4	4	4	0	0	0	8	8	8	24
Total Dissolved Solids	4	4	4	1	1	1	0	0	0	5	5	5	15
Turbidity (NTU)	4	4	4	1	1	1	0	0	0	5	5	5	15
Metals	4	4	4	4	4	4	8	8	8	16	16	16	48
Seawater	4			4			8			16	0	0	16
WWTF		4	4		4	4		8	8	0	16	16	32
Cyanide	4	4	4	1	1	1	5	1	1	10	6	6	22
Total Phenolic Compounds	4	4	4	1	1	1	5	1	1	10	6	6	22
Volatile Organic Compounds	4	4	4	1	1	1	5	1	1	10	6	6	22
Acid Extactable Compounds	4	4	4	1	1	1	5	1	1	10	6	6	22
Base-Neutral Compounds	4	4	4	1	1	1	5	1	1	10	6	6	22
Field Parameters	Project Total Sample Count												Total
	Total Sampling Frequency			No. Field Replicates <sup>1</sup>			No of Other QC Samples <sup>2</sup>			Total No. of Samples in Field			
	River	WWTF Pease	WWTF Newingto n	River	WWTF Pease	WWTF Newington	River	WWTF Pease	WWTF Newingto n	River	WWTF Pease	WWTF Newington	
Dissolved Oxygen	4	4	4	4	4	4	0	0	0	8	8	8	24
pH	4	4	4	4	4	4	0	0	0	8	8	8	24
Conductivity	4	4	4	4	4	4	0	0	0	8	8	8	24
Temperature	4	4	4	4	4	4	0	0	0	8	8	8	24

<sup>1</sup> - Includes Field Duplicates for Laboratory Samples and Field Replicates for Field Samples (In-situ)

<sup>2</sup> - Includes Trip Blanks (T), Equipment blanks (E), and Matrix Spike/Matrix Spike Duplicates(S)

<sup>3</sup> - Includes Equipment blank (E), and Matrix Spike/Matrix Spike Duplicates(S)

<sup>4</sup> - Includes Trip Blank (T) and Equipment blank (E)

<sup>5</sup> - Includes Equipment blank (E)

## APPENDIX B

Laboratory Reports of Sample Results and Chain of Custody

Round 1 – September 16-17, 2018

EnviroSystems, Inc.  
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Hampton, N.H. 03843-0778  
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Steve Clifton  
Underwood Engineers, Inc.  
25 Vaughan Mall  
Portsmouth, NH 03801

PO Number: None  
Report Number: 31148  
Date Received: 09/17/18  
Date Reported: 10/12/18

Project: Piscataqua River

Attached please find results for analyses performed on samples received on 09/17/18 at 1125 and 1515.

Samples were received in acceptable condition, except where noted, and under chain of custody.

Samples for total phenolics and volatile organic compounds analyses were subcontracted to Alpha Analytical of Westborough, MA. Results for subcontracted samples may be found in the data appendix.

Instruments used in analysis were calibrated with the appropriate frequency and to the specifications of the referenced methods.

Analytes in blanks were below levels affecting sample results.

Matrix effects as monitored by matrix spike recovery or unusual physical properties were not apparent unless otherwise noted.

Accuracy and precision as monitored by laboratory control sample analyses were within acceptance limits unless otherwise noted.

Accreditations may be viewed at [www.envirosystems.com](http://www.envirosystems.com).

The results presented in this report relate only to the samples described on the chain(s) of custody and sample receipt log(s), and are intended to be used only by the submitter.

EnviroSystems, Incorporated

  
\_\_\_\_\_  
Authorized  
Signature

Date 10/12/18

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_001  
Matrix: Water  
Sampled: 09/17/18 0830

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31148-007	17	1	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D
Total dissolved solids	31148-019	2100	5	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C
Biochemical Oxygen Demand	31148-001	13	5	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Ammonia-N	31148-017	3.6	0.1	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31148-017	6.0	0.5	mg/L as N	10/08/18 1015	10/11/18 1020	CA /SM 4500-N C
Total Nitrogen	31148-017	6.8	0.5	mg/L as N	10/12/18	10/12/18	JLH/Calculation
Nitrate plus nitrite-N	31148-017	0.80	0.05	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Total phosphorus	31148-017	52	2	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E

Notes:

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_001  
Matrix: Water  
Sampled: 09/17/18 1040

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31148-021	8.33	0.2	NTU	09/17/18 1600	09/17/18 1600	JLH/SM 2130 B
Oil and grease	31148-015	ND	5	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_001DUP  
Matrix: Water  
Sampled: 09/17/18 0830

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31148-008	17	2	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D
Ammonia-N	31148-018	3.6	0.1	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31148-018	6.5	0.5	mg/L as N	10/08/18 1015	10/11/18 1020	CA /SM 4500-N C
Total Nitrogen	31148-018	7.3	0.5	mg/L as N	10/12/18	10/12/18	JLH/Calculation
Nitrate plus nitrite-N	31148-018	0.77	0.05	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Total phosphorus	31148-018	63	2	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E

Notes:

ESI



Report No: 31148  
Project: Piscataqua River  
  
Sample ID: PEASE\_001DUP  
Matrix: Water  
Sampled: 09/17/18 1040

SDG:

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31148-022	8.28	0.2	NTU	09/17/18 1600	09/17/18 1600	JLH/SM 2130 B
Oil and grease	31148-016	ND	5	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: NEW\_001  
Matrix: Water  
Sampled: 09/17/18 0730

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31148-042	1.7	1	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D
Total dissolved solids	31148-054	710	5	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C
Biochemical Oxygen Demand	31148-036	ND	5	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Ammonia-N	31148-052	ND	0.1	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31148-052	1.2	1	mg/L as N	10/08/18 1015	10/11/18 1020	CA /SM 4500-N C
Total Nitrogen	31148-052	1.5	1	mg/L as N	10/12/18	10/12/18	JLH/Calculation
Nitrate plus nitrite-N	31148-052	0.34	0.05	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Total phosphorus	31148-052	1.2	0.04	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: NEW\_001  
Matrix: Water  
Sampled: 09/17/18 0845

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31148-056	1.23	0.2	NTU	09/17/18 1600	09/17/18 1600	JLH/SM 2130 B
Oil and grease	31148-050	ND	5	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: NEW\_001DUP  
Matrix: Water  
Sampled: 09/17/18 0730

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31148-043	1.8	1	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D
Total dissolved solids	31148-055	690	5	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C
Biochemical Oxygen Demand	31148-037	ND	5	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Ammonia-N	31148-053	ND	0.1	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31148-053	1.1	1	mg/L as N	10/08/18 1015	10/11/18 1020	CA /SM 4500-N C
Total Nitrogen	31148-053	1.4	1	mg/L as N	10/12/18	10/12/18	JLH/Calculation
Nitrate plus nitrite-N	31148-053	0.34	0.05	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Total phosphorus	31148-053	1.2	0.04	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: NEW\_001DUP  
Matrix: Water  
Sampled: 09/17/18 0845

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31148-057	1.2	0.2	NTU	09/17/18 1600	09/17/18 1600	JLH/SM 2130 B
Oil and grease	31148-051	ND	5	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001  
Matrix: Water  
Sampled: 09/17/18 1350

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31148-079	ND	0.1	mg/L as N	09/24/18 1000	09/24/18 1000	JHW/SM 4500-NH3 G

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001  
Matrix: Water  
Sampled: 09/17/18 1352

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total Kjeldahl Nitrogen	31148-081	ND	0.5	mg/L as N	10/10/18 0915	10/11/18 1020	CA /SM 4500-N C
Total Nitrogen	31148-081	ND	0.5	mg/L as N	10/12/18	10/12/18	JLH/Calculation
Nitrate plus nitrite-N	31148-081	ND	0.05	mg/L as N	09/20/18 1000	09/20/18 1200	JHW/SM 4500-NO3 F

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001  
Matrix: Water  
Sampled: 09/17/18 1354

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total phosphorus	31148-085	0.033	0.02	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E

Notes:

ESI



Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001  
Matrix: Water  
Sampled: 09/17/18 1356

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	31148-083	ND	5	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001  
Matrix: Water  
Sampled: 09/17/18 1358

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved solids	31148-087	31000	5	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C

Notes:

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001  
Matrix: Water  
Sampled: 09/17/18 1359

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31148-089	0.62	0.2	NTU	09/18/18 1530	09/18/18 1530	JLH/SM 2130 B

Notes:

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001  
Matrix: Water  
Sampled: 09/17/18 1402

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31148-077	20	1	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D

Notes:

ESI

Report No: 31148  
Project: Piscataqua River  
SDG:  
Sample ID: RIVER\_001  
Matrix: Water  
Sampled: 09/17/18 1410

Parameter	Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Biochemical Oxygen Demand 31148-071	ND	5	mg/L	09/19/18	09/24/18	KL /SM 5210 B

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001DUP  
Matrix: Water  
Sampled: 09/17/18 1350

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31148-080	ND	0.1	mg/L as N	09/24/18 1000	09/24/18 1000	JHW/SM 4500-NH3 G

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001DUP  
Matrix: Water  
Sampled: 09/17/18 1352

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total Kjeldahl Nitrogen	31148-082	ND	0.5	mg/L as N	10/10/18 0915	10/11/18 1020	CA /SM 4500-N C
Total Nitrogen	31148-082	ND	0.5	mg/L as N	10/12/18	10/12/18	JLH/Calculation
Nitrate plus nitrite-N	31148-082	ND	0.05	mg/L as N	09/20/18 1000	09/20/18 1200	JHW/SM 4500-NO3 F

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001DUP  
Matrix: Water  
Sampled: 09/17/18 1354

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total phosphorus	31148-086	0.062	0.02	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E

Notes:

ESI



Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001DUP  
Matrix: Water  
Sampled: 09/17/18 1356

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	31148-084	ND	5	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001DUP  
Matrix: Water  
Sampled: 09/17/18 1358

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved solids	31148-088	31000	5	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C

Notes:

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001DUP  
Matrix: Water  
Sampled: 09/17/18 1359

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31148-090	0.63	0.2	NTU	09/18/18 1530	09/18/18 1530	JLH/SM 2130 B

Notes:

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001DUP  
Matrix: Water  
Sampled: 09/17/18 1402

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31148-078	9.8	1	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D

Notes:

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001DUP  
Matrix: Water  
Sampled: 09/17/18 1410

Parameter	Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Biochemical Oxygen Demand 31148-072	ND	5	mg/L	09/19/18	09/24/18	KL /SM 5210 B

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001  
Matrix: Water  
Sampled: 09/17/18 1352

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
pH	31148-107	8.0			09/17/18	09/17/18	EPA 9041A
Dissolved Oxygen	31148-107	9.4	0.1	mg/L	09/17/18	09/17/18	SM 4500-O-G
Temperature	31148-107	12		deg C	09/17/18	09/17/18	
Conductivity	31148-107	33	0.01	mS/cm	09/17/18	09/17/18	SM2510B

Notes:

ND = Not Detected

ESI

Lab Number: 31148-032  
Sample Designation: PEASE\_001  
Date Sampled: 09/17/18  
Date Extracted: 09/21/18  
Date Analyzed: 09/25/18  
Matrix: Water

# SEMIVOLATILE ORGANICS

Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	4.4	3	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

## SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	40	21-100	nitrobenzene-d5	39	35-114
phenol-d5	25	10-102	2-fluorobiphenyl	33, J17	43-116
2,4,6-tribromophenol	95	10-123	terphenyl-d14	41	33-141

U = Below quantitation limit

J17 = SUR %R below limit.

ESI

Lab Number: 31148-033  
Sample Designation: PEASE\_001DUP  
Date Sampled: 09/17/18  
Date Extracted: 09/21/18  
Date Analyzed: 09/25/18  
Matrix: Water

# SEMIVOLATILE ORGANICS

Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	7.9	3	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

## SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	47	21-100	nitrobenzene-d5	65	35-114
phenol-d5	31	10-102	2-fluorobiphenyl	47	43-116
2,4,6-tribromophenol	81	10-123	terphenyl-d14	68	33-141

U = Below quantitation limit

ESI



Lab Number: 31148-034  
Sample Designation: Equipment Blank PEASE\_001  
Date Sampled: 09/16/18  
Date Extracted: 09/21/18  
Date Analyzed: 09/25/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	3	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	37	21-100	nitrobenzene-d5	52	35-114
phenol-d5	24	10-102	2-fluorobiphenyl	37	43-116
2,4,6-tribromophenol	70	10-123	terphenyl-d14	82	33-141

U = Below quantitation limit

ESI

Lab Number: 31148-067  
Sample Designation: NEW\_001  
Date Sampled: 09/17/18  
Date Extracted: 09/21/18  
Date Analyzed: 09/25/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	3	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	39	21-100	nitrobenzene-d5	55	35-114
phenol-d5	24	10-102	2-fluorobiphenyl	39	43-116
2,4,6-tribromophenol	79	10-123	terphenyl-d14	91	33-141

U = Below quantitation limit

ESI

Lab Number: 31148-068  
Sample Designation: NEW\_001DUP  
Date Sampled: 09/17/18  
Date Extracted: 09/21/18  
Date Analyzed: 09/25/18  
Matrix: Water

# SEMIVOLATILE ORGANICS

Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	3	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

## SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	29	21-100	nitrobenzene-d5	58	35-114
phenol-d5	18	10-102	2-fluorobiphenyl	29	43-116
2,4,6-tribromophenol	78	10-123	terphenyl-d14	99	33-141

U = Below quantitation limit

ESI

Lab Number: 31148-069  
Sample Designation: Equipment Blank NEW\_001  
Date Sampled: 09/16/18  
Date Extracted: 09/21/18  
Date Analyzed: 09/25/18  
Matrix: Water

# SEMIVOLATILE ORGANICS

Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	3	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	6.7	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

# SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits ( %)		Recovery (%)	Acceptance Limits ( %)
2-fluorophenol	32	21-100	nitrobenzene-d5	55	35-114
phenol-d5	19	10-102	2-fluorobiphenyl	32	43-116
2,4,6-tribromophenol	66	10-123	terphenyl-d14	90	33-141

U = Below quantitation limit

ESI

Lab Number: 31148-103  
Sample Designation: RIVER\_001  
Date Sampled: 09/17/18  
Date Extracted: 09/21/18  
Date Analyzed: 09/25/18  
Matrix: Water

# SEMIVOLATILE ORGANICS

Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	3	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

# SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	49	21-100	nitrobenzene-d5	55	35-114
phenol-d5	36	10-102	2-fluorobiphenyl	47	43-116
2,4,6-tribromophenol	75	10-123	terphenyl-d14	34	33-141

U = Below quantitation limit

ESI

Lab Number: 31148-104  
Sample Designation: RIVER\_001DUP  
Date Sampled: 09/17/18  
Date Extracted: 09/21/18  
Date Analyzed: 09/25/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	3	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits ( %)		Recovery (%)	Acceptance Limits ( %)
2-fluorophenol	46	21-100	nitrobenzene-d5	67	35-114
phenol-d5	33	10-102	2-fluorobiphenyl	46	43-116
2,4,6-tribromophenol	75	10-123	terphenyl-d14	76	33-141

U = Below quantitation limit

ESI

Lab Number: 31148-105  
Sample Designation: Field Blank RIVER\_001  
Date Sampled: 09/17/18  
Date Extracted: 09/21/18  
Date Analyzed: 10/03/18  
Matrix: Water

# SEMIVOLATILE ORGANICS

Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U, J	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	3	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	2.8	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U, J	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

## SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	27	21-100	nitrobenzene-d5	50	35-114
phenol-d5	19	10-102	2-fluorobiphenyl	27, J17	43-116
2,4,6-tribromophenol	69	10-123	terphenyl-d14	64	33-141

U = Below quantitation limit

J17 = SUR %R below limti.

J = CCV recovery below acceptable llimits. Internal standard within acceptable limits.

ESI

Lab Number: 31148-106  
Sample Designation: Trip Blank RIVER\_001  
Date Sampled: 09/17/18  
Date Extracted: 09/21/18  
Date Analyzed: 10/03/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U, J	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	3	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U, J	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits ( %)		Recovery (%)	Acceptance Limits ( %)
2-fluorophenol	28	21-100	nitrobenzene-d5	40	35-114
phenol-d5	19	10-102	2-fluorobiphenyl	28, J17	43-116
2,4,6-tribromophenol	60	10-123	terphenyl-d14	54	33-141

U = Below quantitation limit

J17 = SUR %R below limit.

J = CCV recovery below acceptable limits. Internal standard within acceptable limits.

ESI



## BACTERIAL ANALYSIS REPORT

ESI STUDY No.: 31148  
 Client: Underwood Engineers  
 Sample Receipt: 09/17/18 1125

### Fecal Coliform

Method: SM 9222D

Sample Identification	Sample Collection		Sample Analysis		Result (CFU/100mL)	Analyst
	Date	Time	Date	Time		
RIVER001	09/17/18	1400	09/17/18	1836	2	MW
RIVER001DUP	09/17/18	1400	09/17/18	1846	5	MW
PEASE-001	09/17/18	1045	09/17/18	1310	3	MW
PEASE-001 Dup	09/17/18	1045	09/17/18	1310	4	MW
NEW-001	09/17/18	0845	09/17/18	1315	5	MW
NEW-001 Dup	09/17/18	0845	09/17/18	1332	7	MW

### Enterococcus

Method: EPA 1600

Sample Identification	Sample Collection		Sample Analysis		Result (CFU/100mL)	Analyst
	Date	Time	Date	Time		
RIVER001	09/17/18	1405	09/17/18	1830	<1	MW
RIVER001DUP	09/17/18	1405	09/17/18	1836	<1	MW
PEASE-001	09/17/18	1045	09/17/18	1524	40	MW
PEASE-001 Dup	09/17/18	1045	09/17/18	1524	49	MW
NEW-001	09/17/18	0845	09/17/18	1530	7	MW
NEW-001 Dup	09/17/18	0845	09/17/18	1551	4	MW

### Effluent Chemistry

Total Residual Chlorine (mg/L)	- <sup>a</sup>
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<sup>a</sup> TRC was not measured at the lab prior to analysis.

Analytical Methods: APHA. 2012. *Standard Methods for the Examination of Water and Wastewater*, 22<sup>nd</sup> Edition. Washington D.C.

U.S. Environmental Protection Agency Office of Water (4303T). 2003. *Method 1600: Membrane Filter Test for Enterococci in Water*. Washington D.C.

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_001  
Matrix: Water  
Sampled: 09/17/18 0830

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	PB438W	0		ND	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total suspended solids	LCS438W	10	10	99	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total suspended solids	LCSD438W	10	10	99, 0%RSD	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total dissolved solids	PB592W	0	0	ND	mg/L	09/19/18 0930	09/20/18 1220	CA/SM 2540C
Total dissolved solids	LCS592W	518	500	104	mg/L	09/19/18 0930	09/20/18 1220	CA/SM 2540C
Total dissolved solids	LCSD592W	505	500	101, 3%RSD	mg/L	09/19/18 0930	09/20/18 1220	CA/SM 2540C
Biochemical Oxygen Demand	PB859W	0	0	ND	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	PB859W	0	0	ND	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	LCS859W	208	198	105	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	LCSD859W	199	198	100	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	LCST859W	204	198	103, 2%RSD	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Ammonia-N	PB967W	0	0	ND	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Ammonia-N	LCS967W	10	10	99	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Ammonia-N	LCSD967	10	10	99, 0%RSD	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB581W	0	0	ND	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Total Kjeldahl Nitrogen	LCS581W	8	10	83	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Total Kjeldahl Nitrogen	LCSD581	10	10	98, 17%RSD	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Nitrate plus nitrite-N	PB378W	0	0	ND	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCS378W	1	1	100	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD378W	1	1	100, 0%RSD	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Total phosphorus	PB507W	0	0	ND	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E
Total phosphorus	LCS507W	1	1	102	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E
Total phosphorus	LCSD507W	1	1	102, 1%RSD	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_001  
Matrix: Water  
Sampled: 09/17/18 1040

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	PB479W	0	0	ND	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A
Oil and grease	LCS479W	34	40	85	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A
Oil and grease	LCSD479W	33	40	83, 2%RSD	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_001DUP  
Matrix: Water  
Sampled: 09/17/18 0830

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	PB438W	0		ND	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total suspended solids	LCS438W	10	10	99	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total suspended solids	LCSD438W	10	10	99, 0%RSD	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Ammonia-N	PB967W	0	0	ND	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Ammonia-N	LCS967W	10	10	99	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Ammonia-N	LCSD967	10	10	99, 0%RSD	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB581W	0	0	ND	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Total Kjeldahl Nitrogen	LCS581W	8	10	83	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Total Kjeldahl Nitrogen	LCSD581	10	10	98, 17%RSD	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Nitrate plus nitrite-N	PB378W	0	0	ND	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCS378W	1	1	100	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD378W	1	1	100, 0%RSD	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Total phosphorus	PB507W	0	0	ND	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E
Total phosphorus	LCS507W	1	1	102	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E
Total phosphorus	LCSD507W	1	1	102, 1%RSD	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E

Notes:

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_001DUP  
Matrix: Water  
Sampled: 09/17/18 1040

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	PB479W	0	0	ND	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A
Oil and grease	LCS479W	34	40	85	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A
Oil and grease	LCSD479W	33	40	83, 2%RSD	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A

Notes:

ND = Not Detected

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: NEW\_001  
Matrix: Water  
Sampled: 09/17/18 0730

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	PB438W	0		ND	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D
Total suspended solids	LCS438W	10	10	99	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D
Total suspended solids	LCSD438W	10	10	99, 0%RSD	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D
Total dissolved solids	PB592W	0	0	ND	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C
Total dissolved solids	LCS592W	518	500	104	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C
Total dissolved solids	LCSD592W	505	500	101, 3%RSD	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C
Biochemical Oxygen Demand	PB859W	0	0	ND	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Biochemical Oxygen Demand	PB859W	0	0	ND	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Biochemical Oxygen Demand	LCS859W	208	198	105	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Biochemical Oxygen Demand	LCSD859W	199	198	100	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Biochemical Oxygen Demand	LCST859W	204	198	103, 2%RSD	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Ammonia-N	PB967W	0	0	ND	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Ammonia-N	LCS967W	10	10	99	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Ammonia-N	LCSD967	10	10	99, 0%RSD	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB581W	0	0	ND	mg/L as N	10/08/18 1015	10/11/18 1020	CA /SM 4500-N C
Total Kjeldahl Nitrogen	LCS581W	8	10	83	mg/L as N	10/08/18 1015	10/11/18 1020	CA /SM 4500-N C
Total Kjeldahl Nitrogen	LCSD581	10	10	98, 17%RSD	mg/L as N	10/08/18 1015	10/11/18 1020	CA /SM 4500-N C
Nitrate plus nitrite-N	PB378W	0	0	ND	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCS378W	1	1	100	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD378W	1	1	100, 0%RSD	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Total phosphorus	PB507W	0	0	ND	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E
Total phosphorus	LCS507W	1	1	102	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E
Total phosphorus	LCSD507W	1	1	102, 1%RSD	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: NEW\_001  
Matrix: Water  
Sampled: 09/17/18 0845

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	PB479W	0	0	ND	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A
Oil and grease	LCS479W	34	40	85	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A
Oil and grease	LCSD479W	33	40	83, 2%RSD	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A

Notes:

ND = Not Detected

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: NEW\_001DUP  
Matrix: Water  
Sampled: 09/17/18 0730

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	PB438W	0		ND	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total suspended solids	LCS438W	10	10	99	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total suspended solids	LCSD438W	10	10	99, 0%RSD	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total dissolved solids	PB592W	0	0	ND	mg/L	09/19/18 0930	09/20/18 1220	CA/SM 2540C
Total dissolved solids	LCS592W	518	500	104	mg/L	09/19/18 0930	09/20/18 1220	CA/SM 2540C
Total dissolved solids	LCSD592W	505	500	101, 3%RSD	mg/L	09/19/18 0930	09/20/18 1220	CA/SM 2540C
Biochemical Oxygen Demand	PB859W	0	0	ND	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	PB859W	0	0	ND	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	LCS859W	208	198	105	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	LCSD859W	199	198	100	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	LCST859W	204	198	103, 2%RSD	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Ammonia-N	PB967W	0	0	ND	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Ammonia-N	LCS967W	10	10	99	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Ammonia-N	LCSD967	10	10	99, 0%RSD	mg/L as N	10/05/18 1330	10/05/18 1330	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB581W	0	0	ND	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Total Kjeldahl Nitrogen	LCS581W	8	10	83	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Total Kjeldahl Nitrogen	LCSD581	10	10	98, 17%RSD	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Nitrate plus nitrite-N	PB378W	0	0	ND	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCS378W	1	1	100	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD378W	1	1	100, 0%RSD	mg/L as N	09/25/18 1330	09/25/18 1400	JHW/SM 4500-NO3 F
Total phosphorus	PB507W	0	0	ND	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E
Total phosphorus	LCS507W	1	1	102	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E
Total phosphorus	LCSD507W	1	1	102, 1%RSD	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E

Notes:

ND = Not Detected

ESI



Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: NEW\_001DUP  
Matrix: Water  
Sampled: 09/17/18 0845

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	PB479W	0	0	ND	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A
Oil and grease	LCS479W	34	40	85	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A
Oil and grease	LCSD479W	33	40	83, 2%RSD	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31148  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_001  
Matrix: Water

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	PB438W	0		ND	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D
Total suspended solids	LCS438W	10	10	99	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D
Total suspended solids	LCSD438W	10	10	99, 0%RSD	mg/L	09/18/18 1420	09/20/18 0945	CA /SM 2540D
Total dissolved solids	PB592W	0	0	ND	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C
Total dissolved solids	LCS592W	518	500	104	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C
Total dissolved solids	LCSD592W	505	500	101, 3%RSD	mg/L	09/19/18 0930	09/20/18 1220	CA /SM 2540C
Biochemical Oxygen Demand	PB859W	0	0	ND	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Biochemical Oxygen Demand	PB859W	0	0	ND	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Biochemical Oxygen Demand	LCS859W	208	198	105	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Biochemical Oxygen Demand	LCSD859W	199	198	100	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Biochemical Oxygen Demand	LCST859W	204	198	103, 2%RSD	mg/L	09/19/18	09/24/18	KL /SM 5210 B
Ammonia-N	PB959W	0	0	ND	mg/L as N	09/24/18 1000	09/24/18 1000	JHW/SM 4500-NH3 G
Ammonia-N	LCS959W	10	10	100	mg/L as N	09/24/18 1000	09/24/18 1000	JHW/SM 4500-NH3 G
Ammonia-N	LCSD959	8	10	85, 16%RSD	mg/L as N	09/24/18 1000	09/24/18 1000	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB581W	0	0	ND	mg/L as N	10/08/18 1015	10/11/18 1020	CA /SM 4500-N C
Total Kjeldahl Nitrogen	LCS581W	8	10	83	mg/L as N	10/08/18 1015	10/11/18 1020	CA /SM 4500-N C
Total Kjeldahl Nitrogen	LCSD581	10	10	98, 17%RSD	mg/L as N	10/08/18 1015	10/11/18 1020	CA /SM 4500-N C
Nitrate plus nitrite-N	PB386W	0	0	ND	mg/L as N	09/20/18 1000	09/20/18 1200	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCS386W	1	1	100	mg/L as N	09/20/18 1000	09/20/18 1200	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD386W	1	1	100, 0%RSD	mg/L as N	09/20/18 1000	09/20/18 1200	JHW/SM 4500-NO3 F
Total phosphorus	PB507W	0	0	ND	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E
Total phosphorus	LCS507W	1	1	102	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E
Total phosphorus	LCSD507W	1	1	102, 1%RSD	mg/L	10/08/18 1200	10/10/18 1218	CA /SM 4500-P E
Oil and grease	PB479W	0	0	ND	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A
Oil and grease	LCS479W	34	40	85	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A
Oil and grease	LCSD479W	33	40	83, 2%RSD	mg/L	09/24/18 1230	09/26/18 0830	RK /EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31148  
 Project: Piscataqua River  
 Sample ID: RIVER\_001DUP  
 Matrix: Water

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	PB438W	0		ND	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total suspended solids	LCS438W	10	10	99	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total suspended solids	LCSD438W	10	10	99, 0%RSD	mg/L	09/18/18 1420	09/20/18 0945	CA/SM 2540D
Total dissolved solids	PB592W	0	0	ND	mg/L	09/19/18 0930	09/20/18 1220	CA/SM 2540C
Total dissolved solids	LCS592W	518	500	104	mg/L	09/19/18 0930	09/20/18 1220	CA/SM 2540C
Total dissolved solids	LCSD592W	505	500	101, 3%RSD	mg/L	09/19/18 0930	09/20/18 1220	CA/SM 2540C
Biochemical Oxygen Demand	PB859W	0	0	ND	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	PB859W	0	0	ND	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	LCS859W	208	198	105	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	LCSD859W	199	198	100	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Biochemical Oxygen Demand	LCST859W	204	198	103, 2%RSD	mg/L	09/19/18	09/24/18	KL/SM 5210 B
Ammonia-N	PB960W	0	0	ND	mg/L as N	09/24/18 1000	09/24/18 1000	JHW/SM 4500-NH3 G
Ammonia-N	LCS960W	11	10	105	mg/L as N	09/24/18 1000	09/24/18 1000	JHW/SM 4500-NH3 G
Ammonia-N	LCSD960	10	10	102, 3%RSD	mg/L as N	09/24/18 1000	09/24/18 1000	JHW/SM 4500-NH3 G
Ammonia-N	31148-080D	0	0	NC	mg/L as N	09/24/18 1000	09/24/18 1000	JHW/SM 4500-NH3 G
Ammonia-N	31148-080S	10	10	100	mg/L as N	09/24/18 1000	09/24/18 1000	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB581W	0	0	ND	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Total Kjeldahl Nitrogen	LCS581W	8	10	83	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Total Kjeldahl Nitrogen	LCSD581	10	10	98, 17%RSD	mg/L as N	10/08/18 1015	10/11/18 1020	CA/SM 4500-N C
Nitrate plus nitrite-N	PB386W	0	0	ND	mg/L as N	09/20/18 1000	09/20/18 1200	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCS386W	1	1	100	mg/L as N	09/20/18 1000	09/20/18 1200	JHW/SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD386W	1	1	100, 0%RSD	mg/L as N	09/20/18 1000	09/20/18 1200	JHW/SM 4500-NO3 F
Total phosphorus	PB507W	0	0	ND	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E
Total phosphorus	LCS507W	1	1	102	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E
Total phosphorus	LCSD507W	1	1	102, 1%RSD	mg/L	10/08/18 1200	10/10/18 1218	CA/SM 4500-P E
Oil and grease	PB479W	0	0	ND	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A
Oil and grease	LCS479W	34	40	85	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A
Oil and grease	LCSD479W	33	40	83, 2%RSD	mg/L	09/24/18 1230	09/26/18 0830	RK/EPA 1664A

Notes:

ND = Not Detected

ESI

Lab Number: PB157W  
Sample Designation: Laboratory Blank  
Date Sampled: 09/21/18 0930  
Date Extracted: 09/21/18 0930  
Date Analyzed: 09/24/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Quantitation Limit (ug/L)		Concentration (ug/L)	Quantitation Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	5
2-chlorophenol	U	3	4-nitrophenol	U	3
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	3
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	3	hexachlorobenzene	U	3
4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	3
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	3	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits ( %)		Recovery (%)	Acceptance Limits ( %)
2-fluorophenol	38	21-100	nitrobenzene-d5	11, J17	35-114
phenol-d5	23	10-102	2-fluorobiphenyl	10,J17	43-116
2,4,6-tribromophenol	72	10-123	terphenyl-d14	15,J17	33-141

U = Below quantitation limit  
J17 = SUR %R below limit.

Lab Number: LCS157W  
Sample Designation: Laboratory Control Sample  
Date Sampled: 09/21/18 0930  
Date Extracted: 09/21/18 0930  
Date Analyzed: 09/25/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Limits (%)
N-nitrosodimethylamine	U	NA	NA	30-150	acenaphthene	130	200	50-158
phenol	68	200	34	5-112	2,4-dinitrophenol	20	NA	30-150
2-chlorophenol	180	200	92	23-134	4-nitrophenol	87	100	39-139
bis(2-chloroethyl)ether	U	NA	NA	36-166	fluorene	69	100	1-132
1,3-dichlorobenzene	U	NA	NA	1-172	4-chlorophenyl-phenylether	U	NA	59-121
1,4-dichlorobenzene	55	100	55	20-124	diethylphthalate	U	NA	25-158
1,2-dichlorobenzene	U	NA	NA	32-129	4,6-dinitro-2-methylphenol	U	NA	30-150
2-methylphenol (m-cresol)	U	NA	NA	30-150	N-nitrosodiphenylamine	U	NA	1-181
bis(2-chloroisopropyl)ether	U	NA	NA	53-127	1,2-diphenylhydrazine (azo)	U	NA	1-181
hexachloroethane	U	NA	NA	40-113	4-bromophenyl-phenylether	U	NA	30-150
N-nitroso-di-n-propylamine	55	100	55	1-150	hexachlorobenzene	U	NA	53-127
4-methylphenol (p-cresol)	U	NA	NA	30-150	pentachlorophenol	160	200	1-152
nitrobenzene	U	NA	NA	35-180	phenanthrene	69	100	14-176
isophorone	U	NA	NA	21-196	anthracene	70	100	54-120
2-nitrophenol	U	NA	NA	29-182	di-n-butylphthalate	82	100	30-150
2,4-dimethylphenol	U	NA	NA	32-119	fluoranthene	76	100	1-118
bis(2-chloroethoxy)methane	U	NA	NA	33-184	benzidine	U	NA	26-137
2,4-dichlorophenol	U	NA	NA	39-135	pyrene	160	200	30-150
1,2,4-trichlorobenzene	55	100	55	44-142	butylbenzylphthalate	U	NA	52-115
naphthalene	58	100	58	21-133	benzo(a)anthracene	79	100	1-262
hexachloro-1,3-butadiene	U	NA	NA	24-118	chrysene	76	100	33-143
4-chloro-3-methylphenol	180	200	90	22-147	3,3'-dichlorobenzidine	U	NA	1-152
hexachlorocyclopentadiene	U	NA	NA	30-150	bis(2-ethylhexyl)phthalate	U	NA	17-168
2,4,6-trichlorophenol	U	NA	NA	30-150	di-n-octylphthalate	U	NA	1-158
2-chloronaphthalene	U	NA	NA	30-150	benzo(b)fluoranthene	25	100	1-146
acenaphthylene	68	100	68	30-150	benzo(k)fluoranthene	28	100	24-159
dimethylphthalate	U	NA	NA	33-145	benzo(a)pyrene	29	100	11-162
2,6-dinitrotoluene	U	NA	NA	1-112	indeno(1,2,3-cd)pyrene	62	100	17-163
2,4-dinitrotoluene	79	100	79	30-150	dibenzo(a,h)anthracene	58	100	1-171
					benzo(g,h,i)perylene	55	100	1-227

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	45	21-100	nitrobenzene-d5	66	35-114
phenol-d5	28	10-102	2-fluorobiphenyl	61	43-116
2,4,6-tribromophenol	90	10-123	terphenyl-d14	82	33-141

U = Below quantitation limit

Lab Number: LCSD157W  
Sample Designation: Laboratory Control Sample Duplicate  
Date Sampled: 09/21/18 0930  
Date Extracted: 09/21/18 0930  
Date Analyzed: 09/25/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)
N-nitrosodimethylamine	U	NA	NA	30-150	acenaphthene	130	200	65	50-158
phenol	77	200	39	5-112	2,4-dinitrophenol	U	NA	NA	30-150
2-chlorophenol	170	200	85	23-134	4-nitrophenol	93	100	93	39-139
bis(2-chloroethyl)ether	U	NA	NA	36-166	fluorene	70	100	70	1-132
1,3-dichlorobenzene	U	NA	NA	1-172	4-chlorophenyl-phenylether	U	NA	NA	59-121
1,4-dichlorobenzene	55	100	55	20-124	diethylphthalate	U	NA	NA	25-158
1,2-dichlorobenzene	U	NA	NA	32-129	4,6-dinitro-2-methylphenol	U	NA	NA	30-150
2-methylphenol (m-cresol)	U	NA	NA	30-150	N-nitrosodiphenylamine	U	NA	NA	1-181
bis(2-chloroisopropyl)ether	U	NA	NA	53-127	1,2-diphenylhydrazine (azo	U	NA	NA	1-181
hexachloroethane	U	NA	NA	40-113	4-bromophenyl-phenylether	U	NA	NA	30-150
N-nitroso-di-n-propylamine	60	100	60	1-150	hexachlorobenzene	U	NA	NA	53-127
4-methylphenol (p-cresol)	U	NA	NA	30-150	pentachlorophenol	140	200	70	1-152
nitrobenzene	U	NA	NA	35-180	phenanthrene	71	100	71	14-176
isophorone	U	NA	NA	21-186	anthracene	72	100	72	54-120
2-nitrophenol	U	NA	NA	29-182	di-n-butylphthalate	83	100	83	30-150
2,4-dimethylphenol	U	NA	NA	32-119	fluoranthene	78	100	78	1-118
bis(2-chloroethoxy)methane	U	NA	NA	33-184	benzidine	U	NA	NA	26-137
2,4-dichlorophenol	U	NA	NA	39-135	pyrene	160	200	80	30-150
1,2,4-trichlorobenzene	56	100	56	44-142	butylbenzylphthalate	U	NA	NA	52-115
naphthalene	60	100	60	21-133	benzo(a)anthracene	78	100	78	1-262
hexachloro-1,3-butadiene	U	NA	NA	24-116	chrysene	77	100	77	33-143
4-chloro-3-methylphenol	170	200	85	22-147	3,3'-dichlorobenzidine	U	NA	NA	1-152
hexachlorocyclopentadiene	U	NA	NA	30-150	bis(2-ethylhexyl)phthalate	U	NA	NA	17-168
2,4,6-trichlorophenol	U	NA	NA	30-150	di-n-octylphthalate	U	NA	NA	1-158
2-chloronaphthalene	U	NA	NA	30-150	benzo(b)fluoranthene	26	100	26	1-146
acenaphthylene	68	100	68	30-150	benzo(k)fluoranthene	29	100	29	24-159
dimethylphthalate	U	NA	NA	33-145	benzo(a)pyrene	29	100	29	11-182
2,6-dinitrotoluene	U	NA	NA	1-112	indeno(1,2,3-cd)pyrene	63	100	63	17-163
2,4-dinitrotoluene	80	100	80	30-150	dibenzo(a,h)anthracene	58	100	58	1-171
					benzo(g,h,i)perylene	55	100	55	1-227

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	46	21-100	nitrobenzene-d5	64	35-114
phenol-d5	31	10-102	2-fluorobiphenyl	59	43-116
2,4,6-tribromophenol	77	10-123	terphenyl-d14	81	33-141

U = Below quantitation limit

Lab Number: 31148-103MS  
Sample Designation: Matrix Spike  
Date Sampled: 09/17/18  
Date Extracted: 09/21/18  
Date Analyzed: 09/25/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)
N-nitrosodimethylamine	U	NA	NA	30-150	acenaphthene	130	200	64	50-158
phenol	94	200	47	5-112	2,4-dinitrophenol	U	NA	NA	30-150
2-chlorophenol	180	200	90	23-134	4-nitrophenol	84	100	84	39-139
bis(2-chloroethyl)ether	U	NA	NA	36-166	fluorene	66	100	66	1-132
1,3-dichlorobenzene	U	NA	NA	1-172	4-chlorophenyl-phenylether	U	NA	NA	59-121
1,4-dichlorobenzene	57	100	57	20-124	diethylphthalate	U	NA	NA	25-158
1,2-dichlorobenzene	U	NA	NA	32-129	4,6-dinitro-2-methylphenol	U	NA	NA	30-150
2-methylphenol (m-cresol)	U	NA	NA	30-150	N-nitrosodiphenylamine	U	NA	NA	1-181
bis(2-chloroisopropyl)ether	U	NA	NA	53-127	1,2-diphenylhydrazine	U	NA	NA	1-181
hexachloroethane	U	NA	NA	40-113	4-bromophenyl-phenylether	U	NA	NA	30-150
N-nitroso-di-n-propylamine	55	100	55	1-150	hexachlorobenzene	U	NA	NA	53-127
4-methylphenol (p-cresol)	U	NA	NA	30-150	pentachlorophenol	40	200	20	1-152
nitrobenzene	U	NA	NA	35-180	phenanthrene	64	100	64	14-176
isophorone	U	NA	NA	21-196	anthracene	64	100	64	54-120
2-nitrophenol	U	NA	NA	29-182	di-n-butylphthalate	77	100	77	30-150
2,4-dimethylphenol	U	NA	NA	32-119	fluoranthene	69	100	69	1-118
bis(2-chloroethoxy)methane	U	NA	NA	33-184	benzidine	U	NA	NA	26-137
2,4-dichlorophenol	U	NA	NA	39-135	pyrene	140	200	72	30-150
1,2,4-trichlorobenzene	59	100	59	44-142	butylbenzylphthalate	U	NA	NA	52-115
naphthalene	61	100	61	21-133	benzo(a)anthracene	68	100	68	1-262
hexachloro-1,3-butadiene	U	NA	NA	24-116	chrysene	67	100	67	33-143
4-chloro-3-methylphenol	180	200	90	22-147	3,3'-dichlorobenzidine	U	NA	NA	1-152
hexachlorocyclopentadiene	U	NA	NA	30-150	bis(2-ethylhexyl)phthalate	U	NA	NA	17-168
2,4,6-trichlorophenol	U	NA	NA	30-150	di-n-octylphthalate	U	NA	NA	1-158
2-chloronaphthalene	U	NA	NA	30-150	benzo(b)fluoranthene	24	100	24	1-146
acenaphthylene	67	100	67	30-150	benzo(k)fluoranthene	26	100	26	24-159
dimethylphthalate	U	NA	NA	33-145	benzo(a)pyrene	26	100	26	11-162
2,6-dinitrotoluene	U	NA	NA	1-112	indeno(1,2,3-cd)pyrene	57	100	57	17-163
2,4-dinitrotoluene	75	100	75	30-150	dibenzo(a,h)anthracene	54	100	54	1-171
					benzo(g,h,i)perylene	51	100	51	1-227

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	48	21-100	nitrobenzene-d5	66	35-114
phenol-d5	40	10-102	2-fluorobiphenyl	62	43-116
2,4,6-tribromophenol	64	10-123	terphenyl-d14	72	33-141

U = Below quantitation limit

# MICROBIOLOGICAL ASSAY DATA SHEET

Client: Underwood Engineers	Date: 9/17/18	Initials: <i>V</i>
ESI #: 31148	Col.Dil.H <sub>2</sub> O: M-3312 / M-3310	M-FC: M-3311
Date collected: 9/17/18	Pipette Used: A-5003 / A-5104	Positive lot #: ECB0831 18A

	Sample ID	Time Sampled	Time Filtered	mls filtered per 100 mls total vol.	Media	CFU's	Total w/ background	Comments
	Start Blank	-	1310	-	M-FC	0	0	
005	PEASE_001	1045	1310	0.1	M-FC	0	0	3 CFUs / 100mL
005	PEASE_001	1045	1315	1.0	M-FC	0	0	
005	PEASE_001	1045	1320	10	M-FC	0	9	
005	PEASE_001	1045	1341	100	M-FC	3	137	
006	PEASE_001D	1045	1310	0.1	M-FC	0	0	4/110 x 100 = 4 CFUs / 100mL
006	PEASE_001D	1045	1315	1.0	M-FC	0	0	
006	PEASE_001D	1045	1320	10	M-FC	1	8	
006	PEASE_001D	1045	1341	100	M-FC	3	158 <sup>63</sup> MW 10112	
040	NEW_001	0845	1315	0.1	M-FC	0	0	32/110 x 100 = 5 CFUs / 100mL
040	NEW_001	0845	1320	0.1dup	M-FC	0	0	
040	NEW_001	0845	1324	1.0	M-FC	0	0	
040	NEW_001	0845	1332	10	M-FC	1	1	
040	NEW_001	0845	1349	100	M-FC	5	108	
041	NEW_001D	0845	1332	0.1	M-FC	0	0	8/110 x 100 = 7 CFUs / 100mL
041	NEW_001D	0845	1335	0.1dup	M-FC	0	0	
041	NEW_001D	0845	1332	1.0	M-FC	0	0	
041	NEW_001D	0845	1341	10	M-FC	2	2	
041	NEW_001D	0845	1349	100	M-FC	6	113	
	Positive	-	1353	0.1	M-FC	✓	✓	
	End Blank	-	1353	-	M-FC	0	0	
					M-FC			
					M-FC			
					M-FC			
					M-FC			
					M-FC			
					M-FC			

M-FC stored in Incubator #303    Temp: 44.7    1358 9/17/18 to 1258    9/18/18

Method 9222D    Counted: 1300    9/18/18    Counted By: MW



# MICROBIOLOGICAL ASSAY DATA SHEET

Client: Underwood Engineers	Date: 9/17/18	Initials: <i>vw</i>
ESI #: 31148	Col.Dil.H <sub>2</sub> O: M-3312	M-EI: M-3313
Date collected: 9/17/18	Pipette Used: A-5003 / A-5104	Positive lot #: EFB083118A

	Sample ID	Time Sampled	Time Filtered	mls filtered per 100 mls total vol.	Media	CFU's	Total w/ background	Comments
	Start Blank	-	1524	-	M-EI	0	0	
-003	PEASE_001	1045	1524	0.1	M-EI	0	0	40 CFUs/100mL
-003	PEASE_001	1045	1530	1.0	M-EI	0	0	
-003	PEASE_001	1045	1530.5	10	M-EI	4	4	
-003	PEASE_001	1045	1539	100	M-EI	40	40	
-004	PEASE_001D	1045	1524	0.1	M-EI	0	0	49 CFUs/100mL
-004	PEASE_001D	1045	1530	1.0	M-EI	0	0	
-004	PEASE_001D	1045	1530.5	10	M-EI	6	6	
-004	PEASE_001D	1045	1539	100	M-EI	49	49	$\frac{8}{10} \times 100 =$
-038	NEW_001	0845	1530	0.1	M-EI	0	0	7 CFUs/100mL
-038	NEW_001	0845	1535	0.1 dup	M-EI	0	0	
-038	NEW_001	0845	1539	1.0	M-EI	0	0	
-038	NEW_001	0845	1547	10	M-EI	2	2	
-038	NEW_001	0845	1551	100	M-EI	6	6	
-039	NEW_001D	0845	1551	0.1	M-EI	0	0	4 CFUs/100mL
-039	NEW_001D	0845	1551	0.1 dup	M-EI	0	0	
-039	NEW_001D	0845	1557	1.0	M-EI	0	0	
-039	NEW_001D	0845	1557	10	M-EI	0	0	
-039	NEW_001D	0845	1602	100	M-EI	4	4	
	Positive	-	1602	0.1	M-EI	✓	✓	
	End Blank	-	1602	-	M-EI	0	0	
					M-EI			
					M-EI			
					M-EI			
					M-EI			
					M-EI			
					M-EI			
					M-EI			
					M-EI			

M-EI stored in Incubator #309	Temp:	41.1	1605	to	1420	9/18/18
Method EPA 1600	Counted:	1420	9/18/18	Counted By:	MW	

*E10* 9/17/18 HCL sticker on "PEASE-001DUP" Whirl-pak

ESI Study #: 31148

# MICROBIOLOGICAL ASSAY DATA SHEET

Client: Underwood Engineers

Date: 9/17/18

Initials: VL

Col.Dil.H<sub>2</sub>O: M-3312

m-FC: M-3311

m-EI: M-3313

Sample I.D.	Time Sampled	Time Filtered	mLs Filtered	Media Type	CFU's	Total with Background	Comments
Start Blank		1830		m-EI	0	0	
Start Blank		↓		m-FC	0	0	
RIVER001	1405	↓	100	m-EI	0	0	<1 CFU/100mL
RIVER001DUP	1405	1836	100	m-EI	0	0	<1 CFU/100mL
RIVER001	1405 <sup>DUP</sup> 1812	↓	100	m-FC	2	2	2 CFUs/100mL
RIVER001DUP	1400	1846	100	m-FC	5	5	5 CFUs/100mL
End Blank		↓		m-FC	0	0	
Positive	lot EC808-2118A	↓	0.1	m-FC	✓	✓	
Positive	lot EP808-3118A	1849	0.1	m-EI	✓	✓	
End Blank		↓		m-EI	0	0	
m-EI stored in incubator # 309			Temp:	41.0	1853	to 1655	9/18/18
m-FC stored in incubator # 303			Temp:	44.5	↓	to ↓	↓
m-EI Method EPA1600	Counted:	1655	9/18/18			Counted By: MW	
m-FC Method 9222D	Counted:	1658	↓			Counted By: ↓	

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 1 of 5

STUDY NO: 31148  
SDG No:  
Project: Piscataqua River  
Delivered via: ESI  
Date and Time Received: 09/17/18 1125 Date and Time Logged into Lab: 09/17/18 1330  
Received By: DW Logged into Lab by: CS **CS**  
Air bill / Way bill: No Air bill included in folder if received? NA  
Cooler on ice/packs: Yes Custody Seals present? NA  
Cooler Blank Temp (C) at arrival: 6 Custody Seals intact? NA  
Number of COC Pages: 6  
COC Serial Number(s): A1016260  
COC Complete: Yes Does the info on the COC match the samples? Yes  
Sampled Date: Yes Were samples received within holding time? Yes  
Field ID complete: Yes Were all samples properly labeled? Yes  
Sampled Time: Yes Were proper sample containers used? Yes  
Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
Were all samples received? Yes Were VOC vials free of headspace? Yes  
Client notification/authorization: Not required pH Test strip ID number: A-5085

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
PEASE_001	31148-001	W	BOD	500 P	4 C	Yes
PEASE_001	31148-003	W	Enterococci	100 mL Ster 4 C	4 C	Yes
PEASE_001DUP	31148-004	W	Enterococci	100 mL Ster 4 C	4 C	Yes
PEASE_001	31148-005	W	FC	100 mL Ster 4 C	4 C	Yes
PEASE_001DUP	31148-006	W	FC	100 mL Ster 4 C	4 C	Yes
PEASE_001	31148-007	W	TSS	1000 P	4 C	Yes
PEASE_001DUP	31148-008	W	TSS	1000 P	4 C	Yes
PEASE_001	31148-009	W	NH3	125 mL P	H2SO4	Yes
PEASE_001DUP	31148-010	W	NH3	125 mL P	H2SO4	Yes
PEASE_001DUP	31148-010	W	NH3	125 mL P	H2SO4	Yes
PEASE_001	31148-013	W	TKN,NO3+NO2,TN	500 mL P	H2SO4	Yes
PEASE_001DUP	31148-014	W	TKN,NO3+NO2,TN	500 mL P	H2SO4	Yes
PEASE_001	31148-015	W	OG	2x1000 G	H2SO4	Yes
PEASE_001DUP	31148-016	W	OG	2x1000 G	H2SO4	Yes
PEASE_001	31148-017	W	TP	250mL	H2SO4	Yes
PEASE_001DUP	31148-018	W	TP	250mL	H2SO4	Yes
PEASE_001	31148-019	W	TDS	1000 P	4 C	Yes
PEASE_001	31148-021	W	Turbidity	250 P	4 C	Yes
PEASE_001DUP	31148-022	W	Turbidity	250 P	4 C	Yes
PEASE_001	31148-023	W	TPhen	1000 G	H2SO4	Yes
Equipment Blank PEASE_001	31148-024	W	TPhen	1000 G	H2SO4	Yes
PEASE_001	31148-026	W	VOC624	2x40 mL	4 C	No
PEASE_001DUP	31148-027	W	VOC624	2X40 mL	4 C	No

Notes and qualifications:

See COC

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 2 of 5

STUDY NO: 31148  
SDG No:  
Project: Piscataqua River  
Delivered via: ESI  
Date and Time Received: 09/17/18 1125 Date and Time Logged into Lab: 09/17/18 1330  
Received By: DW Logged into Lab by: CS CS  
Air bill / Way bill: No Air bill included in folder if received? NA  
Cooler on ice/packs: Yes Custody Seals present? NA  
Cooler Blank Temp (C) at arrival: 6 Custody Seals intact? NA  
Number of COC Pages: 6  
COC Serial Number(s): A1016260  
COC Complete: Yes  
Does the info on the COC match the samples? Yes  
Sampled Date: Yes Were samples received within holding time? Yes  
Field ID complete: Yes Were all samples properly labeled? Yes  
Sampled Time: Yes Were proper sample containers used? Yes  
Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
Were all samples received? Yes Were VOC vials free of headspace? Yes  
Client notification/authorization: Not required pH Test strip ID number: A-5085

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Equipment Blank PEASE_001	31148-063	W	VOC624	2x40 mL	4 C	No
PEASE_001	31148-029	W	HOLD VOC624	2x40 mL	HCl	No
PEASE_001DUP	31148-030	W	HOLD VOC624	2x40 mL	HCl	No
Equipment Blank PEASE_001	31148-066	W	HOLD VOC624	2x40 mL	HCl	No
PEASE_001	31148-032	W	ABN625	2x1000 G	4 C	Yes
PEASE_001DUP	31148-033	W	ABN625	2x1000 G	4 C	Yes
Equipment Blank PEASE_001	31148-034	W	ABN625	1000 G	4 C	Yes
NEW_001	31148-036	W	BOD	500 P	4 C	Yes
NEW_001DUP	31148-037	W	BOD	500 P	4 C	Yes
NEW_001	31148-038	W	Enterococci	100 mL Ster	4 C	Yes
NEW_001DUP	31148-039	W	Enterococci	100 mL Ster	4 C	Yes
NEW_001	31148-040	W	FC	100 mL Ster	4 C	Yes
NEW_001DUP	31148-041	W	FC	100 mL Ster	4 C	Yes
NEW_001	31148-042	W	TSS	1000 P	4 C	Yes
NEW_001DUP	31148-043	W	TSS	1000 P	4 C	Yes
NEW_001	31148-044	W	NH3	125 mL P	H2SO4	Yes
NEW_001DUP	31148-045	W	NH3	125 mL P	H2SO4	Yes
NEW_001	31148-048	W	TKN,NO3+NO2,TN	500 mL P	H2SO4	Yes
NEW_001DUP	31148-049	W	TKN,NO3+NO2,TN	500 mL P	H2SO4	Yes
NEW_001	31148-050	W	OG	2x1000 G	H2SO4	Yes
NEW_001DUP	31148-051	W	OG	2x1000 G	H2SO4	Yes
NEW_001	31148-052	W	TP	250mL	H2SO4	Yes
NEW_001DUP	31148-053	W	TP	250mL	H2SO4	Yes

Notes and qualifications:

See COC

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

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STUDY NO: 31148  
SDG No:  
Project: Piscataqua River  
Delivered via: ESI  
Date and Time Received: 09/17/18 1125 Date and Time Logged into Lab: 09/17/18 1330  
Received By: DW Logged into Lab by: CS CS  
Air bill / Way bill: No Air bill included in folder if received? NA  
Cooler on ice/packs: Yes Custody Seals present? NA  
Cooler Blank Temp (C) at arrival: 6 Custody Seals intact? NA  
Number of COC Pages: 6  
COC Serial Number(s): A1016260  
COC Complete: Yes Does the info on the COC match the samples? Yes  
Sampled Date: Yes Were samples received within holding time? Yes  
Field ID complete: Yes Were all samples properly labeled? Yes  
Sampled Time: Yes Were proper sample containers used? Yes  
Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
Were all samples received? Yes Were VOC vials free of headspace? Yes  
Client notification/authorization: Not required pH Test strip ID number: A-5085

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NEW_001	31148-054	W	TDS	1000 P	4 C	No
NEW_001DUP	31148-055	W	TDS	1000 P	4 C	Yes
NEW_001	31148-056	W	Turbidity	250 P	4 C	Yes
NEW_001DUP	31148-057	W	Turbidity	250 P	4 C	Yes
NEW_001	31148-058	W	TPhen	1000 G	H2SO4	Yes
NEW_001DUP	31148-059	W	TPhen	1000 G	H2SO4	Yes
Equipment Blank NEW_001	31148-060	W	TPhen	1000 G	H2SO4	Yes
NEW_001	31148-061	W	VOC624	2x40 mL	4 C	No
NEW_001DUP	31148-062	W	VOC624	2x40 mL	4 C	No
Equipment Blank NEW_001	31148-028	W	VOC624	2x40 mL	4 C	No
NEW_001	31148-064	W	HOLD VOC624	2x40 mL	HCl	No
NEW_001DUP	31148-065	W	HOLD VOC624	2x40 mL	HCl	No
Equipment Blank NEW_001	31148-031	W	HOLD VOC624	2x40 mL	HCl	No
NEW_001	31148-067	W	ABN625	2x1000 G	4 C	Yes
NEW_001DUP	31148-068	W	ABN625	2x1000 G	4 C	Yes
Equipment Blank NEW_001	31148-069	W	ABN625	2x1000 G	4 C	Yes

Notes and qualifications:

See COC

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 4 of 5

STUDY NO: 31148  
SDG No:  
Project: Piscataqua River  
Delivered via: ESI  
Date and Time Received: 09/17/18 1515 Date and Time Logged into Lab: 09/17/18 1615  
Received By: MG Logged into Lab by: CS CS  
Air bill / Way bill: No Air bill included in folder if received? NA  
Cooler on ice/packs: Yes Custody Seals present? NA  
Cooler Blank Temp (C) at arrival: 6 Custody Seals intact? NA  
Number of COC Pages: 4  
COC Serial Number(s): A1016280  
COC Complete: Yes Does the info on the COC match the samples? Yes  
Sampled Date: Yes Were samples received within holding time? Yes  
Field ID complete: Yes Were all samples properly labeled? Yes  
Sampled Time: Yes Were proper sample containers used? Yes  
Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
Were all samples received? Yes Were VOC vials free of headspace? Yes  
Client notification/authorization: Not required pH Test strip ID number: A-5085

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
RIVER_001	31148-071	W	BOD	500 P	4 C	Yes
RIVER_001DUP	31148-072	W	BOD	500 P	4 C	Yes
RIVER_001	31148-073	W	Enterococci	100 mL Ster 4 C	4 C	Yes
RIVER_001DUP	31148-074	W	Enterococci	100 mL Ster 4 C	4 C	Yes
RIVER_001	31148-075	W	FC	100 mL Ster 4 C	4 C	Yes
RIVER_001DUP	31148-076	W	FC	100 mL Ster 4 C	4 C	Yes
RIVER_001	31148-077	W	TSS	1000 P	4 C	Yes
RIVER_001DUP	31148-078	W	TSS	1000 P	4 C	Yes
RIVER_001	31148-079	W	NH3	125 mL P	H2SO4	Yes
RIVER_001DUP	31148-080	W	NH3	125 mL P	H2SO4	Yes
RIVER_001	31148-081	W	TKN,NO3+NO2,TN	500 mL P	H2SO4	Yes
RIVER_001DUP	31148-082	W	TKN,NO3+NO2,TN	500 mL P	H2SO4	Yes
RIVER_001	31148-083	W	OG	2x1000 G	H2SO4	Yes
RIVER_001DUP	31148-084	W	OG	2x1000 G	H2SO4	Yes
RIVER_001	31148-085	W	TP	250mL	H2SO4	Yes
RIVER_001DUP	31148-086	W	TP	250mL	H2SO4	Yes
RIVER_001	31148-087	W	TDS	1000 P	4 C	Yes
RIVER_001DUP	31148-088	W	TDS	1000 P	4 C	Yes
RIVER_001	31148-089	W	Turbidity	250 P	4 C	Yes
RIVER_001DUP	31148-090	W	Turbidity	250 P	4 C	Yes
RIVER_001	31148-091	W	TPhen	1000 G	H2SO4	Yes
RIVER_001DUP	31148-092	W	TPhen	1000 G	H2SO4	Yes
Field Blank RIVER_001	31148-093	W	TPhen	1000 G	H2SO4	Yes

Notes and qualifications:

See COC

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 5 of 5

STUDY NO: 31148  
SDG No:  
Project: Piscataqua River  
Delivered via: ESI  
Date and Time Received: 09/17/18 1515 Date and Time Logged into Lab: 09/17/18 1615  
Received By: MG Logged into Lab by: CS CS  
Air bill / Way bill: No Air bill included in folder if received? NA  
Cooler on ice/packs: Yes Custody Seals present? NA  
Cooler Blank Temp (C) at arrival: 6 Custody Seals intact? NA  
Number of COC Pages: 4  
COC Serial Number(s): A1016280  
COC Complete: Yes Does the info on the COC match the samples? Yes  
Sampled Date: Yes Were samples received within holding time? Yes  
Field ID complete: Yes Were all samples properly labeled? Yes  
Sampled Time: Yes Were proper sample containers used? Yes  
Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
Were all samples received? Yes Were VOC vials free of headspace? Yes  
Client notification/authorization: Not required pH Test strip ID number: A-5085

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Trip Blank RIVER_001	31148-094	W	TPhen	1000 G	H2SO4	Yes
RIVER_001	31148-095	W	VOC624	2x40 mL	4 C	No
RIVER_001DUP	31148-096	W	VOC624	2x40 mL	4 C	No
Field Blank RIVER_001	31148-097	W	VOC624	2x40 mL	4 C	No
Trip Blank RIVER_001	31148-098	W	VOC624	2x40 mL	4 C	No
RIVER_001	31148-099	W	HOLD VOC624	2x40 mL	HCl	No
RIVER_001DUP	31148-100	W	HOLD VOC624	2x40 mL	HCl	No
Field Blank RIVER_001	31148-101	W	HOLD VOC624	2x40 mL	HCl	No
Trip Blank RIVER_001	31148-102	W	HOLD VOC624	2x40 mL	HCl	No
RIVER_001	31148-103	W	ABN625	2x1000 G	4 C	Yes
RIVER_001DUP	31148-104	W	ABN625	2x1000 G	4 C	Yes
Field Blank RIVER_001	31148-105	W	ABN625	1000 G	4 C	Yes
Trip Blank RIVER_001	31148-106	W	ABN625	1000 G	4 C	Yes
RIVER_001	31148-107	W	DO,pH,Temperature,Conductivity	1000 P	4 C	Yes

Notes and qualifications:

See COC



EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31148

# CHAIN OF CUSTODY DOCUMENTATION

Client:	Underwood Engineers, Inc.	Contact:	Steve Clifton	Project Name:	Piscataqua River		
Report to:	Steve Clifton	Address:	25 Vaughan Mall	Project Number:	P0771	Task:	0001
Invoice to:	Steve Clifton	Address:	Portsmouth, NH 03801	Project Manager:	Steve Clifton		
Voice:	603-436-6192	Fax:	0	email:		ERR	

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com- posite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preser- vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
001	PEASE 001	9/17/18	8:30A	TH RC	C	1	500	P	4 C	Water	N	BOD
002	PEASE 001DUP	9/17/18	8:30A	"	C	1	500	P	4 C	Water	N	BOD
003	PEASE 001	9/17/18	10:45A	"	C	1	100	le	4 C	Water	N	Enterococci
004	PEASE 001DUP	9/17/18	10:45A	"	C	1	100	le	4 C	Water	N	Enterococci
005	PEASE 001	"	10:45A	"	C	1	100	le	4 C	Water	N	FC
006	PEASE 001DUP	"	10:45A	"	C	1	100	le	4 C	Water	N	FC
007	PEASE 001	"	8:30A	"	C	1	1000	P	4 C	Water	N	TSS
008	PEASE 001DUP	"	8:30A	"	C	1	1000	P	4 C	Water	N	TSS
009	PEASE 001	"	8:30A	"	C	1	125	P	H2SO4	Water	N	NH3
010	PEASE 001DUP	"	8:30A	"	C	1	125	P	H2SO4	Water	N	NH3
011	PEASE 001	"	10:45A	"	C	1	500	P	4 C	Water	N	TRC
012	PEASE 001DUP	"	10:45A	"	C	1	500	P	4 C	Water	N	TRC

Relinquished By:	<i>Tim Oels</i>	Date:	9/17/18	Time:	11:25A	Received By:	<i>[Signature]</i>	Date:	9/17/18	Time:	11:25
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:	

Comments: 011 and 012 not received at laboratory as analyses were performed in field. -es 9/18/18

ERR

COC Number: A1016260

Sample Delivery Group No:

May 2018

Page

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EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31148

CHAIN OF CUSTODY DOCUMENTATION

Client:	Underwood Engineers, Inc.	Contact:	Steve Clifton	Project Name:	Piscataqua River		
Report to:	Steve Clifton	Address:	25 Vaughan Mail	Project Number:	P0771	Task:	0001
Invoice to:	Steve Clifton	Address:	Portsmouth, NH 03801	Project Manager:	Steve Clifton		
Voice:	603-436-6192	Fax:	0	email:			

ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com- posite (G/C)	No	Container Size (mL)	Type (P/G/R)	Field Preser- vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested/ Special Instructions:
013	PEASE 001	9/17/18	8:30A	TAP RC	C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
014	PEASE 001DUP	9/17/18	8:30	TAP RC	C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
015	PEASE 001	9/17/18	10:40A	TAP RC	G	2	1000	G	H2SO4	Water	N	OG
016	PEASE 001DUP	9/17/18	10:40A	TAP RC	G	2	1000	G	H2SO4	Water	N	OG
017	PEASE 001	"	8:30A	"	C	1	250m	mL	H2SO4	Water	N	TP
018	PEASE 001DUP	"	8:30A	"	C	1	250m	mL	H2SO4	Water	N	TP
019	PEASE 001	"	"	"	C	1	1000	P	4 C	Water	N	TDS
020	PEASE 001DUP	"	"	"	C	1	1000	P	4 C	Water	N	TDS
021	PEASE 001	"	10:40A	"	G	1	250	P	4 C	Water	N	Turbidity
022	PEASE 001DUP	"	10:40A	"	G	1	250	P	4 C	Water	N	Turbidity
023	PEASE 001	"	8:30A	"	C	1	1000	G	H2SO4	Water	N	TPhen
024	PEASE 001DUP	"	8:30A	"	C	1	1000	G	H2SO4	Water	N	TPhen

Relinquished By:	Steve Clifton	Date:	9/17/18	Time:	11:25A	Received By:	[Signature]	Date:	9/17/18	Time:	11:25
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:	

Comments: 9°C

ERR

COC Number: A1016260

Sample Delivery Group No:

May 2018

Page 2 of 10



EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31148

# CHAIN OF CUSTODY DOCUMENTATION

Client:	Underwood Engineers, Inc.	Contact:	Steve Clifton	Project Name:	Piscataqua River
Report to:	Steve Clifton	Address:	25 Vaughan Mail	Project Number:	P0771
Invoice to:	Steve Clifton	Address:	Portsmouth, NH 03801	Task:	0001
Voice:	603-436-6192	Fax:	0	Project Manager:	Steve Clifton
Protocol:	NPDES	email:			
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Grab or composite (G/C)	No

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/R)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested/ Special Instructions:
024	Equipment Field Blank PEASE 001	9/16/18	8AM	TAP RC	1	1000	G	H2SO4	Water	N	TPhen
026	PEASE 001	9/17/18	10:45A	"	2	40 m	mL	4 C	Water	N	VOC624
027	PEASE 001DUP	9/17/18	10:45A	"	2	40 m	mL	4 C	Water	N	VOC624
063	Equipment Field Blank PEASE 001	9/16/18	8AM	TAP RC	2	40 m	mL	4 C	Water	N	VOC624
62/69	PEASE 001	9/17/18	10:45A	"	2	40 m	mL	HCl	Water	N	HOLD VOC624
030	PEASE 001DUP	9/17/18	10:45A	"	2	40 m	mL	HCl	Water	N	HOLD VOC624
066	Equipment Field Blank PEASE 001	9/16/18	8AM	TAP RC	2	40 m	mL	HCl	Water	N	HOLD VOC624
032	PEASE 001	9/17/18	8:30A	"	2	1000	G	4 C	Water	N	ABN625
033	PEASE 001DUP	9/17/18	8:30A	"	2	1000	G	4 C	Water	N	ABN625
034	Equipment Field Blank PEASE 001	9/16/18	8AM	TAP RC	1	1000	G	4 C	Water	N	ABN625
035	PEASE 001	9/17/18	10:45A	"	1	1000	P	4 C	Water	N	DO, pH, Temperature, Conductivity

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
<i>Tim Pula</i>	9/17/18	11:25A	<i>[Signature]</i>	9/17/18	11:25
Relinquished By:	Date:	Time:	Received at Lab By:	Date:	Time:

Comments: 9°C @ sample 035 not received at laboratory as analysis was performed in field - cs 9/18/18



ENVIRONMENTAL SYSTEMS, LLC  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31148

### CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River	
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001	
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton	
Voice: 603-436-6192		Fax: 0		email:	
Protocol: NPDES					

ERR

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filler N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
036	NEW 001	9/17/18	7:30A	TAP RC	C	1	500	P	4 C	Water	N	BOD
037	NEW 001DUP	9/17/18	7:30A	TAP RC	C	1	500	P	4 C	Water	N	BOD
038	NEW 001	9/17/18	8:45A	TAP RC	G	1	100	le	4 C	Water	N	Enterococci
039	NEW 001DUP	9/17/18	8:45A	TAP RC	G	1	100	le	4 C	Water	N	Enterococci
040	NEW 001	9/17/18	8:45A	TAP RC	G	1	100	le	4 C	Water	N	FC
041	NEW 001DUP	9/17/18	8:45A	TAP RC	G	1	100	le	4 C	Water	N	FC
042	NEW 001	9/17/18	7:30A	TAP RC	C	1	1000	P	4 C	Water	N	TSS
043	NEW 001DUP	9/17/18	7:30A	TAP RC	C	1	1000	P	4 C	Water	N	TSS
044	NEW 001	9/17/18	7:30A	TAP RC	C	1	125	P	H2SO4	Water	N	NH3
045	NEW 001DUP	9/17/18	7:30A	TAP RC	C	1	125	P	H2SO4	Water	N	NH3
046	NEW 001	9/17/18	9:15A	TAP RC	G	1	500	P	4 C	Water	N	TRC
047	NEW 001DUP	9/17/18	9:15A	TAP RC	G	1	500	P	4 C	Water	N	TRC

Relinquished By: <i>Tim Puls</i>	Date: 9/17/18	Time: 11:25A
Received By: <i>[Signature]</i>	Date: 9-17-18	Time: 11:25

Relinquished By: *Tim Puls* Date: 9/17/18 Time: 11:25A  
Received at Lab By: *[Signature]* Date: 9-17-18 Time: 11:25

Comments: 9°C @ samples analyzed and 047 not received at laboratory as analyses were performed in field. -CS



EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31148

# CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River								
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001								
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton								
Voice: 603-436-6192		Fax: 0		email:								
Protocol: NPDES												
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested/ Special Instructions:
048 NEW 001		9/17/18	7:30A	RC TAP	C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
049 NEW 001DUP		9/17/18	7:30A	RC TAP	C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
050 NEW 001		9/17/18	8:45A	RC TAP	G	2	1000	G	H2SO4	Water	N	OG
051 NEW 001DUP		9/17/18	8:45A	RC TAP	G	2	1000	G	H2SO4	Water	N	OG
052 NEW 001		9/17/18	7:30A	RC TAP	C	1	250m	mL	H2SO4	Water	N	TP
053 NEW 001DUP		9/17/18	7:30A	RC TAP	C	1	250m	mL	H2SO4	Water	N	TP
054 NEW 001		9/17/18	7:30A	RC TAP	C	1	1000	P	4 C	Water	N	TDS
055 NEW 001DUP		9/17/18	7:30A	RC TAP	C	1	1000	P	4 C	Water	N	TDS
056 NEW 001		9/17/18	8:45A	RC TAP	G	1	250	P	4 C	Water	N	Turbidity
057 NEW 001DUP		9/17/18	8:45A	RC TAP	G	1	250	P	4 C	Water	N	Turbidity
058 NEW 001		9/17/18	7:30AM	RC TAP	C	1	1000	G	H2SO4	Water	N	TPhen
059 NEW 001DUP		9/17/18	7:30AM	RC TAP	C	1	1000	G	H2SO4	Water	N	TPhen
Relinquished By: <i>Tina Rob</i>		Date: 9/17/18		Time: 11:25A		Received By: <i>DW</i>		Date: 9/17/18		Time: 11:25		
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:		
Comments: 90C												

ERR

COC Number: A1016180

Sample Delivery Group No: May 2018

Page 5 of 10



ENVIRONMENTAL SYSTEMS, INC.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31148

CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River								
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001								
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton								
Voice: 603-436-6192		Fax: 0		email:								
Protocol: NPDES												
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
060	Equipment Field Blank NEW 001	9/16/18	7:41 AM	TAP RC	G	1	1000	G	H2SO4	Water	N	TPhen
061	NEW 001	9/17/18	7:30 AM	TAP RC	G	2	40 mL	mL	4 C	Water	N	VOC624
062	NEW 001DUP	9/17/18	7:30 AM	TAP RC	G	2	40 mL	mL	4 C	Water	N	VOC624
063	Equipment Field Blank NEW 001	9/16/18	7:41 AM	TAP RC	G	2	40 mL	mL	4 C	Water	N	VOC624
064	NEW 001	9/17/18	7:30 AM	TAP RC	G	2	40 mL	mL	HCl	Water	N	HOLD VOC624
065	NEW 001DUP	9/17/18	7:30 AM	TAP RC	G	2	40 mL	mL	HCl	Water	N	HOLD VOC624
066	Equipment Field Blank NEW 001	9/16/18	7:41 AM	TAP RC	G	2	40 mL	mL	HCl	Water	N	HOLD VOC624
067	NEW 001	9/17/18	7:30 AM	TAP RC	C	2	1000	G	4 C	Water	N	ABN625
068	NEW 001DUP	9/17/18	7:30 AM	TAP RC	C	2	1000	G	4 C	Water	N	ABN625
069	Equipment Field Blank NEW 001	9/16/18	7:41 AM	TAP RC	G	1	1000	G	4 C	Water	N	ABN625
070	NEW 001	9/17/18	8:45 AM	TAP RC	G	1	1000	P	4 C	Water	N	DO, pH, Temperature, Conductivity
Relinquished By: <i>Ami Dub</i>		Date: 9/17/18		Time: 11:25 AM		Received By: <i>Dub</i>		Date: 9/17/18		Time: 11:25 AM		
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:		

Comments: 9°C EVO sample OTO not received at laboratory as analysis was performed in field. -CS  
ERR 9/18/18

COC Number: A1016180

Sample Delivery Group No: May 2018

Page 10 of 10



EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31148

CHAIN OF CUSTODY DOCUMENTATION

Client:	Underwood Engineers, Inc.	Contact:	Steve Clifton	Project Name:	Piscataqua River		
Report to:	Steve Clifton	Address:	25 Vaughan Mall	Project Number:	P0771	Task:	0001
Invoice to:	Steve Clifton	Address:	Portsmouth, NH 03801	Project Manager:	Steve Clifton		
Voice:	603-436-6192	Fax:	0	email:			

ERR

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/R)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
071	RIVER_001	9/17/18	14:10	Greenway		1	500	P	4 C	Water	N	BOD
072	RIVER_001DUP		14:10			1	500	P	4 C	Water	N	BOD
073	RIVER_001		14:05			1	100	le	4 C	Water	N	Enterococci
074	RIVER_001DUP		14:05			1	100	le	4 C	Water	N	Enterococci
075	RIVER_001		14:00			1	100	le	4 C	Water	N	FC
076	RIVER_001DUP		14:00			1	100	le	4 C	Water	N	FC
077	RIVER_001		14:02			1	1000	P	4 C	Water	N	TSS
078	RIVER_001DUP		14:02			1	1000	P	4 C	Water	N	TSS
079	RIVER_001	9/17/18	13:50	Greenway		1	125	P	H2SO4	Water	N	NH3
080	RIVER_001DUP		13:50			1	125	P	H2SO4	Water	N	NH3
081	RIVER_001		13:52			1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
082	RIVER_001DUP		13:52			1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN

Relinquished By:		Date:	9-17-18	Time:	3:58
Relinquished By:		Date:	9-17-18	Time:	3:15

Comments:	6°C
-----------	-----

ERR

COC Number: A1016180

Sample Delivery Group No: May 2018

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EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31148

### CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River								
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001								
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton								
Voice: 603-436-6192		Fax: 0		email:								
Protocol: NPDES												
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
083 RIVER 001		9/17/18	1350			2	1000	G	H2SO4	Water	N	OG
084 RIVER 001DUP			1350			2	1000	G	H2SO4	Water	N	OG
085 RIVER 001			1351			1	250m	mL	H2SO4	Water	N	TP
086 RIVER 001DUP			1351			1	250m	mL	H2SO4	Water	N	TP
087 RIVER 001			1358			1	1000	P	4 C	Water	N	TDS
088 RIVER 001DUP			1358			1	1000	P	4 C	Water	N	TDS
089 RIVER 001			1359			1	250	P	4 C	Water	N	Turbidity
090 RIVER 001DUP			1359			1	250	P	4 C	Water	N	Turbidity
091 RIVER 001			1358			1	1000	G	H2SO4	Water	N	TPhen
092 RIVER 001DUP			1358			1	1000	G	H2SO4	Water	N	TPhen
Relinquished By:		Date: 9-17-18		Time: 3:15 p		Received By:		Date: 9/17/18		Time: 3:15		
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:		
Comments: 6°C												

ERR

COC Number: A1016180

Sample Delivery Group No: May 2018

Page 8 of 10

## CHAIN OF CUSTODY DOCUMENTATION

[illegible]




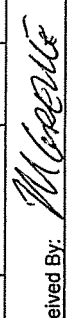
## CHAIN OF CUSTODY DOCUMENTATION

Client:	Underwood Engineers, Inc.	Contact:	Steve Clifton	Project Name:	Piscataqua River
Report to:	Steve Clifton	Address:	25 Vaughan Mail	Project Number:	P0771
Invoice to:	Steve Clifton	Address:	Portsmouth, NH 03801	Task:	0001
Voice:	603-436-6192	Fax:	0	Project Manager:	Steve Clifton
Protocol:	NPDES			email:	

ERR

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com- posite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preser- vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested/ Special Instructions:
103	RIVER_001	9/17/18	13:50	Tom	Grab	2	1000	G	4 C	Water	N	ABN625
104	RIVER_001DUP		13:50			2	1000	G	4 C	Water	N	ABN625
105	Field Blank RIVER 001		13:50			1	1000	G	4 C	Water	N	ABN625
106	Trip Blank RIVER 001		13:50			1	1000	G	4 C	Water	N	ABN625
107	RIVER_001		13:50			1	1000	P	4 C	Water	N	DO, pH, Temperature, Conductivity

69/69

Relinquished By:		Date:	9.17.18	Time:	3:50 P	Received By:		Date:	9/17/18	Time:	3:15
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:	

Comments: GC

ERR



## ANALYTICAL REPORT

Lab Number:	L1837054
Client:	EnviroSystems, Inc. 1 Lafayette Road PO Box 778 Hampton, NH 03843
ATTN:	Catherine Sasso
Phone:	(603) 926-3345
Project Name:	31148
Project Number:	Not Specified
Report Date:	09/25/18

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1837054-01	31148-026	WATER	Not Specified	09/17/18 10:45	09/18/18
L1837054-02	31148-027	WATER	Not Specified	09/17/18 10:45	09/18/18
L1837054-03	31148-028	WATER	Not Specified	09/16/18 07:00	09/18/18
L1837054-04	31148-029	WATER	Not Specified	09/17/18 10:45	09/18/18
L1837054-05	31148-030	WATER	Not Specified	09/17/18 10:45	09/18/18
L1837054-06	31148-031	WATER	Not Specified	09/16/18 07:00	09/18/18
L1837054-07	31148-061	WATER	Not Specified	09/17/18 07:00	09/18/18
L1837054-08	31148-062	WATER	Not Specified	09/17/18 07:00	09/18/18
L1837054-09	31148-063	WATER	Not Specified	09/16/18 08:00	09/18/18
L1837054-10	31148-064	WATER	Not Specified	09/17/18 07:00	09/18/18
L1837054-11	31148-065	WATER	Not Specified	09/17/18 07:00	09/18/18
L1837054-12	31148-066	WATER	Not Specified	09/16/18 08:00	09/18/18
L1837054-13	31148-095	WATER	Not Specified	09/17/18 14:10	09/18/18
L1837054-14	31148-096	WATER	Not Specified	09/17/18 14:10	09/18/18
L1837054-15	31148-097	WATER	Not Specified	09/17/18 14:10	09/18/18
L1837054-16	31148-098	WATER	Not Specified	09/17/18 14:00	09/18/18
L1837054-17	31148-099	WATER	Not Specified	09/17/18 14:00	09/18/18
L1837054-18	31148-100	WATER	Not Specified	09/17/18 14:00	09/18/18
L1837054-19	31148-101	WATER	Not Specified	09/17/18 14:00	09/18/18
L1837054-20	31148-102	WATER	Not Specified	09/17/18 14:00	09/18/18
L1837054-21	31148-023	WATER	Not Specified	09/17/18 08:30	09/18/18
L1837054-22	31148-024	WATER	Not Specified	09/16/18 08:00	09/18/18
L1837054-23	31148-058	WATER	Not Specified	09/17/18 07:30	09/18/18
L1837054-24	31148-059	WATER	Not Specified	09/17/18 07:30	09/18/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Serial_No:09251813:33	
				Collection Date/Time	Receive Date
L1837054-25	31148-060	WATER	Not Specified	09/16/18 07:00	09/18/18
L1837054-26	31148-091	WATER	Not Specified	09/17/18 13:58	09/18/18
L1837054-27	31148-092	WATER	Not Specified	09/17/18 13:58	09/18/18
L1837054-28	31148-093	WATER	Not Specified	09/17/18 13:58	09/18/18
L1837054-29	31148-094	WATER	Not Specified	09/17/18 13:58	09/18/18

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

#### HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**Case Narrative (continued)**

**Sample Receipt**

L1837054-29: The sample was received above the appropriate pH for the Total Phenolics analysis. The laboratory added additional H<sub>2</sub>SO<sub>4</sub> to a pH <4.

**Volatile Organics**

L1837054-01, -02, -07, and -08: The pH of the sample was less than two. It should be noted that 2-chloroethylvinyl ether breaks down under acidic conditions.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Melissa Cripps

Title: Technical Director/Representative

Date: 09/25/18

# ORGANICS

# **VOLATILES**



**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-01  
**Client ID:** 31148-026  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 10:45  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 09/19/18 13:19  
**Analyst:** NLK/G

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	66		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	24		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	53		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	2.2		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1



**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-01  
**Client ID:** 31148-026  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 10:45  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	17		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	98		60-140
Fluorobenzene	99		60-140
4-Bromofluorobenzene	97		60-140

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-02  
**Client ID:** 31148-027  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 10:45  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 09/19/18 13:56  
**Analyst:** NLK/G

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	72		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	24		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	54		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	2.5		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-02  
**Client ID:** 31148-027  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 10:45  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	18		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	99		60-140
Fluorobenzene	97		60-140
4-Bromofluorobenzene	98		60-140

Project Name: 31148  
Project Number: Not Specified

Serial\_No:09251813:33  
Lab Number: L1837054  
Report Date: 09/25/18

# SAMPLE RESULTS

Lab ID: L1837054-03  
Client ID: 31148-028  
Sample Location: Not Specified

Date Collected: 09/16/18 07:00  
Date Received: 09/18/18  
Field Prep: Not Specified

Sample Depth:  
Matrix: Water  
Analytical Method: 128,624.1  
Analytical Date: 09/19/18 12:05  
Analyst: NLK/G

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1



Project Name: 31148  
Project Number: Not Specified

Lab Number: L1837054  
Report Date: 09/25/18

**SAMPLE RESULTS**

Lab ID: L1837054-03  
Client ID: 31148-028  
Sample Location: Not Specified

Date Collected: 09/16/18 07:00  
Date Received: 09/18/18  
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	96		60-140
Fluorobenzene	99		60-140
4-Bromofluorobenzene	101		60-140

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-07  
**Client ID:** 31148-061  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 07:00  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 09/19/18 14:33  
**Analyst:** NLK/G

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	40		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	54		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	71		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	6.7		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1



**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-07  
**Client ID:** 31148-061  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 07:00  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	96		60-140
Fluorobenzene	94		60-140
4-Bromofluorobenzene	98		60-140



Project Name: 31148  
Project Number: Not Specified

Serial\_No:09251813:33  
Lab Number: L1837054  
Report Date: 09/25/18

# SAMPLE RESULTS

Lab ID: L1837054-08  
Client ID: 31148-062  
Sample Location: Not Specified

Date Collected: 09/17/18 07:00  
Date Received: 09/18/18  
Field Prep: Not Specified

Sample Depth:  
Matrix: Water  
Analytical Method: 128,624.1  
Analytical Date: 09/19/18 15:10  
Analyst: NLK/G

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	39		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	52		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	68		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	6.6		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1



Project Name: 31148  
Project Number: Not Specified

Lab Number: L1837054  
Report Date: 09/25/18

**SAMPLE RESULTS**

Lab ID: L1837054-08  
Client ID: 31148-062  
Sample Location: Not Specified

Date Collected: 09/17/18 07:00  
Date Received: 09/18/18  
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	98		60-140
Fluorobenzene	95		60-140
4-Bromofluorobenzene	99		60-140

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-09  
**Client ID:** 31148-063  
**Sample Location:** Not Specified

**Date Collected:** 09/16/18 08:00  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 09/19/18 12:42  
**Analyst:** NLK/G

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	1.2		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-09  
**Client ID:** 31148-063  
**Sample Location:** Not Specified

**Date Collected:** 09/16/18 08:00  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	94		60-140
Fluorobenzene	88		60-140
4-Bromofluorobenzene	101		60-140

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-13  
**Client ID:** 31148-095  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 14:10  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 09/19/18 15:46  
**Analyst:** NLK/G

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-13  
**Client ID:** 31148-095  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 14:10  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by GC/MS - Westborough Lab</b>						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	104		60-140
Fluorobenzene	95		60-140
4-Bromofluorobenzene	92		60-140

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-14  
**Client ID:** 31148-096  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 14:10  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 09/19/18 16:23  
**Analyst:** NLK/G

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-14  
**Client ID:** 31148-096  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 14:10  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	97		60-140
Fluorobenzene	95		60-140
4-Bromofluorobenzene	95		60-140



**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-15  
**Client ID:** 31148-097  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 14:10  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 09/19/18 17:00  
**Analyst:** NLK/G

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-15  
**Client ID:** 31148-097  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 14:10  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	106		60-140
Fluorobenzene	101		60-140
4-Bromofluorobenzene	102		60-140

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-16  
**Client ID:** 31148-098  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 14:00  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 09/19/18 17:37  
**Analyst:** NLK/G

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-16  
**Client ID:** 31148-098  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 14:00  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	107		60-140
Fluorobenzene	101		60-140
4-Bromofluorobenzene	103		60-140

Project Name: 31148  
Project Number: Not Specified

Lab Number: L1837054  
Report Date: 09/25/18

### Method Blank Analysis Batch Quality Control

Analytical Method: 128,624.1  
Analytical Date: 09/19/18 11:29  
Analyst: NLK/G

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-03,07-09,13-16 Batch: WG1157786-16					
Methylene chloride	ND		ug/l	1.0	--
1,1-Dichloroethane	ND		ug/l	1.5	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	3.5	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.5	--
2-Chloroethylvinyl ether	ND		ug/l	10	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	3.5	--
Trichlorofluoromethane	ND		ug/l	5.0	--
1,2-Dichloroethane	ND		ug/l	1.5	--
1,1,1-Trichloroethane	ND		ug/l	2.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	1.5	--
cis-1,3-Dichloropropene	ND		ug/l	1.5	--
Bromoform	ND		ug/l	1.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Benzene	ND		ug/l	1.0	--
Toluene	ND		ug/l	1.0	--
Ethylbenzene	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	5.0	--
Bromomethane	ND		ug/l	5.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.5	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--



**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 128,624.1  
**Analytical Date:** 09/19/18 11:29  
**Analyst:** NLK/G

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-03,07-09,13-16 Batch: WG1157786-16					
1,2-Dichlorobenzene	ND		ug/l	5.0	--
1,3-Dichlorobenzene	ND		ug/l	5.0	--
1,4-Dichlorobenzene	ND		ug/l	5.0	--
p/m-Xylene	ND		ug/l	2.0	--
o-xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
Styrene	ND		ug/l	1.0	--
Acetone	ND		ug/l	10	--
Carbon disulfide	ND		ug/l	5.0	--
2-Butanone	ND		ug/l	10	--
Vinyl acetate	ND		ug/l	10	--
4-Methyl-2-pentanone	ND		ug/l	10	--
2-Hexanone	ND		ug/l	10	--
Acrolein	ND		ug/l	8.0	--
Acrylonitrile	ND		ug/l	10	--
n-Hexane <sup>1</sup>	ND		ug/l	20	--
Methyl tert butyl ether	ND		ug/l	10	--
Dibromomethane	ND		ug/l	1.0	--
1,4-Dioxane <sup>1</sup>	ND		ug/l	2000	--
Tert-Butyl Alcohol	ND		ug/l	100	--
Tertiary-Amyl Methyl Ether	ND		ug/l	20	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	96		60-140
Fluorobenzene	99		60-140
4-Bromofluorobenzene	97		60-140



# Lab Control Sample Analysis Batch Quality Control

Lab Number: L1837054  
Report Date: 09/25/18

Project Name: 31148  
Project Number: Not Specified

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03,07-09,13-16 Batch: WG1157786-15								
Methylene chloride	95		-		60-140	-		28
1,1-Dichloroethane	85		-		50-150	-		49
Chloroform	100		-		70-135	-		54
Carbon tetrachloride	90		-		70-130	-		41
1,2-Dichloropropane	85		-		35-165	-		55
Dibromochloromethane	100		-		70-135	-		50
1,1,2-Trichloroethane	90		-		70-130	-		45
2-Chloroethylvinyl ether	85		-		1-225	-		71
Tetrachloroethene	90		-		70-130	-		39
Chlorobenzene	85		-		65-135	-		53
Trichlorofluoromethane	90		-		50-150	-		84
1,2-Dichloroethane	95		-		70-130	-		49
1,1,1-Trichloroethane	90		-		70-130	-		36
Bromodichloromethane	105		-		65-135	-		56
trans-1,3-Dichloropropene	90		-		50-150	-		86
cis-1,3-Dichloropropene	105		-		25-175	-		58
Bromoform	100		-		70-130	-		42
1,1,2,2-Tetrachloroethane	75		-		60-140	-		61
Benzene	90		-		65-135	-		61
Toluene	90		-		70-130	-		41
Ethylbenzene	90		-		60-140	-		63
Chloromethane	90		-		1-205	-		60
Bromomethane	70		-		15-185	-		61

## Lab Control Sample Analysis

Batch Quality Control

Lab Number: L1837054  
Report Date: 09/25/18

Project Name: 31148  
Project Number: Not Specified

Parameter	LCS		LCSD		%Recovery		RPD	
	%Recovery	Qual	%Recovery	Qual	Limits		Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03,07-09,13-16 Batch: WG1157786-15								
Vinyl chloride	115		-		5-195	-		66
Chloroethane	90		-		40-160	-		78
1,1-Dichloroethene	85		-		50-150	-		32
trans-1,2-Dichloroethene	95		-		70-130	-		45
cis-1,2-Dichloroethene	90		-		60-140	-		30
Trichloroethene	80		-		65-135	-		48
1,2-Dichlorobenzene	90		-		65-135	-		57
1,3-Dichlorobenzene	80		-		70-130	-		43
1,4-Dichlorobenzene	90		-		65-135	-		57
p/m-Xylene	98		-		60-140	-		30
o-xylene	90		-		60-140	-		30
Styrene	85		-		60-140	-		30
Acetone	120		-		40-160	-		30
Carbon disulfide	90		-		60-140	-		30
2-Butanone	108		-		60-140	-		30
Vinyl acetate	140		-		60-140	-		30
4-Methyl-2-pentanone	104		-		60-140	-		30
2-Hexanone	112		-		60-140	-		30
Acrolein	98		-		60-140	-		30
Acrylonitrile	115		-		60-140	-		60
Methyl tert butyl ether	100		-		60-140	-		30
Dibromomethane	90		-		70-130	-		30
1,4-Dioxane <sup>1</sup>	80		-		60-140	-		30



## Lab Control Sample Analysis

### Batch Quality Control

Project Name: 31148

Lab Number: L1837054

Project Number: Not Specified

Report Date: 09/25/18

Parameter	LCS		LCSD		%Recovery		RPD	
	%Recovery	Qual	%Recovery	Qual	Limits		Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03,07-09,13-16 Batch: WG1157786-15								
Tert-Butyl Alcohol	98		-		60-140		-	30
Tertiary-Amyl Methyl Ether	85		-		60-140		-	30

Surrogate	LCS		LCSD		Acceptance	
	%Recovery	Qual	%Recovery	Qual	Criteria	
Pentafluorobenzene	110				60-140	
Fluorobenzene	98				60-140	
4-Bromofluorobenzene	101				60-140	

# **INORGANICS & MISCELLANEOUS**



**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-21  
**Client ID:** 31148-023  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 08:30  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	09/19/18 09:14	09/19/18 13:08	4,420.1	BR



Serial\_No:09251813:33

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

### SAMPLE RESULTS

**Lab ID:** L1837054-22  
**Client ID:** 31148-024  
**Sample Location:** Not Specified

**Date Collected:** 09/16/18 08:00  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	09/19/18 09:14	09/19/18 13:11	4,420.1	BR



**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-23  
**Client ID:** 31148-058  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 07:30  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	09/19/18 09:14	09/19/18 13:12	4,420.1	BR



Serial\_No:09251813:33

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

### SAMPLE RESULTS

**Lab ID:** L1837054-24  
**Client ID:** 31148-059  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 07:30  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	09/19/18 09:14	09/19/18 13:15	4,420.1	BR



Serial\_No:09251813:33

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

### SAMPLE RESULTS

**Lab ID:** L1837054-25  
**Client ID:** 31148-060  
**Sample Location:** Not Specified

**Date Collected:** 09/16/18 07:00  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	09/19/18 09:14	09/19/18 13:16	4,420.1	BR



Serial\_No:09251813:33

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

### SAMPLE RESULTS

**Lab ID:** L1837054-26  
**Client ID:** 31148-091  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 13:58  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	09/19/18 09:14	09/19/18 13:17	4,420.1	BR





**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

**SAMPLE RESULTS**

**Lab ID:** L1837054-27  
**Client ID:** 31148-092  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 13:58  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	09/19/18 09:14	09/19/18 13:18	4,420.1	BR



Serial\_No:09251813:33

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

### SAMPLE RESULTS

**Lab ID:** L1837054-28  
**Client ID:** 31148-093  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 13:58  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	09/19/18 09:14	09/19/18 13:19	4,420.1	BR



Serial\_No:09251813:33

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

### SAMPLE RESULTS

**Lab ID:** L1837054-29  
**Client ID:** 31148-094  
**Sample Location:** Not Specified

**Date Collected:** 09/17/18 13:58  
**Date Received:** 09/18/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	09/19/18 09:14	09/19/18 13:20	4,420.1	BR



Serial\_No:09251813:33

Project Name: 31148

Lab Number: L1837054

Project Number: Not Specified

Report Date: 09/25/18

**Method Blank Analysis**  
Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 21-29 Batch: WG1158476-1									
Phenolics, Total	ND	mg/l	0.030	--	1	09/19/18 09:14	09/19/18 13:06	4,420.1	BR



**Lab Control Sample Analysis**  
Batch Quality Control

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

Parameter	LCS		LCSD		%Recovery	
	%Recovery	Qual	%Recovery	Qual	Limits	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 21-29 Batch: WG1158476-2						
Phenolics, Total	102	-	-	-	70-130	-



**Matrix Spike Analysis**  
Batch Quality Control

Project Name: 31148  
Project Number: Not Specified

Lab Number: L1837054  
Report Date: 09/25/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 21-29 QC Batch ID: WG1158476-4 QC Sample: L1837054-21 Client ID: 31148-023										
Phenolics, Total	ND	0.4	0.41	102	-	-	-	70-130	-	20



# Lab Duplicate Analysis Batch Quality Control

Project Name: 31148  
Project Number: Not Specified

Lab Number: L1837054  
Report Date: 09/25/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 21-29 QC Batch ID: WG1158476-3 QC Sample: L1837054-21 Client ID: 31148-023						
Phenolics, Total	ND	ND	mg/l	NC		20

Project Name: 31148  
 Project Number: Not Specified

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information  
 Cooler A Custody Seal Absent

Container Information		Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
Container ID	Container Type								
L1837054-01A	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-01B	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-02A	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-02B	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-03A	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-03B	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-04A	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)
L1837054-04B	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)
L1837054-05A	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)
L1837054-05B	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)
L1837054-06A	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)
L1837054-06B	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)
L1837054-07A	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-07B	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-08A	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-08B	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-09A	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-09B	Vial unpreserved	A	NA		4.5	Y	Absent		624.1(3)
L1837054-10A	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)
L1837054-10B	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)
L1837054-11A	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)
L1837054-11B	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)
L1837054-12A	Vial HCl preserved	A	NA		4.5	Y	Absent		HOLD-624(14)



Container Information			Initial		Final		Temp		Cooler		Pres		Seal		Frozen		Analysis(*)
Container ID	Container Type		pH	pH	pH	deg	C								Date/Time		
L1837054-12B	Vial HCl preserved		NA	NA	4.5	4.5	Y	Y	A								HOLD-624(14)
L1837054-13A	Vial unpreserved		NA	NA	4.5	4.5	Y	Y	A								624.1(3)
L1837054-13B	Vial unpreserved		NA	NA	4.5	4.5	Y	Y	A								624.1(3)
L1837054-14A	Vial unpreserved		NA	NA	4.5	4.5	Y	Y	A								624.1(3)
L1837054-14B	Vial unpreserved		NA	NA	4.5	4.5	Y	Y	A								624.1(3)
L1837054-15A	Vial unpreserved		NA	NA	4.5	4.5	Y	Y	A								624.1(3)
L1837054-15B	Vial unpreserved		NA	NA	4.5	4.5	Y	Y	A								624.1(3)
L1837054-16A	Vial unpreserved		NA	NA	4.5	4.5	Y	Y	A								624.1(3)
L1837054-16B	Vial unpreserved		NA	NA	4.5	4.5	Y	Y	A								624.1(3)
L1837054-17A	Vial HCl preserved		NA	NA	4.5	4.5	Y	Y	A								HOLD-624(14)
L1837054-17B	Vial HCl preserved		NA	NA	4.5	4.5	Y	Y	A								HOLD-624(14)
L1837054-18A	Vial HCl preserved		NA	NA	4.5	4.5	Y	Y	A								HOLD-624(14)
L1837054-18B	Vial HCl preserved		NA	NA	4.5	4.5	Y	Y	A								HOLD-624(14)
L1837054-19A	Vial HCl preserved		NA	NA	4.5	4.5	Y	Y	A								HOLD-624(14)
L1837054-19B	Vial HCl preserved		NA	NA	4.5	4.5	Y	Y	A								HOLD-624(14)
L1837054-20A	Vial HCl preserved		NA	NA	4.5	4.5	Y	Y	A								HOLD-624(14)
L1837054-20B	Vial HCl preserved		NA	NA	4.5	4.5	Y	Y	A								HOLD-624(14)
L1837054-21A	Amber 950ml H2SO4 preserved		<4	<4	4.5	4.5	Y	Y	A								TPHENOL-420(28)
L1837054-22A	Amber 950ml H2SO4 preserved		<4	<4	4.5	4.5	Y	Y	A								TPHENOL-420(28)
L1837054-23A	Amber 950ml H2SO4 preserved		<4	<4	4.5	4.5	Y	Y	A								TPHENOL-420(28)
L1837054-24A	Amber 950ml H2SO4 preserved		<4	<4	4.5	4.5	Y	Y	A								TPHENOL-420(28)
L1837054-25A	Amber 950ml H2SO4 preserved		<4	<4	4.5	4.5	Y	Y	A								TPHENOL-420(28)
L1837054-26A	Amber 950ml H2SO4 preserved		<4	<4	4.5	4.5	Y	Y	A								TPHENOL-420(28)
L1837054-27A	Amber 950ml H2SO4 preserved		<4	<4	4.5	4.5	Y	Y	A								TPHENOL-420(28)
L1837054-28A	Amber 950ml H2SO4 preserved		<4	<4	4.5	4.5	Y	Y	A								TPHENOL-420(28)
L1837054-29A	Amber 950ml H2SO4 preserved		7	<4	4.5	4.5	N	N	A								TPHENOL-420(28)

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

## GLOSSARY

### Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

**Report Format:** Data Usability Report



**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

#### Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

**Project Name:** 31148  
**Project Number:** Not Specified

**Lab Number:** L1837054  
**Report Date:** 09/25/18

#### REFERENCES

- 4 Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983.
- 128 Method 624.1: Purgeables by GC/MS, EPA 821-R-16-008, December 2016.

#### LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.  
 Facility: Company-wide  
 Department: Quality Assurance  
 Title: Certificate/Approval Program Summary

## Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

### Westborough Facility

EPA 624: m/p-xylene, o-xylene

EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

EPA 300: DW: Bromide

EPA 6860: SCM: Perchlorate

EPA 9010: NPW and SCM: Amenable Cyanide Distillation

SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

### Westborough Facility:

#### Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; EPA 353.2: Nitrate-N, Nitrite-N; SM4500NO<sub>3</sub>-F: Nitrate-N, Nitrite-N; SM4500F-C, SM4500CN-CE,

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B

EPA 332: Perchlorate; EPA 524.2: THMs and VOCs; EPA 504.1: EDB, DBCP.

Microbiology: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.

#### Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH<sub>3</sub>-BH: Ammonia-N and Kjeldahl-N, EPA 350.1:

Ammonia-N, LACHAT 10-107-06-1-B: Ammonia-N, EPA 351.1, SM4500NO<sub>3</sub>-F, EPA 353.2: Nitrate-N, EPA 351.1, SM4500P-E, SM4500P-B, E,

SM4500SO<sub>4</sub>-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.

EPA 624: Volatile Halocarbons & Aromatics,

EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625: SVOC (Acid/Base/Neutral Extractables), EPA 600/4-81-045: PCB-Oil.

Microbiology: SM9223B-Colilert-QT; Enterolert-QT, SM9221E, SM9222D.

### Mansfield Facility:

#### Drinking Water

EPA 200.7: Al, Ba, Be, Cd, Cr, Cu, Mn, Ni, Na, Ag, Ca, Zn. EPA 200.8: Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. EPA 245.1 Hg.

EPA 522.

#### Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

## CHAIN OF CUSTODY RECORD

## ENVIROSYSTEMS, INCORPORATED

P.O. Box 778, Hampton, New Hampshire 03842

ESI Study Number: 41837054Customer Services: Phone # (603) 926-3345  
Fax # (603) 926-3521

PAGE 1 OF 3

CLIENT: EnviroSystems, Inc.	CONTACT: Jason Hobbs Email: jason.hobbs@enthalpy.com CC: catherine.sasso@enthalpy.com	PROJECT NAME: 31148	P.O. #
REPORT TO: Jason Hobbs	ADDRESS: P.O. Box 778	PHONE: Ext. 208	
INVOICE TO: Jason Hobbs	ADDRESS: Hampton, NH 03843	SAMPLED BY: CS	

Program Requirements: ☐ NPDES ☐ RCRA ☐ USACE ☐ EPA ☐ OTHER

SAMPLE #	YOUR FIELD IDENTIFICATION (MUST AGREE WITH CONTAINER)	DATE SAMPLED	TIME SAMPLED	COMPOSITE /GRAB	E-EFFLUENT D-DILUENT O-OTHER	CONTAINER #/VOLUME	FIELD PRESERVED	ANALYSIS REQUESTED (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
37054-01	31148-026	9/17/18	1045	G		2 x 40 mL G	4C	VOC 624
02	31148-027	9/17/18	1045	G		2 x 40 mL G	4C	VOC 624
03	31148-028	9/16/18	0700	G		2 x 40 mL G	4C	VOC 624
04	31148-029	9/17/18	1045	G		2 x 40 mL G	HCI	HOLD VOC 624
05	31148-030	9/17/18	1045	G		2 x 40 mL G	HCI	HOLD VOC 624
06	31148-031	9/16/18	0700	G		2 x 40 mL G	HCI	HOLD VOC 624
07	31148-061	9/17/18	0700	G		2 x 40 mL G	4C	VOC 624
08	31148-062	9/17/18	0700	G		2 x 40 mL G	4C	VOC 624
09	31148-063	9/16/18	0800	G		2 x 40 mL G	4C	VOC 624
10	31148-064	9/17/18	0700	G		2 x 40 mL G	HCL	HOLD VOC 624
11	31148-065	9/17/18	0700	G		2 x 40 mL G	HCI	HOLD VOC 624
12	31148-066	9/16/18	0800	G		2 x 40 mL G	HCI	HOLD VOC 624

RELINQUISHED BY: Jason HobbsDATE: 9/18/18TIME: 1:25RECEIVED BY: Cheri GreenDATE: 9/18/18TIME: 11:25

FOR VOCs: IF WITHIN HOLD TIME (7 DAYS FROM SAMPLE DATE) PLEASE RUN SAMPLES NOT LABELED AS HOLD AHEAD  
 Page 53 of 60  
 THESE SAMPLES ARE UNPRESERVED IF OUTSIDE OF HOLD TIME, PLEASE RUN HOLD SAMPLES (PRESERVED VOC SAMPLES) ONLY. PLEASE  
 SEE EMAIL DATED 9/18/18 FOR MORE INFORMATION.

## CHAIN OF CUSTODY RECORD

## ENVIROSYSTEMS, INCORPORATED

P.O. Box 778, Hampton, New Hampshire 03842

ESI Study Number 11837054Customer Services: Phone # (603) 926-3345  
Fax # (603) 926-3521

PAGE 2 OF 3

CLIENT: EnviroSystems, Inc.	CONTACT: Jason Hobbs Email: jason.hobbs@enthalpy.com CC: catherine.sasso@enthalpy.com	PROJECT NAME: 31148	P.O. #
REPORT TO: Jason Hobbs	ADDRESS: P.O. Box 778		PHONE: Ext. 208
INVOICE TO: Jason Hobbs	ADDRESS: Hampton, NH 03843		SAMPLED BY: CS

Program Requirements: ☐ NPDES ☐ RCRA ☐ USACE ☐ EPA ☐ OTHER

SAMPLE #	YOUR FIELD IDENTIFICATION (MUST AGREE WITH CONTAINER)	DATE SAMPLED	TIME SAMPLED	COMPOSITE /GRAB	EFFLUENT D-DILUENT O-OTHER	CONTAINER #VOLUME	FIELD PRESERVED	ANALYSIS REQUESTED (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
3784-13	31148-095	9/17/18	1410	G		2 x 40 mL G	4C	VOC 624
14	31148-096	9/17/18	1410	G		2 x 40 mL G	4C	VOC 624
15	31148-097	9/17/18	1410	G		2 x 40 mL G	4C	VOC 624
16	31148-098	9/17/18	1400	G		2 x 40 mL G	4C	VOC 624
17	31148-099	9/17/18	1400	G		2 x 40 mL G	HCl	HOLD VOC 624
18	31148-100	9/17/18	1400	G		2 x 40 mL G	HCl	HOLD VOC 624
19	31148-101	9/17/18	1400	G		2 x 40 mL G	HCl	HOLD VOC 624
20	31148-102	9/17/18	1400	G		2 x 40 mL G	HCl	HOLD VOC 624
21	31148-023	9/17/18	0830	C		1 x 1000 mL G	H2SO4	TPhen (EPA 420.1)
22	31148-024	9/16/18	0800	G		1 x 1000 mL G	H2SO4	TPhen (EPA 420.1)
23	31148-058	9/17/18	0730	C		1 x 1000 mL G	H2SO4	TPhen (EPA 420.1)
24	31148-059	9/17/18	0730	C		1 x 1000 mL G	H2SO4	TPhen (EPA 420.1)

RELINQUISHED BY: RS 571 DATE: 9/18/18RECEIVED BY: Chen Jean TIME: 11:25DATE: 9/18/18 TIME: 11:25

P.O. Box 778, Hampton, New Hampshire 03842

ESI Study Number:

**Customer Services: Phone # (603) 926-3345  
Fax # (603) 926-3521**

**P.O. Box 778, Hampton, New Hampshire 03842**

**CLIENT:** EnviroSystems, Inc.

CONTACT:  
Jason Hobbs  
Email: [jason.hobbs@usdoj.gov](mailto:jason.hobbs@usdoj.gov)  
CC: [catherin.hobbs@usdoj.gov](mailto:catherin.hobbs@usdoj.gov)

PROJECT NAME:

Email: [jason.hobbs@enthalpy.com](mailto:jason.hobbs@enthalpy.com)  
CC: [catherine.sasso@enthalpy.com](mailto:catherine.sasso@enthalpy.com)

#.O.4

312418

**REPORT TO:**

**Jason Hobbs**

### ADDRESSES:

P.O. Box 778

Ext. 208

**INVOICE TO:**

**Jason Hobbs**

**ADDRESS:**

Hampton, NH 03843

SAMPLED BY: CS

Program Requirements: ☐ NPDES ☐ RCRA ☐ USACE ☐ EPA ☐ OTHER[illegible]

RELINQUISHED BY:

SHED BY: *RSW*

DATE: 9/8/12

TIME: 11/25

RECEIVED BY: *Chen*

icecream

DATE: 8/18/18

TIME: 11







Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

24 October 2018

Steven Clifton  
Underwood Engineers  
25 Vaughan Mall  
Portsmouth, NH 03801  
RE: Trace Metals In Wastewater

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in blue ink that reads "Maricris dela Rosa".

Maricris dela Rosa  
Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

**Reported:**  
24-Oct-18 12:43

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
NEW-EB-01 NEW-EB-TM	8I00809-02	Water	16-Sep-18 07:00	19-Sep-18 10:20
NEW-EB-01 NEW-EB-Hg	8I00809-03	Water	16-Sep-18 07:00	19-Sep-18 10:20
PEASE-EB-01 PEASE-EB-TM	8I00809-05	Water	16-Sep-18 08:00	19-Sep-18 10:20
PEASE-EB-01 PEASE-EB-Hg	8I00809-06	Water	16-Sep-18 08:00	19-Sep-18 10:20
NEW-COMP-01 NEW-01-TM	8I00809-09	Water	17-Sep-18 07:30	19-Sep-18 10:20
NEW-COMP-01 NEW-02-TM	8I00809-10	Water	17-Sep-18 07:30	19-Sep-18 10:20
NEW-COMP-01 NEW-01-Hg	8I00809-11	Water	17-Sep-18 07:30	19-Sep-18 10:20
NEW-COMP-01 NEW-02-Hg	8I00809-12	Water	17-Sep-18 07:30	19-Sep-18 10:20
PEASE-COMP-01 PEASE-01-TM	8I00809-14	Water	17-Sep-18 08:45	19-Sep-18 10:20
PEASE-COMP-01 PEASE-02-TM	8I00809-15	Water	17-Sep-18 08:45	19-Sep-18 10:20
PEASE-COMP-01 PEASE-01-Hg	8I00809-16	Water	17-Sep-18 08:45	19-Sep-18 10:20

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Maricris dela Rosa, Project Manager

Page 2 of 45



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Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

#### SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 19-Sep-18 10:20. The samples were received intact, on-ice within a sealed cooler at

<u>Cooler</u>	<u>Temp C°</u>
Default Cooler	8.0

Samples were shipped to Eurofins Calscience in Garden Grove, CA for the EPA SM4500 Total CN analysis per the initial project setup.

The subcontract report is located after the notes and definitions section of the EFGS report.

#### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total mercury by flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631E.

Samples were prepared and analyzed for total recoverable metals by inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 200.8 (EFGS-054).

#### ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

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*Maricris dela Rosa*

Maricris dela Rosa, Project Manager



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Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

**Reported:**  
24-Oct-18 12:43

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries. All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

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## Sample Receipt Checklist

Client: Vander wood

Date & Time Received: 9/14/18 9:20

Date Labeled: 9/25/18 Labeled By: CSF

Project: \_\_\_\_\_

Received By: JS

Label Verified By: m

# of Coolers Received: 2

Samples Arrived By: 1

Shipping Service \_\_\_\_\_ Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (Specify: \_\_\_\_\_)

Coolant: ☐ None/Ambient ☐ Loose Ice ☒ Gel Ice ☐ Dry Ice

Coolant Required: Y / N

Temp Blank Used ☒ Y/N for Cooler(s): 1

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y/N

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>N</u>	
Custody seals signed:	<u>N</u>	

TID: <u>122409235</u> CF: <u>0.1</u> °C	Date/time: <u>9/14/18 9:20</u> By: <u>JS</u>
Cooler 1: <u>7.4</u> °C w/ CF: <u>0.0</u> °C	Cooler 4: °C w/ CF: °C
Cooler 2: °C w/ CF: °C	Cooler 5: °C w/ CF: °C
Cooler 3: °C w/ CF: °C	Cooler 6: °C w/ CF: °C

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Preservation type:	<u>Y</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
Internal COC required:	<u>Y</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>Y</u>	

Anomalies/Non-conformances (attach additional pages if needed):

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8100809





Frontier Global Sciences

# Chain of Custody Record & Laboratory Analysis Request: Air, Water, Sediments, Plant and Animal Tissue, Hydrocarbon & Other Samples

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
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Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

Page 1 of 2

8100809

Client: UNDERWOOD ENGINEERS, INC.						Contact: Tim Puls			Analyses Requested				EFGS PM:			
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Phone: (603) 436-6192 Fax:							Date:			
Project Name: Anti-Degradation						E-mail: tpuls@underwoodengineers.com			Total Metals Total Cn Total Mercury				TAT (business days): <b>20</b> (std)			
Report To: Tim Puls						Contract/PO:							15 10 5 4 3 2 24 hrs.			
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Invoice To: (SAME)			Total Metals Total Cn Total Mercury				(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)			
Phone: (603) 436-6192 Fax:						Address:							Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N			
E-mail: tpuls@underwoodengineers.com						Phone: Fax:			Total Metals Total Cn Total Mercury				(If yes, please contact PM)			
E-mail: tpuls@underwoodengineers.com						E-mail:							EDD <input type="checkbox"/> Y <input type="checkbox"/> N			
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)					QA <input type="checkbox"/> Standard <input type="checkbox"/> High			
															Comments	
1	NEW-EB-01	NEW-EB-Cn	1	Fresh	9/16/18 7AM	TAP	N	NaOH			X				Total Metals include: Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Ni, Se, Ag, Tl, Zn	
2	NEW-EB-01	NEW-EB-TM	1	"	"	"	"	-		X						
3	NEW-EB-01	NEW-EB-Hg	1	"	"	"	"	-				X				
4	PEASE-EB-01	PEASE-EB-Cn	1	"	" 8AM	"	"	NaOH			X					
5	PEASE-EB-01	PEASE-EB-TM	1	"	" 8AM	"	"	-		X						
6	PEASE-EB-01	PEASE-EB-Hg	1	"	" 8AM	"	"	-				X				
7	NEW-COM-01	NEW-01-Cn	1	"	9/17/18 7:30A	"	"	NaOH			X					
8	"	NEW-02-Cn	1	"	"	"	"	NaOH				X				
9	"	NEW-01-TM	1	"	"	"	"	-		X						
10	"	NEW-02-TM	1	"	"	"	"	-		X						
11	"	NEW-01-Hg	1	"	"	"	"	-					X			
12	"	NEW-02-Hg	1	"	"	"	"	-					X			
For Laboratory Use Only						Matrix Codes:			Relinquished By:			Received By:				
COC Seal:		Comments:		FW: Fresh Water		Name: Tim Puls			Name:			Name:				
Cooler Temp:				WW: Waste Water		Organization: UE			Organization:			Organization:				
Carrier:				SB: Sea and Brackish Water		Date & Time: 9/17/18 3PM			Date & Time:			Date & Time:				
VTSR:				SS: Soil and Sediment		Tracking number:										
# of Coolers:				TS: Plant and Animal Tissue												
				HC: Hydrocarbons												
				TR: Trap												
				OT: Other												
Sample Disposal:						By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.										
<input type="checkbox"/> Return (shipping fees may apply)						Customer Approval: _____ Date: _____										
<input type="checkbox"/> Standard Disposal - 30 Days after report																
<input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)																



Frontier Global Sciences

# Chain of Custody Record & Laboratory Analysis Request:

Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

Page 2 of 2

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Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

8100809

Client: UNDERWOOD ENGINEERS, INC.						Contact: Tim Puls		Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Analyses Requested				EFGS PM:	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Phone: (603) 436-6192 Fax:									Date:	
Project Name: Anti-Degradation						E-mail: tpuls@underwoodengineers.com									TAT (business days): <b>20</b> (std)	
Report To: Tim Puls						Contract/PO:									<b>15 10 5 4 3 2 24 hrs.</b>	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Invoice To: <b>(SAME)</b>									(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)	
Phone: (603) 436-6192 Fax:						Phone: Fax:						Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N				
E-mail: tpuls@underwoodengineers.com						E-mail:						(If yes, please contact PM)				
												EDD <input type="checkbox"/> Y <input type="checkbox"/> N				
												QA <input type="checkbox"/> Standard <input type="checkbox"/> High				
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time						Total Metals	Total Cu	Total Mercury	Comments		
1	PEASE-COMP-01	PEASE-01-Cu	1	Fresh	9/12/18 8:45 AM	RE	N	NaOH			X			Total Metals include: Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Ni, Se, Ag, Ti, Zn		
2	"	PEASE-01-TM	1	"	"	"	N	-		X						
3	"	PEASE-02-TM	1	"	"	"	U	-		X						
4	"	PEASE-01-Hg	1	"	"	"	N	-				X				
5																
6																
7																
8																
9																
10																
11																
12																

For Laboratory Use Only		Matrix Codes:		Relinquished By:		Received By:		Received By:	
COC Seal:	Comments:	FW: Fresh Water	SB: Sea and Brackish Water SS: Soil and Sediment TS: Plant and Animal Tissue HC: Hydrocarbons TR: Trap OT: Other	Name: <i>Tim Puls</i>		Name:		Name:	
Cooler Temp:		Organization: <i>UE</i>		Organization:		Organization:			
Carrier:		Date & Time: <i>9/17/18 3PM</i>		Date & Time:		Date & Time:			
VTSR:		Tracking number:							
# of Coolers:									

Sample Disposal:  
☐ Return (shipping fees may apply)  
☐ Standard Disposal – 30 Days after report  
☐ Retain for \_\_\_\_ weeks after report (storage fees may apply)

By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.

Customer Approval: \_\_\_\_\_ Date: \_\_\_\_\_



**SUBCONTRACT ORDER**  
Eurofins Frontier Global Sciences, Inc.  
**8100809**

**SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

Analysis	Comments
----------	----------

Sample ID: NEW-EB-01 NEW-EB-Cn

EFGS Lab ID: 8100809-01      Matrix: Water

Sampled: 16-Sep-18 07:00 (GMT-05:00) Eastern Time (US &

Due: 17-Oct-18 19:00

**Misc. Subcontract 1**

**EPA SM4500 CN E**

*Containers Supplied:*

23\_Client Specific Bottle (

Sample ID: PEASE-EB-01 PEASE-EB-Cn

EFGS Lab ID: 8100809-04      Matrix: Water

Sampled: 16-Sep-18 08:00 (GMT-05:00) Eastern Time (US &

Due: 17-Oct-18 19:00

**Misc. Subcontract 1**

**EPA SM4500 CN E**

*Containers Supplied:*

23\_Client Specific Bottle (

Sample ID: NEW-COMP-01 NEW-01-Cn

EFGS Lab ID: 8100809-07      Matrix: Water

Sampled: 17-Sep-18 07:30 (GMT-05:00) Eastern Time (US &

Due: 17-Oct-18 19:00

**Misc. Subcontract 1**

**EPA SM4500 CN E**

*Containers Supplied:*

23\_Client Specific Bottle (

Used By

Date

Received By

Date

Used By

Date

Received By

Date

SUBCONTRACT ORDER  
Eurofins Frontier Global Sciences, Inc.  
8100809

Analysis	Comments
Sample ID: NEW-COMP-01 NEW-02-Cn	
EFGS Lab ID: 8100809-08	Matrix: Water
Sampled: 17-Sep-18 07:30 (GMT-05:00) Eastern Time (US & Canada) Due: 17-Oct-18 19:00	
Misc. Subcontract 1	EPA SM4500 CN E
Containers Supplied: 23_Client Specific Bottle (1)	
Sample ID: PEASE-COMP-01 PEASE-01-Cn	
EFGS Lab ID: 8100809-13	Matrix: Water
Sampled: 17-Sep-18 08:45 (GMT-05:00) Eastern Time (US & Canada) Due: 17-Oct-18 19:00	
Misc. Subcontract 1	EPA SM4500 CN E
Containers Supplied: 23_Client Specific Bottle (1)	

Received By	Date	Received By	Date
Received By	Date	Received By	Date



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

**NEW-EB-01 NEW-EB-TM**  
**8100809-02**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	ND	0.009	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Arsenic	ND	0.10	0.30	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
<b>Beryllium</b>	<b>0.007</b>	0.004	0.061	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Cadmium	ND	0.008	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
<b>Chromium</b>	<b>0.03</b>	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
<b>Copper</b>	<b>0.07</b>	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
<b>Iron</b>	<b>2</b>	1	10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Lead	ND	0.005	0.040	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
<b>Nickel</b>	<b>0.13</b>	0.04	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Selenium	ND	0.44	0.61	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
<b>Silver</b>	<b>0.002</b>	0.002	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Thallium	ND	0.006	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
<b>Zinc</b>	<b>1.53</b>	0.16	0.50	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	

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*Maricris dela Rosa*

Maricris dela Rosa, Project Manager



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25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

**Reported:**  
24-Oct-18 12:43

**NEW-EB-01 NEW-EB-Hg**  
**8100809-03**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	ND	0.08	0.50	ng/L	1	F810184	25-Sep-18	8J02006	01-Oct-18	EPA 1631E	U

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Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

PEASE-EB-01 PEASE-EB-TM

8100809-05

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	ND	0.009	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Arsenic	ND	0.10	0.30	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
<b>Beryllium</b>	<b>0.008</b>	0.004	0.061	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Cadmium	ND	0.008	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Chromium	ND	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
<b>Copper</b>	<b>0.05</b>	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Iron	ND	1	10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Lead	ND	0.005	0.040	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Nickel	ND	0.04	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Selenium	ND	0.44	0.61	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Silver	ND	0.002	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Thallium	ND	0.006	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
<b>Zinc</b>	<b>15.6</b>	0.16	0.50	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	

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*Maricris dela Rosa*

Maricris dela Rosa, Project Manager



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Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

**Reported:**  
24-Oct-18 12:43

**PEASE-EB-01 PEASE-EB-Hg**  
**8100809-06**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	0.11	0.08	0.50	ng/L	1	F810184	25-Sep-18	8J02006	01-Oct-18	EPA 1631E	J

Eurofins Frontier Global Sciences, LLC

*Maricris dela Rosa*

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

NEW-COMP-01 NEW-01-TM

8100809-09

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	0.118	0.009	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Arsenic	1.28	0.10	0.30	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Beryllium	0.005	0.004	0.061	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Cadmium	0.014	0.008	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Chromium	0.39	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Copper	2.16	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Iron	63	1	10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Lead	0.400	0.005	0.040	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Nickel	2.22	0.04	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Selenium	1.09	0.44	0.61	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Silver	0.217	0.002	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Zinc	85.4	1.62	5.05	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

NEW-COMP-01 NEW-02-TM

8100809-10

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	0.116	0.009	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Arsenic	1.30	0.10	0.30	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Beryllium	0.006	0.004	0.061	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Cadmium	0.014	0.008	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Chromium	0.41	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Copper	2.13	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Iron	63	1	10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Lead	0.401	0.005	0.040	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Nickel	2.21	0.04	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Selenium	1.12	0.44	0.61	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Silver	0.224	0.002	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Zinc	106	1.62	5.05	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

**Reported:**  
24-Oct-18 12:43

**NEW-COMP-01 NEW-01-Hg**  
**8I00809-11**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Mercury</b>	<b>0.99</b>	0.08	0.50	ng/L	1	F810184	25-Sep-18	8J02006	01-Oct-18	EPA 1631E	

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Project Manager: Steven Clifton

**Reported:**  
24-Oct-18 12:43

**NEW-COMP-01 NEW-02-Hg**  
**8100809-12**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Mercury</b>	<b>1.06</b>	0.08	0.50	ng/L	1	F810184	25-Sep-18	8J02006	01-Oct-18	EPA 1631E	

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Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

PEASE-COMP-01 PEASE-01-TM

8100809-14

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	0.230	0.091	0.202	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Arsenic	3.64	0.10	0.30	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Beryllium	0.004	0.004	0.061	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Cadmium	ND	0.081	0.202	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Chromium	0.73	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Copper	10.8	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Iron	802	1	10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Lead	1.03	0.050	0.404	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Nickel	8.31	0.04	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Selenium	1.45	0.44	0.61	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Silver	0.027	0.020	0.202	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Thallium	ND	0.061	0.202	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Zinc	96.4	1.62	5.05	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	

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Project: Trace Metals In Wastewater  
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Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

PEASE-COMP-01 PEASE-02-TM

8100809-15

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	0.541	0.091	0.202	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Arsenic	3.66	0.10	0.30	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Beryllium	0.004	0.004	0.061	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Cadmium	0.059	0.008	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Chromium	0.75	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Copper	10.7	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Iron	814	1	10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Lead	1.06	0.050	0.404	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Nickel	8.29	0.04	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Selenium	1.53	0.44	0.61	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	
Silver	0.031	0.020	0.202	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Thallium	ND	0.061	0.202	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
Zinc	101	1.62	5.05	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	

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Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

**Reported:**  
24-Oct-18 12:43

**PEASE-COMP-01 PEASE-01-Hg**  
**8100809-16**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	3.17	0.08	0.50	ng/L	1	F810184	25-Sep-18	8J02006	01-Oct-18	EPA 1631E	

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F810184 - EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Blank (F810184-BLK1)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810184-BLK2)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810184-BLK3)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810184-BLK4)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	ND	0.09	0.52	ng/L							QB-06, U
<b>LCS (F810184-BS1)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	16.46	0.08	0.50	ng/L	14.688		112	80-120			
<b>LCS Dup (F810184-BSD1)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	15.02	0.08	0.50	ng/L	14.688		102	80-120	9.18	24	
<b>Duplicate (F810184-DUP1)</b>					<b>Source: 8I00630-01</b>		Prepared & Analyzed: 01-Oct-18				
Mercury	1.67	0.08	0.50	ng/L		1.19			33.1	24	AD, QR-07
<b>Matrix Spike (F810184-MS1)</b>					<b>Source: 8I00809-12</b>		Prepared & Analyzed: 01-Oct-18				
Mercury	5.87	0.08	0.50	ng/L	5.0702	1.06	94.8	71-125			AS
<b>Matrix Spike (F810184-MS2)</b>					<b>Source: 8I00809-16</b>		Prepared & Analyzed: 01-Oct-18				
Mercury	12.48	0.08	0.50	ng/L	10.140	3.17	91.8	71-125			AS
<b>Matrix Spike Dup (F810184-MSD1)</b>					<b>Source: 8I00809-12</b>		Prepared & Analyzed: 01-Oct-18				
Mercury	6.11	0.08	0.50	ng/L	5.0702	1.06	99.6	71-125	4.10	24	AS

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Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810184 - EFGS SOP2796 EPA 1631 Oxidation

##### Matrix Spike Dup (F810184-MSD2)

Source: 8I00809-16

Prepared & Analyzed: 01-Oct-18

Mercury	12.28	0.08	0.50	ng/L	10.140	3.17	89.8	71-125	1.65	24	AS
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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F810306-BLK1)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Silver	0.002	0.002	0.020	µg/L							J
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##### Blank (F810306-BLK2)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Arsenic	ND	0.10	0.30	µg/L							U
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Silver	ND	0.002	0.020	µg/L							U
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##### LCS (F810306-BS1)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Arsenic	44.96	0.50	1.50	µg/L	50.000		89.9	85-115			
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Silver	22.93	0.010	0.100	µg/L	25.000		91.7	85-115			
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##### LCS Dup (F810306-BSD1)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Arsenic	47.23	0.50	1.50	µg/L	50.000		94.5	85-115	4.91	20	
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Silver	23.98	0.010	0.100	µg/L	25.000		95.9	85-115	4.45	20	
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##### Matrix Spike (F810306-MS1)

Source: 8I00809-10

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Arsenic	47.33	1.01	3.04	µg/L	50.000	ND	94.7	70-130			
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Silver	23.70	0.020	0.202	µg/L	25.000	0.220	93.9	70-130			
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##### Matrix Spike (F810306-MS2)

Source: 8I00809-15

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Arsenic	47.25	1.01	3.04	µg/L	50.000	2.89	88.7	70-130			
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Silver	21.98	0.020	0.202	µg/L	25.000	0.031	87.8	70-130			
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Reported:  
24-Oct-18 12:43

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Matrix Spike (F810306-MS4)</b>		<b>Source: 8I00809-10</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Arsenic	383.3	1.01	3.03	µg/L	410.00	ND	93.5	70-130			AS
Silver	19.90	0.020	0.202	µg/L	20.500	0.220	96.0	70-130			AS
<b>Matrix Spike (F810306-MS5)</b>		<b>Source: 8I00809-15</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Arsenic	383.6	1.01	3.03	µg/L	410.00	2.89	92.9	70-130			AS
Silver	19.03	0.020	0.202	µg/L	20.500	0.031	92.7	70-130			AS
<b>Matrix Spike (F810306-MS8)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Arsenic	51.11	2.53	7.59	µg/L	50.000	3.16	95.9	70-130			
Silver	21.26	0.051	0.506	µg/L	25.000	ND	85.0	70-130			
<b>Matrix Spike (F810306-MSA)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Arsenic	1004	2.52	7.57	µg/L	1025.0	3.16	97.6	70-130			AS
<b>Matrix Spike Dup (F810306-MSD1)</b>		<b>Source: 8I00809-10</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Arsenic	47.49	1.01	3.04	µg/L	50.000	ND	95.0	70-130	0.341	20	
Silver	23.64	0.020	0.202	µg/L	25.000	0.220	93.7	70-130	0.270	20	
<b>Matrix Spike Dup (F810306-MSD2)</b>		<b>Source: 8I00809-15</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Arsenic	49.48	1.01	3.04	µg/L	50.000	2.89	93.2	70-130	4.60	20	
Silver	22.66	0.020	0.202	µg/L	25.000	0.031	90.5	70-130	3.04	20	
<b>Matrix Spike Dup (F810306-MSD4)</b>		<b>Source: 8I00809-10</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Arsenic	378.3	1.01	3.03	µg/L	410.00	ND	92.3	70-130	1.32	20	AS
Silver	19.57	0.020	0.202	µg/L	20.500	0.220	94.4	70-130	1.68	20	AS
<b>Matrix Spike Dup (F810306-MSD5)</b>		<b>Source: 8I00809-15</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Arsenic	384.2	1.01	3.03	µg/L	410.00	2.89	93.0	70-130	0.157	20	AS
Silver	18.80	0.020	0.202	µg/L	20.500	0.031	91.6	70-130	1.22	20	AS

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Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Matrix Spike Dup (F810306-MSD8)

Source: 8I00810-04RE1 Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Arsenic	52.74	2.53	7.59	µg/L	50.000	3.16	99.2	70-130	3.14	20	
Silver	21.90	0.051	0.506	µg/L	25.000	ND	87.6	70-130	2.97	20	

##### Matrix Spike Dup (F810306-MSDA)

Source: 8I00810-04RE1 Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Arsenic	1012	2.52	7.57	µg/L	1025.0	3.16	98.5	70-130	0.879	20	AS
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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F810306-BLK2)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Beryllium	ND	0.004	0.060	µg/L							U
Chromium	ND	0.02	0.10	µg/L							U
Iron	3	1	10	µg/L							J
Nickel	ND	0.04	0.10	µg/L							U
Copper	ND	0.02	0.10	µg/L							U
Zinc	ND	0.16	0.50	µg/L							U
Selenium	ND	0.44	0.60	µg/L							U
Cadmium	ND	0.008	0.020	µg/L							U
Antimony	ND	0.009	0.020	µg/L							U
Thallium	ND	0.006	0.020	µg/L							U
Lead	ND	0.005	0.040	µg/L							U

##### LCS (F810306-BS1)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Beryllium	38.06	0.020	0.301	µg/L	40.010		95.1	85-115			
Chromium	48.54	0.10	0.50	µg/L	49.990		97.1	85-115			
Iron	1125	6	50	µg/L	1250.0		90.0	85-115			
Nickel	48.32	0.20	0.50	µg/L	50.010		96.6	85-115			
Copper	48.41	0.10	0.50	µg/L	50.000		96.8	85-115			
Zinc	46.53	0.80	2.50	µg/L	50.010		93.1	85-115			
Selenium	48.47	2.20	3.01	µg/L	49.990		97.0	85-115			
Cadmium	38.25	0.040	0.100	µg/L	40.010		95.6	85-115			
Antimony	41.01	0.045	0.100	µg/L	40.030		102	85-115			QB-01
Thallium	36.59	0.030	0.100	µg/L	39.990		91.5	85-115			
Lead	47.08	0.025	0.200	µg/L	50.010		94.1	85-115			

##### LCS Dup (F810306-BSD1)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Beryllium	40.12	0.020	0.301	µg/L	40.010		100	85-115	5.28	20	
Chromium	51.15	0.10	0.50	µg/L	49.990		102	85-115	5.24	20	
Iron	1134	6	50	µg/L	1250.0		90.7	85-115	0.826	20	
Nickel	49.97	0.20	0.50	µg/L	50.010		99.9	85-115	3.36	20	
Copper	50.53	0.10	0.50	µg/L	50.000		101	85-115	4.29	20	
Zinc	48.05	0.80	2.50	µg/L	50.010		96.1	85-115	3.20	20	
Selenium	49.59	2.20	3.01	µg/L	49.990		99.2	85-115	2.29	20	
Cadmium	40.00	0.040	0.100	µg/L	40.010		100	85-115	4.49	20	

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Maricris dela Rosa, Project Manager



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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### LCS Dup (F810306-BSD1)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Antimony	41.99	0.045	0.100	µg/L	40.030		105	85-115	2.37	20	QB-01
Thallium	38.15	0.030	0.100	µg/L	39.990		95.4	85-115	4.18	20	
Lead	48.70	0.025	0.200	µg/L	50.010		97.4	85-115	3.39	20	

##### Matrix Spike (F810306-MS1)

Source: 8100809-10

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Beryllium	39.06	0.040	0.607	µg/L	40.010	0.073	97.4	70-130			
Chromium	50.57	0.20	1.01	µg/L	49.990	0.38	100	70-130			
Iron	1207	11	101	µg/L	1250.0	115	87.4	70-130			
Nickel	51.70	0.40	1.01	µg/L	50.010	2.56	98.2	70-130			
Copper	51.98	0.20	1.01	µg/L	50.000	2.29	99.4	70-130			
Zinc	149.7	1.62	5.06	µg/L	50.010	106.2	87.0	70-130			
Selenium	50.97	4.45	6.07	µg/L	49.990	ND	102	70-130			
Cadmium	39.89	0.081	0.202	µg/L	40.010	ND	99.7	70-130			
Antimony	40.29	0.091	0.202	µg/L	40.030	0.296	99.9	70-130			QB-01
Thallium	38.85	0.061	0.202	µg/L	39.990	ND	97.1	70-130			
Lead	49.12	0.051	0.405	µg/L	50.010	0.390	97.4	70-130			

##### Matrix Spike (F810306-MS2)

Source: 8100809-15

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Beryllium	36.50	0.040	0.607	µg/L	40.010	0.044	91.1	70-130			
Chromium	47.37	0.20	1.01	µg/L	49.990	0.69	93.4	70-130			
Iron	1796	11	101	µg/L	1250.0	764	82.5	70-130			
Nickel	55.82	0.40	1.01	µg/L	50.010	8.59	94.4	70-130			
Copper	56.86	0.20	1.01	µg/L	50.000	11.81	90.1	70-130			
Selenium	49.15	4.45	6.07	µg/L	49.990	ND	98.3	70-130			
Cadmium	37.51	0.081	0.202	µg/L	40.010	ND	93.7	70-130			
Antimony	37.71	0.091	0.202	µg/L	40.030	0.541	92.8	70-130			
Thallium	37.46	0.061	0.202	µg/L	39.990	ND	93.7	70-130			
Lead	47.23	0.051	0.405	µg/L	50.010	1.057	92.3	70-130			

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Project Manager: Steven Clifton

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### Quality Control Data

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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

Matrix Spike (F810306-MS4)		Source: 8100809-10			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	19.83	0.040	0.606	µg/L	20.500	0.073	96.4	70-130			AS
Chromium	400.2	0.20	1.01	µg/L	410.00	0.38	97.5	70-130			AS
Iron	1959	11	101	µg/L	2050.0	115	89.9	70-130			AS
Nickel	491.8	0.40	1.01	µg/L	512.50	2.56	95.5	70-130			AS
Copper	492.6	0.20	1.01	µg/L	512.50	2.29	95.7	70-130			AS
Zinc	1062	1.62	5.05	µg/L	1025.0	106.2	93.3	70-130			AS
Selenium	406.8	4.44	6.06	µg/L	410.00	ND	99.2	70-130			AS
Cadmium	40.10	0.081	0.202	µg/L	41.000	ND	97.8	70-130			AS
Antimony	19.19	0.091	0.202	µg/L	20.500	0.296	92.2	70-130			AS
Thallium	19.38	0.061	0.202	µg/L	20.500	ND	94.6	70-130			AS
Lead	98.13	0.050	0.404	µg/L	102.50	0.390	95.4	70-130			AS

Matrix Spike (F810306-MS5)		Source: 8100809-15			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	19.30	0.040	0.606	µg/L	20.500	0.044	93.9	70-130			AS
Chromium	394.6	0.20	1.01	µg/L	410.00	0.69	96.1	70-130			AS
Iron	2571	11	101	µg/L	2050.0	764	88.2	70-130			AS
Nickel	480.8	0.40	1.01	µg/L	512.50	8.59	92.1	70-130			AS
Copper	484.2	0.20	1.01	µg/L	512.50	11.81	92.2	70-130			AS
Selenium	405.4	4.44	6.06	µg/L	410.00	ND	98.9	70-130			AS
Cadmium	39.47	0.081	0.202	µg/L	41.000	ND	96.3	70-130			AS
Antimony	19.49	0.091	0.202	µg/L	20.500	0.541	92.4	70-130			AS
Thallium	19.45	0.061	0.202	µg/L	20.500	ND	94.9	70-130			AS
Lead	98.28	0.050	0.404	µg/L	102.50	1.057	94.9	70-130			AS

Matrix Spike (F810306-MS7)		Source: 8100809-15RE2			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Zinc	134.0	1.62	5.06	µg/L	50.010	95.49	77.1	70-130			

Matrix Spike (F810306-MS8)		Source: 8100810-04RE1			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	40.03	0.101	1.52	µg/L	40.010	ND	100	70-130			
Chromium	52.27	0.51	2.53	µg/L	49.990	ND	105	70-130			
Iron	1286	28	253	µg/L	1250.0	128	92.6	70-130			
Nickel	45.67	1.01	2.53	µg/L	50.010	ND	91.3	70-130			
Copper	44.37	0.51	2.53	µg/L	50.000	0.57	87.6	70-130			
Zinc	45.85	4.05	12.6	µg/L	50.010	ND	91.7	70-130			

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F810306-MS8)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Cadmium	36.89	0.202	0.506	µg/L	40.010	ND	92.2	70-130			
Antimony	39.09	0.228	0.506	µg/L	40.030	0.904	95.4	70-130			
<b>Matrix Spike (F810306-MS9)</b>		<b>Source: 8I00809-15RE2</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Zinc	932.2	1.62	5.05	µg/L	1025.0	95.49	81.6	70-130			AS
<b>Matrix Spike (F810306-MSA)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	45.15	0.101	1.51	µg/L	51.250	ND	88.1	70-130			AS
Chromium	995.5	0.50	2.52	µg/L	1025.0	ND	97.1	70-130			AS
Iron	4751	28	252	µg/L	5125.0	128	90.2	70-130			AS
Nickel	1131	1.01	2.52	µg/L	1281.2	ND	88.3	70-130			AS
Copper	1113	0.50	2.52	µg/L	1281.2	0.57	86.8	70-130			AS
Cadmium	93.08	0.202	0.505	µg/L	102.50	ND	90.8	70-130			AS
Antimony	46.56	0.227	0.505	µg/L	51.250	0.904	89.1	70-130			AS
<b>Matrix Spike (F810306-MSB)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 18-Oct-18						
Thallium	36.21	0.152	0.506	µg/L	39.990	ND	90.5	70-130			
Lead	43.87	0.126	1.01	µg/L	50.010	0.260	87.2	70-130			
<b>Matrix Spike (F810306-MSC)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 18-Oct-18						
Thallium	43.15	0.151	0.505	µg/L	51.250	ND	84.2	70-130			AS
Lead	208.1	0.126	1.01	µg/L	256.25	0.260	81.1	70-130			AS
<b>Matrix Spike (F810306-MSD)</b>		<b>Source: 8I00810-04RE2</b>			Prepared: 15-Oct-18 Analyzed: 20-Oct-18						
Selenium	111.7	22.3	30.4	µg/L	49.990	ND	223	70-130			QM-07
<b>Matrix Spike Dup (F810306-MSD1)</b>		<b>Source: 8I00809-10</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	38.78	0.040	0.607	µg/L	40.010	0.073	96.7	70-130	0.732	20	
Chromium	50.37	0.20	1.01	µg/L	49.990	0.38	100	70-130	0.388	20	
Iron	1834	11	101	µg/L	1250.0	115	138	70-130	41.2	20	QM-07, QR-08
Nickel	52.02	0.40	1.01	µg/L	50.010	2.56	98.9	70-130	0.619	20	
Copper	52.06	0.20	1.01	µg/L	50.000	2.29	99.5	70-130	0.143	20	
Zinc	150.0	1.62	5.06	µg/L	50.010	106.2	87.8	70-130	0.261	20	
Selenium	50.38	4.45	6.07	µg/L	49.990	ND	101	70-130	1.15	20	
Cadmium	40.45	0.081	0.202	µg/L	40.010	ND	101	70-130	1.39	20	

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F810306-MSD1)</b>		<b>Source: 8100809-10</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Antimony	40.51	0.091	0.202	µg/L	40.030	0.296	100	70-130	0.533	20	QB-01
Thallium	38.92	0.061	0.202	µg/L	39.990	ND	97.3	70-130	0.181	20	
Lead	48.70	0.051	0.405	µg/L	50.010	0.390	96.6	70-130	0.843	20	
<b>Matrix Spike Dup (F810306-MSD2)</b>		<b>Source: 8100809-15</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	37.05	0.040	0.607	µg/L	40.010	0.044	92.5	70-130	1.50	20	
Chromium	49.46	0.20	1.01	µg/L	49.990	0.69	97.6	70-130	4.32	20	
Iron	1845	11	101	µg/L	1250.0	764	86.4	70-130	2.69	20	
Nickel	55.64	0.40	1.01	µg/L	50.010	8.59	94.1	70-130	0.308	20	
Copper	58.75	0.20	1.01	µg/L	50.000	11.81	93.9	70-130	3.27	20	
Selenium	53.20	4.45	6.07	µg/L	49.990	ND	106	70-130	7.90	20	
Cadmium	39.34	0.081	0.202	µg/L	40.010	ND	98.3	70-130	4.78	20	
Antimony	39.77	0.091	0.202	µg/L	40.030	0.541	98.0	70-130	5.34	20	
Thallium	38.10	0.061	0.202	µg/L	39.990	ND	95.3	70-130	1.70	20	
Lead	48.98	0.051	0.405	µg/L	50.010	1.057	95.8	70-130	3.64	20	
<b>Matrix Spike Dup (F810306-MSD4)</b>		<b>Source: 8100809-10</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	19.15	0.040	0.606	µg/L	20.500	0.073	93.1	70-130	3.45	20	AS
Chromium	389.6	0.20	1.01	µg/L	410.00	0.38	94.9	70-130	2.68	20	AS
Iron	1920	11	101	µg/L	2050.0	115	88.0	70-130	2.01	20	AS
Nickel	482.9	0.40	1.01	µg/L	512.50	2.56	93.7	70-130	1.84	20	AS
Copper	490.3	0.20	1.01	µg/L	512.50	2.29	95.2	70-130	0.467	20	AS
Zinc	1048	1.62	5.05	µg/L	1025.0	106.2	91.9	70-130	1.35	20	AS
Selenium	397.4	4.44	6.06	µg/L	410.00	ND	96.9	70-130	2.33	20	AS
Cadmium	39.55	0.081	0.202	µg/L	41.000	ND	96.5	70-130	1.37	20	AS
Antimony	19.17	0.091	0.202	µg/L	20.500	0.296	92.1	70-130	0.111	20	AS
Thallium	19.35	0.061	0.202	µg/L	20.500	ND	94.4	70-130	0.194	20	AS
Lead	96.94	0.050	0.404	µg/L	102.50	0.390	94.2	70-130	1.22	20	AS

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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

Matrix Spike Dup (F810306-MSD5)		Source: 8I00809-15			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	19.09	0.040	0.606	µg/L	20.500	0.044	92.9	70-130	1.10	20	AS
Chromium	391.8	0.20	1.01	µg/L	410.00	0.69	95.4	70-130	0.714	20	AS
Iron	2586	11	101	µg/L	2050.0	764	88.9	70-130	0.549	20	AS
Nickel	481.7	0.40	1.01	µg/L	512.50	8.59	92.3	70-130	0.189	20	AS
Copper	488.0	0.20	1.01	µg/L	512.50	11.81	92.9	70-130	0.779	20	AS
Selenium	411.3	4.44	6.06	µg/L	410.00	ND	100	70-130	1.45	20	AS
Cadmium	39.26	0.081	0.202	µg/L	41.000	ND	95.7	70-130	0.543	20	AS
Antimony	19.03	0.091	0.202	µg/L	20.500	0.541	90.2	70-130	2.42	20	AS
Thallium	19.26	0.061	0.202	µg/L	20.500	ND	94.0	70-130	0.955	20	AS
Lead	96.72	0.050	0.404	µg/L	102.50	1.057	93.3	70-130	1.60	20	AS

Matrix Spike Dup (F810306-MSD7)		Source: 8I00809-15RE2			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Zinc	125.8	1.62	5.06	µg/L	50.010	95.49	60.7	70-130	6.31	20	QM-07

Matrix Spike Dup (F810306-MSD8)		Source: 8I00810-04RE1			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	41.51	0.101	1.52	µg/L	40.010	ND	104	70-130	3.63	20	
Chromium	53.92	0.51	2.53	µg/L	49.990	ND	108	70-130	3.10	20	
Iron	1350	28	253	µg/L	1250.0	128	97.7	70-130	4.87	20	
Nickel	47.07	1.01	2.53	µg/L	50.010	ND	94.1	70-130	3.02	20	
Copper	45.15	0.51	2.53	µg/L	50.000	0.57	89.1	70-130	1.73	20	
Zinc	47.77	4.05	12.6	µg/L	50.010	ND	95.5	70-130	4.11	20	
Cadmium	38.08	0.202	0.506	µg/L	40.010	ND	95.2	70-130	3.18	20	
Antimony	38.36	0.228	0.506	µg/L	40.030	0.904	93.6	70-130	1.90	20	

Matrix Spike Dup (F810306-MSD9)		Source: 8I00809-15RE2			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Zinc	962.0	1.62	5.05	µg/L	1025.0	95.49	84.5	70-130	3.15	20	AS

Matrix Spike Dup (F810306-MSDA)		Source: 8I00810-04RE1			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	43.33	0.101	1.51	µg/L	51.250	ND	84.6	70-130	4.11	20	AS
Chromium	999.9	0.50	2.52	µg/L	1025.0	ND	97.6	70-130	0.446	20	AS
Iron	4846	28	252	µg/L	5125.0	128	92.0	70-130	1.98	20	AS
Nickel	1138	1.01	2.52	µg/L	1281.2	ND	88.8	70-130	0.606	20	AS
Copper	1121	0.50	2.52	µg/L	1281.2	0.57	87.5	70-130	0.714	20	AS
Cadmium	93.85	0.202	0.505	µg/L	102.50	ND	91.6	70-130	0.825	20	AS
Antimony	46.54	0.227	0.505	µg/L	51.250	0.904	89.0	70-130	0.0605	20	AS

Eurofins Frontier Global Sciences, LLC

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

*Maricris dela Rosa*

Maricris dela Rosa, Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
24-Oct-18 12:43

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Matrix Spike Dup (F810306-MSDB)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 18-Oct-18						
Thallium	37.10	0.152	0.506	µg/L	39.990	ND	92.8	70-130	2.45	20	
Lead	45.16	0.126	1.01	µg/L	50.010	0.260	89.8	70-130	2.90	20	
<b>Matrix Spike Dup (F810306-MSDC)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 18-Oct-18						
Thallium	45.31	0.151	0.505	µg/L	51.250	ND	88.4	70-130	4.90	20	AS
Lead	219.3	0.126	1.01	µg/L	256.25	0.260	85.5	70-130	5.22	20	AS
<b>Matrix Spike Dup (F810306-MSDD)</b>		<b>Source: 8I00810-04RE2</b>			Prepared: 15-Oct-18 Analyzed: 20-Oct-18						
Selenium	118.2	22.3	30.4	µg/L	49.990	ND	236	70-130	5.66	20	QM-07
<b>Matrix Spike Dup (F810306-MSDE)</b>		<b>Source: 8I00810-04RE2</b>			Prepared: 15-Oct-18 Analyzed: 20-Oct-18						
Zinc	5119	8.08	25.2	µg/L	5125.0	ND	99.9	70-130	126	20	AS
Selenium	2271	22.2	30.3	µg/L	2050.0	ND	111	70-130	2.13	20	AS
<b>Matrix Spike (F810306-MSE)</b>		<b>Source: 8I00810-04RE2</b>			Prepared: 15-Oct-18 Analyzed: 20-Oct-18						
Selenium	2223	22.2	30.3	µg/L	2050.0	ND	108	70-130			AS

Eurofins Frontier Global Sciences, LLC

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

*Maricris dela Rosa*

Maricris dela Rosa, Project Manager



Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

**Reported:**  
24-Oct-18 12:43

### Notes and Definitions

- U Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
- QR-08 The RPD value for the MS/MSD was outside of acceptance limits. Batch QC acceptable based on matrix duplicate and/or LCS/LCSD RPD values within control limits.
- QR-07 The RPD/RSD value for the matrix duplicate/triplicate was outside of acceptance limits. Batch QC acceptable based on MS/MSD and/or LCS/LCSD RPD values within control limits.
- QM-07 The spike recovery was outside control limits for the MS and/or MSD. The batch was accepted based on LCS and LCSD recoveries within control limits and, when analysis permits, acceptable AS/ASD.
- QB-06 The blank was preserved to 5% BrCl rather than 1%. The control limit for blanks preserved to greater than 1% BrCl is the preservation percentage multiplied by the MRL.
- QB-01 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the blank concentration(s) are less than 10% of the sample result.
- J The result is an estimated concentration.
- AS This MS and/or MSD is an analytical spike and/or an analytical spike duplicate.
- AD This matrix duplicate is an analytical duplicate.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the method detection limit if reported to the MDL or above the reporting limit if reported to the MRL.
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference



Supplemental Report 1

The original report has been revised/corrected.

**WORK ORDER NUMBER: 18-09-2104***The difference is service*

AIR | SOIL | WATER | MARINE CHEMISTRY

**Analytical Report For****Client:** Eurofins Frontier Global Sciences, Inc.**Client Project Name:** 8100809

**Attention:** Amy Goodall  
 11720 North Creek Parkway North  
 Suite 4  
 Bothell, WA 98011-8244

A black and white image of a handwritten signature, likely belonging to Carla Hollowell.

Approved for release on 10/19/2018 by:  
 Carla Hollowell  
 Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience (Calscience) certifies that the test results provided in this report meet all NELAC Institute requirements for parameters for which accreditation is required or available. Any exceptions to NELAC Institute requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

# Contents

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 Work Order Number: 18-09-2104

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## Work Order Narrative

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Work Order: 18-09-2104

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Page 1 of 1

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**Condition Upon Receipt:**

Samples were received under Chain-of-Custody (COC) on 09/28/18. They were assigned to Work Order 18-09-2104.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

**Holding Times:**

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

**Quality Control:**

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

**Subcontractor Information:**

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

**Additional Comments:**

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

**DoD Projects:**

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

**Sample Summary**

---

Client:	Eurofins Frontier Global Sciences, Inc.	Work Order:	18-09-2104
	11720 North Creek Parkway North, Suite 4	Project Name:	8I00809
	Bothell, WA 98011-8244	PO Number:	
		Date/Time Received:	09/28/18 11:00
		Number of Containers:	5

---

Attn: Amy Goodall

---

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
NEW-EB-01 NEW-EB-Cn	18-09-2104-1	09/16/18 07:00	1	Aqueous
PEASE-EB-01 PEASE-EB-Cn	18-09-2104-2	09/16/18 08:00	1	Aqueous
NEW-COMP-01 NEW-01-Cn	18-09-2104-3	09/17/18 07:30	1	Aqueous
NEW-COMP-01 NEW-02-Cn	18-09-2104-4	09/17/18 07:30	1	Aqueous
PEASE-COMP-01 PEASE-01-Cn	18-09-2104-5	09/17/18 08:45	1	Aqueous

  
Return to Contents

## Analytical Report

Eurofins Frontier Global Sciences, Inc.  
 11720 North Creek Parkway North, Suite 4  
 Bothell, WA 98011-8244

Date Received: 09/28/18  
 Work Order: 18-09-2104  
 Preparation: N/A  
 Method: SM 4500-CN E  
 Units: mg/L

Project: 8I00809

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NEW-EB-01 NEW-EB-Cn	18-09-2104-1-A	09/16/18 07:00	Aqueous	UV 9	09/28/18	09/28/18 19:14	I0928CNL2

Comment(s): - Results were evaluated to the MDL (DL), concentrations  $\geq$  to the MDL (DL) but  $<$  RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cyanide, Total	ND	0.020	0.0070	1.00	

PEASE-EB-01 PEASE-EB-Cn	18-09-2104-2-A	09/16/18 08:00	Aqueous	UV 9	09/28/18	09/28/18 19:14	I0928CNL2
-------------------------	----------------	----------------	---------	------	----------	----------------	-----------

Comment(s): - Results were evaluated to the MDL (DL), concentrations  $\geq$  to the MDL (DL) but  $<$  RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cyanide, Total	ND	0.020	0.0070	1.00	

NEW-COMP-01 NEW-01-Cn	18-09-2104-3-A	09/17/18 07:30	Aqueous	UV 9	09/28/18	09/28/18 19:14	I0928CNL2
-----------------------	----------------	----------------	---------	------	----------	----------------	-----------

Comment(s): - Results were evaluated to the MDL (DL), concentrations  $\geq$  to the MDL (DL) but  $<$  RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cyanide, Total	ND	0.020	0.0070	1.00	

NEW-COMP-01 NEW-02-Cn	18-09-2104-4-A	09/17/18 07:30	Aqueous	UV 9	09/28/18	09/28/18 19:14	I0928CNL2
-----------------------	----------------	----------------	---------	------	----------	----------------	-----------

Comment(s): - Results were evaluated to the MDL (DL), concentrations  $\geq$  to the MDL (DL) but  $<$  RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cyanide, Total	ND	0.020	0.0070	1.00	

PEASE-COMP-01 PEASE-01-Cn	18-09-2104-5-A	09/17/18 08:45	Aqueous	UV 9	09/28/18	09/28/18 19:14	I0928CNL2
---------------------------	----------------	----------------	---------	------	----------	----------------	-----------

Comment(s): - Results were evaluated to the MDL (DL), concentrations  $\geq$  to the MDL (DL) but  $<$  RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cyanide, Total	0.012	0.020	0.0070	1.00	J

Method Blank	099-05-061-4297	N/A	Aqueous	UV 9	09/28/18	09/28/18 19:14	I0928CNL2
--------------	-----------------	-----	---------	------	----------	----------------	-----------

Comment(s): - Results were evaluated to the MDL (DL), concentrations  $\geq$  to the MDL (DL) but  $<$  RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cyanide, Total	ND	0.020	0.0070	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

## Quality Control - LCS/LCSD

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 09/28/18  
Work Order: 18-09-2104  
Preparation: N/A  
Method: SM 4500-CN E

Project: 8I00809

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-05-061-4297	LCS	Aqueous	UV 9	09/28/18	09/28/18 19:14	I0928CNL2			
099-05-061-4297	LCSD	Aqueous	UV 9	09/28/18	09/28/18 19:14	I0928CNL2			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Cyanide, Total	0.2000	0.1885	94	0.2166	108	80-120	14	0-20	

## Glossary of Terms and Qualifiers

Work Order: 18-09-2104

Page 1 of 1

<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDS or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.



**SUBCONTRACT ORDER**  
Eurofins Frontier Global Sciences, Inc.

8I00809

**18-09-2104****SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

**Analysis****Comments**

Sample ID: NEW-EB-01 NEW-EB-Cn

①

EFGS Lab ID: 8I00809-01

Matrix: Water

Sampled: 16-Sep-18 07:00 (GMT-05:00) Eastern Time (US &amp;

Due: 17-Oct-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:

23\_Client Specific Bottle

Sample ID: PEASE-EB-01 PEASE-EB-Cn

②

EFGS Lab ID: 8I00809-04

Matrix: Water

Sampled: 16-Sep-18 08:00 (GMT-05:00) Eastern Time (US &amp;

Due: 17-Oct-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:

23\_Client Specific Bottle

Sample ID: NEW-COMP-01 NEW-01-Cn

③

EFGS Lab ID: 8I00809-07

Matrix: Water

Sampled: 17-Sep-18 07:30 (GMT-05:00) Eastern Time (US &amp;

Due: 17-Oct-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:

23\_Client Specific Bottle



Released By

9/27/18

Date

Received By

Date

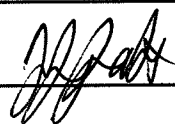


Released By

9/27/18

Date

Received By



9/28/18

Date

SUBCONTRACT ORDER  
Eurofins Frontier Global Sciences, Inc.

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8I00809

2104

Analysis

Comments

Sample ID: NEW-COMP-01 NEW-02-Cn

4

EFGS Lab ID: 8I00809-08

Matrix: Water

Sampled: 17-Sep-18 07:30 (GMT-05:00) Eastern Time (US &

Due: 17-Oct-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:

23\_Client Specific Bottle

Sample ID: PEASE-COMP-01 PEASE-01-Cn

5

EFGS Lab ID: 8I00809-13

Matrix: Water

Sampled: 17-Sep-18 08:45 (GMT-05:00) Eastern Time (US &

Due: 17-Oct-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:

23\_Client Specific Bottle

Released By

Date

Received By

Date

Released By

Date

Received By

Date



Chain of Custody Record & Laboratory Analysis Request:  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

Frontier Global Sciences

Page 1 of 2

2104

http://www.FrontierGS.com

8100809

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com

EFGS PM:

Date:

TAT (business days): 20 (std)  
15 10 5 4 3 2 24 hrs.  
(For TAT < 10 days, contact PM.  
Surcharges apply for expedited TAT)

Saturday delivery? ☐ Y ☐ N  
(If yes, please contact PM)

EDD ☐ Y ☐ N

QA ☐ Standard ☐ High

Comments

Total Metals include: Sb, As,  
Be, Cd, Cr, Cu, Fe, Pb, Ni, Se,  
Ag, Ti, Zn

Analyses Requested

Total Metals

Total Cn

Total Mercury

Field Preserved:  
HNO<sub>3</sub> HCl BrCl Other (%)

Field Filtered (Y/N)

Sampled By

Relinquished By:

Received By:

Name:

Organization:

Date & Time:

Tracking number:

By signing, you declare that you agree with EFGS' terms and conditions, and that  
you authorize EFGS to perform the specified analyses.

Customer Approval: \_\_\_\_\_ Date: \_\_\_\_\_

Return to Contents

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Standard Disposal - 30 Days after report  
retain for \_\_\_\_\_ weeks after report (storage fees may apply)

For Laboratory Use Only

COC Seal:

Cooler Temp:

Carrier:

Comments:

Matrix Codes:

FW: Fresh Water

WW: Waste Water

SB: Sea and Brackish Water

SS: Soil and Sediment

TS: Plant and Animal Tissue

HC: Hydrocarbons

OT: Trap

OT: Other

No.

Engraved Bottle ID

Sample ID

# of Bottles

Matrix

Date & Time

1 NEW-EB-01 NEW-EB-Cn

2 NEW-EB-01 NEW-EB-TM

3 NEW-EB-01 NEW-EB-Hg

4 PEASE-EB-01 PEASE-EB-Cn

5 PEASE-EB-01 PEASE-EB-TM

6 PEASE-EB-01 PEASE-EB-Hg

7 NEW-EB-01 NEW-EB-Cn

8 " NEW-EB-Cn

9 " NEW-EB-TM

10 " NEW-EB-TM

11 " NEW-EB-Hg

12 " NEW-EB-Hg

Client: UNDERWOOD ENGINEERS, INC.

Address: 25 VAUGHAN MALL,  
PORTSMOUTH, NH 03801

Phone: (603) 436-6192

Fax: (603) 436-6192

E-mail: tpuls@underwoodengineers.com

Project Name: Anti-Degradation

Report To: Tim Puls

Contract/PO:

Invoice To: (SAME)

Address:

Phone:

Fax:

E-mail:

Contact: Tim Puls

Phone: (603) 436-6192

Fax: (603) 436-6192

E-mail: tpuls@underwoodengineers.com

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Fax:

E-mail:

Contact: Tim Puls

Phone: (603) 436-6192

Fax: (603) 436-6192

E-mail: tpuls@underwoodengineers.com

Contract/PO:

Invoice To: (SAME)

Address:

Phone:

Fax:

E-mail:

Contact: Tim Puls

Phone: (603) 436-6192

Fax: (603) 436-6192

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Contact: Tim Puls

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Fax: (603) 436-6192

E-mail: tpuls@underwoodengineers.com

Contract/PO:

Invoice To: (SAME)

Address:

Phone:

Fax:

E-mail:

Contact: Tim Puls

Phone: (603) 436-6192



Chain of Custody Record & Laboratory Analysis Request:  
Air, Water, Sediments, Plankton and Animal Tissue,  
Hydrocarbon & Other Samples

Frontier Global Sciences

Page 2 of 2

11720 Northcreek Pkwy N, Suite 400  
Boi WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

8100809

Client: UNDERWOOD ENGINEERS, INC.		Contact: Tim Puls		Analyses Requested		EFGS PM:	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Phone: (603) 436-6192 Fax:		Date:		TAT (business days): 20 (std)	
Project Name: Anti-Degradation		E-mail: tpuls@underwoodengineers.com		Field Preserved:		15 10 5 4 3 2 24 hrs.	
Report To: Tim Puls		Contract/PO:		Field Filtered (Y/N)		(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Invoice To: (SAME)		Sampled By		Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N	
Phone: (603) 436-6192 Fax:		Address:		Field Preserved:		(If yes, please contact PM)	
E-mail: tpuls@underwoodengineers.com		Phone: Fax:		HNO <sub>3</sub> HCl BrCl Other (%)		EDD <input type="checkbox"/> Y <input type="checkbox"/> N	
E-mail: tpuls@underwoodengineers.com		Fax:		Field Preserved:		QA <input type="checkbox"/> Standard <input type="checkbox"/> High	
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Total Metals	Comments
1	PEASE-COMP-01-Cu	PEASE-01-Cu	1	Fresh	9/12/18 8:45 AM	X	Total Metals include: Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Ni, Se, Ag, Ti, Zn
2	"	PEASE-01-TM	"	"	"	X	
3	"	PEASE-02-TM	"	"	"	X	
4	"	PEASE-01-Hg	"	"	"	X	
5							
6							
7							
8							
9							
10							
11							
12							
For Laboratory Use Only		Matrix Codes:		Relinquished By:		Received By:	
COC Seal:	Comments:	FW: Fresh Water WW: Waste Water SB: Sea and Brackish Water SS: Soil and Sediment TS: Plant and Animal Tissue HC: Hydrocarbons TR: Trap OT: Other		Name: Tim Puls		Name:	
Cooler Temp:				Organization: UFE		Organization:	
Carrier:				Date & Time: 9/17/18 3PM		Date & Time:	
REFR:				Tracking number:			
If Coolers:							
Sample Disposal:							
Return (shipping fees may apply)							
Standard Disposal - 30 Days after report							
Retain for _____ weeks after report (storage fees may apply)							
Customer Approval:						Date:	

FRONT DESK  
(425) 886-1996  
FRONTIER GLOBAL SCIENCES  
11720 N CREEK PKWY N  
BOTHELL WA 98011-8244

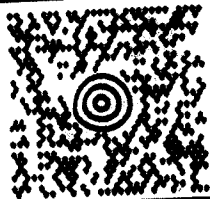
37 LBS

1 OF 1

DWT: 24,13,14

**SHIP TO:**

SAMPLE RECEIVING  
(714) 865-5494  
EUROFINS CALSCIENCE, INC.  
7440 LINCOLN WAY  
GARDEN GROVE CA 92841



**CA 927 9-09**



**UPS NEXT DAY AIR**

TRACKING #: 1Z 86W 050 01 5166 4242

**1**



BILLING: P/P

EUROFINS CAL  
7440 LINC

GARDEN

P.V

Return to Contents

## SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: EFGS

DATE: 09/28/2018

**TEMPERATURE:** (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: -0.5°C); Temperature (w/o CF): 2.9 °C (w/ CF): 2.4 °C; ☐ Blank ☒ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: \_\_\_\_\_)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter

Checked by: VJBP

**CUSTODY SEAL:**

Cooler ☐ Present and Intact ☐ Present but Not Intact ☒ Not Present ☐ N/A

Checked by: VJBP

Sample(s) ☐ Present and Intact ☐ Present but Not Intact ☒ Not Present ☐ N/A

Checked by: TTL5

**SAMPLE CONDITION:**

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sampling date <input type="checkbox"/> Sampling time <input type="checkbox"/> Matrix <input type="checkbox"/> Number of containers			
<input type="checkbox"/> No analysis requested <input type="checkbox"/> Not relinquished <input type="checkbox"/> No relinquished date <input type="checkbox"/> No relinquished time			
Sampler's name indicated on COC .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample container label(s) consistent with COC .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and in good condition .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers for analyses requested .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sufficient volume/mass for analyses requested .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples received within holding time .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aqueous samples for certain analyses received within 15-minute holding time			
<input type="checkbox"/> pH <input type="checkbox"/> Residual Chlorine <input type="checkbox"/> Dissolved Sulfide <input type="checkbox"/> Dissolved Oxygen .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation chemical(s) noted on COC and/or sample container .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unpreserved aqueous sample(s) received for certain analyses			
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Total Metals <input type="checkbox"/> Dissolved Metals			
Acid/base preserved samples - pH within acceptable range .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Container(s) for certain analysis free of headspace .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Dissolved Gases (RSK-175) <input type="checkbox"/> Dissolved Oxygen (SM 4500)			
<input type="checkbox"/> Carbon Dioxide (SM 4500) <input type="checkbox"/> Ferrous Iron (SM 3500) <input type="checkbox"/> Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**CONTAINER TYPE:**

(Trip Blank Lot Number: \_\_\_\_\_)

**Aqueous:** ☐ VOA ☐ VOAh ☐ VOAna<sub>2</sub> ☐ 100PJ ☐ 100PJna<sub>2</sub> ☐ 125AGB ☐ 125AGBh ☐ 125AGBp ☐ 125PB ☐ 125PBznna (pH\_\_9)  
☐ 250AGB ☐ 250CGB ☐ 250CGBs (pH\_\_2) ☐ 250PB ☐ 250PBn (pH\_\_2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJs (pH\_\_2) ☐ 500PB  
☐ 1AGB ☐ 1AGBna<sub>2</sub> ☐ 1AGBs (pH\_\_2) ☐ 1AGBs (O&G) ☐ 1PB ☒ 1PBna (pH\_\_12) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

**Solid:** ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (\_\_\_\_) ☐ EnCores® (\_\_\_\_) ☐ TerraCores® (\_\_\_\_) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

**Air:** ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ \_\_\_\_\_ **Other Matrix** (\_\_\_\_): ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Container: A = Amber, B = Bottle, C = Clear, E = Envelope, G = Glass, J = Jar, P = Plastic, and Z = Ziploc/Resealable Bag

Preservative: b = buffered, f = filtered, h = HCl, n = HNO<sub>3</sub>, na = NaOH, na<sub>2</sub> = Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, p = H<sub>3</sub>PO<sub>4</sub>, Labeled/Checked by: TTL5

s = H<sub>2</sub>SO<sub>4</sub>, u = ultra-pure, x = Na<sub>2</sub>SO<sub>3</sub>+NaHSO<sub>4</sub>.H<sub>2</sub>O, znna = Zn (CH<sub>3</sub>CO<sub>2</sub>)<sub>2</sub> + NaOH

Reviewed by: WFS





Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

05 December 2018

Steven Clifton  
Underwood Engineers  
25 Vaughan Mall  
Portsmouth, NH 03801  
RE: Trace Metals In Wastewater

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Amy Goodall". The signature is written in a cursive, flowing style.

Amy Goodall  
Project Manager





Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

**Reported:**  
05-Dec-18 12:27

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
River-01 Dissolved-1	8I00810-01	Water	17-Sep-18 13:23	19-Sep-18 10:20
River-01 Dissolved-2	8I00810-02	Water	17-Sep-18 13:23	19-Sep-18 10:20
River-01 TM-1	8I00810-03	Water	17-Sep-18 13:38	19-Sep-18 10:20
River-01 TM-2	8I00810-04	Water	17-Sep-18 13:38	19-Sep-18 10:20
River-01 TM-Blank	8I00810-05	Water	17-Sep-18 13:38	19-Sep-18 10:20
River-01 Dissolved Hg-1	8I00810-06	Water	17-Sep-18 13:33	19-Sep-18 10:20
River-01 Dissolved Hg-2	8I00810-07	Water	17-Sep-18 13:33	19-Sep-18 10:20
River-01 Dissolved Hg-Blank	8I00810-08	Water	17-Sep-18 13:33	19-Sep-18 10:20

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager

Page 2 of 37



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
05-Dec-18 12:27

#### SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 19-Sep-18 10:20. The samples were received intact, on-ice within a sealed cooler at

<u>Cooler</u>	<u>Temp C°</u>
Default Cooler	8.0

Samples were shipped to Eurofins Calscience in Garden Grove, CA for the EPA SM4500 Total CN analysis per the initial project setup.

The subcontract report is located after the notes and definitions section of the EFGS report.

#### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total mercury by flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631E.

Samples were prepared and analyzed for total recoverable metals by inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 1638 (EFGS-054).

#### ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery

Eurofins Frontier Global Sciences, LLC

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Amy Goodall, Project Manager

Page 3 of 37



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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

**Reported:**  
05-Dec-18 12:27

and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries. All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager

Page 4 of 37

## Sample Receipt Checklist

Client: Vander wood

Date & Time Received: 9/14/18 9020

Date Labeled: 9/15/18 Labeled By: CS

Project: \_\_\_\_\_

Received By: JS

Label Verified By: JS

# of Coolers Received: 2

Samples Arrived By: 1 Shipping Service \_\_\_\_\_ Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (Specify: \_\_\_\_\_)

Coolant: ☐ None/Ambient ☐ Loose Ice ☒ Gel Ice ☐ Dry Ice Coolant Required: Y / N Temp Blank Used ☒ Y/N for Cooler(s): 1

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y/N

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>N</u>	
Custody seals signed:	<u>N</u>	

TID: <u>12240225</u> CF: <u>10.1</u> °C	Date/time: <u>9/14/18 9020</u> By: <u>JS</u>
Cooler 1: <u>7.9</u> °C w/ CF: <u>9.0</u> °C	Cooler 4: °C w/ CF: °C
Cooler 2: °C w/ CF: °C	Cooler 5: °C w/ CF: °C
Cooler 3: °C w/ CF: °C	Cooler 6: °C w/ CF: °C

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Preservation type:	<u>Y</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
Internal COC required:	<u>Y</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>Y</u>	

Anomalies/Non-conformances (attach additional pages if needed):

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8100810



8100810



Frontier Global Sciences

# Chain of Custody Record & Laboratory Analysis Request:

Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@frontiergs.com  
http://www.frontiergs.com

Page 1 of 1

Client: Underwood Engineers			Contact: Tim Puls			Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Analyses Requested				EFGS PM:
Address: 25 Vaughan Mall Portsmouth, NH 03801			Phone: 603 436-6192										Date:
Project Name: Anti-Degradation			E-mail: tpuls@underwoodengineers.com										TAT (business days): 20 (std)
Report To: Tim Puls			Contract/PO:										15 10 5 4 3 2 24 hrs.
Address: 25 Vaughan Mall Portsmouth, NH 03801			Invoice To: SAME										(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)
Phone: 603 436-6192 Fax:			Address:			Dissolved Metals	Total Metals	Total Cu	Dissolved Mercury	Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N			
E-mail: tpuls@underwoodengineers.com			Phone: Fax:							(If yes, please contact PM)			
			E-mail:							EDD <input type="checkbox"/> Y <input type="checkbox"/> N			
										QA <input type="checkbox"/> Standard <input type="checkbox"/> High			
										Comments			
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time								
1	River-01	Dissolved-1	1	Water	9-17-18 1333	JEL	N	N	✓				* Dissolved Hg sample bottles are labeled as Total Hg * No blank included for Dissolved Metals
2		Dissolved-2	1		9-17-18 1333				✓				
3		TM-1	1		1338					✓			
4		TM-2	1		1338					✓			
5		TM-Blank	1		1338					✓			
6		Dissolved Hg-1 *	1		1333						✓		
7		Dissolved Hg-2 *	1		1333						✓		
8		Dissolved Hg-Blank	1		1333						✓		
9		Total CN-1	1		1340						✓		
10		Total CN-2	1		1340						✓		
11		Total CN-Blank	1		1340						✓		
12													
For Laboratory Use Only			Matrix Codes:			Relinquished By:			Received By:			Received By:	
COC Seal: No			Comments:			Name: Megan Hartwick			Name: Ryan S. S.			Name:	
Cooler Temp: 4.0						Organization: WCH/JEL			Organization:			Organization:	
Carrier: WFS						Date & Time: 9-18-18			Date & Time:			Date & Time:	
VTSR: 10.70						Tracking number: J 452 496 820 3							
# of Coolers: 2													
Sample Disposal:						By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.							
<input type="checkbox"/> Return (shipping fees may apply) <input type="checkbox"/> Standard Disposal - 30 Days after report <input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)						Customer Approval: _____ Date: _____							

J 452 496 8146

**SUBCONTRACT ORDER**  
**Eurofins Frontier Global Sciences, Inc.**

**8I00810**

**SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

Analysis	Comments
----------	----------

Sample ID: River-01 Total Cn-1	
--------------------------------	--

EFGS Lab ID: 8I00810-09	Matrix: Water
-------------------------	---------------

Sampled: 17-Sep-18 13:40 (GMT-05:00) Eastern Time (US &	Due: 17-Oct-18 19:00
---	----------------------

Misc. Subcontract 1	EPA SM4500 CN E
---------------------	-----------------

*Containers Supplied:*

23_Client Specific Bottle	
---------------------------	--

Sample ID: River-01 Total Cn-2	
--------------------------------	--

EFGS Lab ID: 8I00810-10	Matrix: Water
-------------------------	---------------

Sampled: 17-Sep-18 13:40 (GMT-05:00) Eastern Time (US &	Due: 17-Oct-18 19:00
---	----------------------

Misc. Subcontract 1	EPA SM4500 CN E
---------------------	-----------------

*Containers Supplied:*

23_Client Specific Bottle	
---------------------------	--

Sample ID: River-01 Total Cn-Blank	
------------------------------------	--

EFGS Lab ID: 8I00810-11	Matrix: Water
-------------------------	---------------

Sampled: 17-Sep-18 13:40 (GMT-05:00) Eastern Time (US &	Due: 17-Oct-18 19:00
---	----------------------

Misc. Subcontract 1	EPA SM4500 CN E
---------------------	-----------------

*Containers Supplied:*

23_Client Specific Bottle	
---------------------------	--

Used By	Date	Received By	Date
Used By	Date	Received By	Date



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
05-Dec-18 12:27

**River-01 Dissolved-1**

**8100810-01**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
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**Sample Preparation: EFGS SOP2820 Reductive Precipitation**

Arsenic	0.97	0.04	0.38	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	
Cadmium	0.135	0.020	0.100	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	
Copper	0.71	0.08	0.25	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	
Lead	0.021	0.020	0.100	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	J
Nickel	0.48	0.08	0.25	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	
Selenium	ND	0.16	1.50	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640 Mod.	U
Silver	0.09	0.01	0.10	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	J
Zinc	0.57	0.14	0.50	µg/L	5	F811191	12-Nov-18	8K26019	15-Nov-18	EPA 1640	

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
05-Dec-18 12:27

**River-01 Dissolved-2**

**8100810-02**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2820 Reductive Precipitation</b>											
Arsenic	0.99	0.04	0.38	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	
Cadmium	1.64	0.020	0.100	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	
Copper	1.27	0.08	0.25	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	
Lead	0.080	0.020	0.100	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	J
Nickel	0.42	0.08	0.25	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	
Selenium	0.17	0.16	1.50	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640 Mod.	J
Silver	0.09	0.01	0.10	µg/L	5	F810462	30-Oct-18	8K02008	01-Nov-18	EPA 1640	J
Zinc	0.91	0.28	1.00	µg/L	5	F811191	12-Nov-18	8K26019	15-Nov-18	EPA 1640	J

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**River-01 TM-1**

**8100810-03**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Antimony</b>	<b>0.356</b>	0.227	0.505	µg/L	25	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	R-05, J
Beryllium	ND	0.040	0.606	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U, R-05
<b>Chromium</b>	<b>0.38</b>	0.20	1.01	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	R-05, J
<b>Iron</b>	<b>142</b>	11	101	µg/L	10	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	R-05
Thallium	ND	0.151	0.505	µg/L	25	F810306	15-Oct-18	8J19007	18-Oct-18	EPA 200.8	U, R-05

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**River-01 TM-2**

**8100810-04**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	ND	0.227	0.505	µg/L	25	F810306	15-Oct-18	8J19007	18-Oct-18	EPA 200.8	U, R-05
Beryllium	ND	0.101	1.51	µg/L	25	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U, R-05
Chromium	ND	0.50	2.52	µg/L	25	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U, R-05
<b>Iron</b>	<b>128</b>	28	252	µg/L	25	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	R-05, J
Thallium	ND	0.151	0.505	µg/L	25	F810306	15-Oct-18	8J19007	18-Oct-18	EPA 200.8	U, R-05

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Project Manager: Steven Clifton

Reported:  
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**River-01 TM-Blank**

**8100810-05**

Analyte	Detection		Reporting	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
	Result	Limit	Limit								
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	ND	0.009	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
<b>Beryllium</b>	<b>0.007</b>	0.004	0.061	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Chromium	ND	0.02	0.10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U
<b>Iron</b>	<b>2</b>	1	10	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	J
Thallium	ND	0.006	0.020	µg/L	1	F810306	15-Oct-18	8J15014	16-Oct-18	EPA 200.8	U

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Project Manager: Steven Clifton

**Reported:**  
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**River-01 Dissolved Hg-1**  
**8100810-06**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	0.35	0.08	0.50	ng/L	1	F810185	25-Sep-18	8J02006	01-Oct-18	EPA 1631E	J

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Project Manager: Steven Clifton

**Reported:**  
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**River-01 Dissolved Hg-2**

**8100810-07**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	0.38	0.08	0.50	ng/L	1	F810185	25-Sep-18	8J02006	01-Oct-18	EPA 1631E	J

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Project Manager: Steven Clifton

**Reported:**  
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**River-01 Dissolved Hg-Blank**

**8100810-08**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	ND	0.08	0.50	ng/L	1	F810185	25-Sep-18	8J02006	01-Oct-18	EPA 1631E	U

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
05-Dec-18 12:27

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F810185 - EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Blank (F810185-BLK1)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810185-BLK2)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810185-BLK3)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810185-BLK4)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	ND	0.09	0.52	ng/L							U, QB-06
<b>LCS (F810185-BS1)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	15.70	0.08	0.50	ng/L	14.688		107	80-120			
<b>LCS Dup (F810185-BSD1)</b>					Prepared & Analyzed: 01-Oct-18						
Mercury	16.29	0.08	0.50	ng/L	14.688		111	80-120	3.72	24	
<b>Duplicate (F810185-DUP1)</b>					<b>Source: 8100842-01</b>		Prepared & Analyzed: 01-Oct-18				
Mercury	29.34	0.08	0.50	ng/L		30.35			3.39	24	AD
<b>Matrix Spike (F810185-MS1)</b>					<b>Source: 8100810-07</b>		Prepared & Analyzed: 01-Oct-18				
Mercury	4.47	0.08	0.50	ng/L	2.5351	0.38	162	71-125			AS, QM-07
<b>Matrix Spike (F810185-MS2)</b>					<b>Source: 8100842-01</b>		Prepared & Analyzed: 01-Oct-18				
Mercury	132.0	0.83	5.00	ng/L	101.40	30.35	100	71-125			AS
<b>Matrix Spike (F810185-MS3)</b>					<b>Source: 8100810-07</b>		Prepared & Analyzed: 01-Oct-18				
Mercury	3.44	0.08	0.50	ng/L	2.5351	0.38	121	71-125			AS

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Project Manager: Steven Clifton

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05-Dec-18 12:27

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810185 - EFGS SOP2796 EPA 1631 Oxidation

##### Matrix Spike Dup (F810185-MSD1)

Source: 8100810-07

Prepared & Analyzed: 01-Oct-18

Mercury	3.49	0.08	0.50	ng/L	2.5351	0.38	123	71-125	24.6	24	AS, QR-08
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##### Matrix Spike Dup (F810185-MSD2)

Source: 8100842-01

Prepared & Analyzed: 01-Oct-18

Mercury	136.2	0.83	5.00	ng/L	101.40	30.35	104	71-125	3.08	24	AS
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##### Matrix Spike Dup (F810185-MSD3)

Source: 8100810-07

Prepared & Analyzed: 01-Oct-18

Mercury	3.68	0.08	0.50	ng/L	2.5351	0.38	130	71-125	6.96	24	AS, QM-07
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#### Batch F810462 - EFGS SOP2820 Reductive Precipitation

##### Blank (F810462-BLK1)

Prepared: 30-Oct-18 Analyzed: 01-Nov-18

Nickel	0.09	0.03	0.10	µg/L							J
Copper	0.07	0.03	0.10	µg/L							J
Arsenic	ND	0.02	0.15	µg/L							U
Selenium	ND	0.06	0.60	µg/L							U
Cadmium	ND	0.008	0.040	µg/L							U
Lead	0.010	0.008	0.040	µg/L							J

##### Blank (F810462-BLK2)

Prepared: 30-Oct-18 Analyzed: 01-Nov-18

Nickel	0.07	0.03	0.10	µg/L							J
Copper	0.09	0.03	0.10	µg/L							J
Arsenic	ND	0.02	0.15	µg/L							U
Selenium	0.10	0.06	0.60	µg/L							J
Cadmium	0.013	0.008	0.040	µg/L							J
Lead	ND	0.008	0.040	µg/L							U

##### Blank (F810462-BLK3)

Prepared: 30-Oct-18 Analyzed: 02-Nov-18

Silver	0.08	0.01	0.10	µg/L							J, QM-12
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Project Manager: Steven Clifton

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810462 - EFGS SOP2820 Reductive Precipitation

##### Blank (F810462-BLK4)

Prepared: 30-Oct-18 Analyzed: 02-Nov-18

Silver	0.08	0.01	0.10	µg/L							J, QM-12
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##### LCS (F810462-BS1)

Prepared: 30-Oct-18 Analyzed: 01-Nov-18

Silver	6.15	0.05	0.50	µg/L	6.2500		98.4	30-151			
Cadmium	9.081	0.101	0.500	µg/L	10.002		90.8	73-105			
Lead	12.00	0.100	0.500	µg/L	12.502		96.0	62-129			

##### LCS (F810462-BS2)

Prepared: 30-Oct-18 Analyzed: 01-Nov-18

Nickel	8.67	0.03	0.10	µg/L	12.502		69.3	26-147			
Copper	12.86	0.03	0.10	µg/L	12.500		103	77-109			
Arsenic	10.16	0.02	0.15	µg/L	12.500		81.3	58-110			
Selenium	11.22	0.06	0.60	µg/L	12.498		89.8	55-120			

##### LCS Dup (F810462-BSD1)

Prepared: 30-Oct-18 Analyzed: 01-Nov-18

Silver	6.25	0.05	0.50	µg/L	6.2500	0.09	100	30-151	1.62	20	
Cadmium	9.031	0.101	0.500	µg/L	10.002	1.644	90.3	73-105	0.556	20	
Lead	12.16	0.100	0.500	µg/L	12.502	ND	97.2	62-129	1.26	20	

##### LCS Dup (F810462-BSD2)

Prepared: 30-Oct-18 Analyzed: 01-Nov-18

Nickel	8.97	0.03	0.10	µg/L	12.502		71.7	26-147	3.39	20	
Copper	12.78	0.03	0.10	µg/L	12.500		102	77-109	0.648	20	
Arsenic	10.42	0.02	0.15	µg/L	12.500		83.4	58-110	2.54	20	
Selenium	11.60	0.06	0.60	µg/L	12.498		92.8	55-120	3.28	25	

##### Matrix Spike (F810462-MS1)

Source: 8I00810-02

Prepared: 30-Oct-18 Analyzed: 01-Nov-18

Silver	6.06	0.05	0.50	µg/L	6.2500	0.09	95.5	30-151			
Cadmium	9.365	0.101	0.500	µg/L	10.002	1.644	77.2	73-105			
Lead	12.31	0.100	0.500	µg/L	12.502	ND	98.5	62-129			

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810462 - EFGS SOP2820 Reductive Precipitation

<b>Matrix Spike (F810462-MS2)</b>		<b>Source: 8I00810-02</b>			Prepared: 30-Oct-18 Analyzed: 01-Nov-18						
Nickel	10.78	0.03	0.10	µg/L	12.502	0.42	82.9	71-130			
Copper	12.59	0.03	0.10	µg/L	12.500	1.27	90.6	77-109			
Arsenic	12.74	0.02	0.15	µg/L	12.500	0.99	94.0	58-110			
Selenium	11.94	0.06	0.60	µg/L	12.498	0.17	94.1	25-135			
<b>Matrix Spike Dup (F810462-MSD1)</b>		<b>Source: 8I00810-02</b>			Prepared: 30-Oct-18 Analyzed: 01-Nov-18						
Silver	5.69	0.05	0.50	µg/L	6.2500	0.09	89.7	30-151	6.21	20	
Cadmium	9.351	0.101	0.500	µg/L	10.002	1.644	77.0	73-105	0.159	20	
Lead	12.33	0.100	0.500	µg/L	12.502	ND	98.7	62-129	0.179	20	
<b>Matrix Spike Dup (F810462-MSD2)</b>		<b>Source: 8I00810-02</b>			Prepared: 30-Oct-18 Analyzed: 01-Nov-18						
Nickel	11.29	0.03	0.10	µg/L	12.502	0.42	87.0	71-130	4.63	20	
Copper	13.02	0.03	0.10	µg/L	12.500	1.27	94.0	77-109	3.32	20	
Arsenic	13.03	0.02	0.15	µg/L	12.500	0.99	96.3	58-110	2.25	20	
Selenium	11.09	0.06	0.60	µg/L	12.498	0.17	87.3	25-135	7.38	25	

#### Batch F811191 - EFGS SOP2820 Reductive Precipitation

<b>Blank (F811191-BLK1)</b>		Prepared: 12-Nov-18 Analyzed: 15-Nov-18									
Zinc	0.19	0.14	0.50	µg/L							J
<b>LCS (F811191-BS1)</b>		Prepared: 12-Nov-18 Analyzed: 15-Nov-18									
Zinc	10.78	0.69	2.50	µg/L	12.502		86.2	75-95			
<b>LCS (F811191-BS3)</b>		Prepared: 12-Nov-18 Analyzed: 03-Dec-18									
Zinc	11.51	0.14	0.50	µg/L	12.502		92.1	75-95			

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Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811191 - EFGS SOP2820 Reductive Precipitation

<b>LCS Dup (F811191-BSD1)</b>					Prepared: 12-Nov-18 Analyzed: 15-Nov-18						
Zinc	10.29	0.69	2.50	µg/L	12.502		82.3	75-95	4.65	20	
<b>LCS Dup (F811191-BSD3)</b>					Prepared: 12-Nov-18 Analyzed: 03-Dec-18						
Zinc	11.02	0.14	0.50	µg/L	12.502		88.1	75-95	4.37	20	
<b>Matrix Spike (F811191-MS1)</b>					<b>Source: 8I00810-02RE1</b>		Prepared: 12-Nov-18 Analyzed: 15-Nov-18				
Zinc	23.15	1.39	5.00	µg/L	25.005	ND	92.6	75-95			
<b>Matrix Spike (F811191-MS3)</b>					<b>Source: 8I00810-02RE1</b>		Prepared: 12-Nov-18 Analyzed: 03-Dec-18				
Zinc	23.51	0.28	1.00	µg/L	25.005	0.91	90.4	75-95			
<b>Matrix Spike Dup (F811191-MSD1)</b>					<b>Source: 8I00810-02RE1</b>		Prepared: 12-Nov-18 Analyzed: 15-Nov-18				
Zinc	18.00	1.39	5.00	µg/L	25.005	ND	72.0	75-95	25.0	20	QM-05, QR-08
<b>Matrix Spike Dup (F811191-MSD3)</b>					<b>Source: 8I00810-02RE1</b>		Prepared: 12-Nov-18 Analyzed: 03-Dec-18				
Zinc	18.40	0.28	1.00	µg/L	25.005	0.91	69.9	75-95	24.4	20	QM-05, QR-08

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Amy Goodall, Project Manager

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Frontier Global Sciences

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
05-Dec-18 12:27

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F810306-BLK2)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Beryllium	ND	0.004	0.060	µg/L							U
Chromium	ND	0.02	0.10	µg/L							U
Iron	3	1	10	µg/L							J
Antimony	ND	0.009	0.020	µg/L							U
Thallium	ND	0.006	0.020	µg/L							U

##### LCS (F810306-BS1)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Beryllium	38.06	0.020	0.301	µg/L	40.010		95.1	85-115			
Chromium	48.54	0.10	0.50	µg/L	49.990		97.1	85-115			
Iron	1125	6	50	µg/L	1250.0		90.0	85-115			
Antimony	41.01	0.045	0.100	µg/L	40.030		102	85-115			QB-01
Thallium	36.59	0.030	0.100	µg/L	39.990		91.5	85-115			

##### LCS Dup (F810306-BS1)

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Beryllium	40.12	0.020	0.301	µg/L	40.010		100	85-115	5.28	20	
Chromium	51.15	0.10	0.50	µg/L	49.990		102	85-115	5.24	20	
Iron	1134	6	50	µg/L	1250.0		90.7	85-115	0.826	20	
Antimony	41.99	0.045	0.100	µg/L	40.030		105	85-115	2.37	20	QB-01
Thallium	38.15	0.030	0.100	µg/L	39.990		95.4	85-115	4.18	20	

##### Matrix Spike (F810306-MS1)

Source: 8100809-10

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Beryllium	39.06	0.040	0.607	µg/L	40.010	0.073	97.4	70-130			
Chromium	50.57	0.20	1.01	µg/L	49.990	0.38	100	70-130			
Iron	1207	11	101	µg/L	1250.0	115	87.4	70-130			
Antimony	40.29	0.091	0.202	µg/L	40.030	0.296	99.9	70-130			QB-01
Thallium	38.85	0.061	0.202	µg/L	39.990	ND	97.1	70-130			

##### Matrix Spike (F810306-MS2)

Source: 8100809-15

Prepared: 15-Oct-18 Analyzed: 16-Oct-18

Beryllium	36.50	0.040	0.607	µg/L	40.010	0.044	91.1	70-130			
Chromium	47.37	0.20	1.01	µg/L	49.990	0.69	93.4	70-130			
Iron	1796	11	101	µg/L	1250.0	764	82.5	70-130			
Antimony	37.71	0.091	0.202	µg/L	40.030	0.541	92.8	70-130			
Thallium	37.46	0.061	0.202	µg/L	39.990	ND	93.7	70-130			

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*Amy Goodall*

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Amy Goodall, Project Manager



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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
05-Dec-18 12:27

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F810306-MS4)</b>		<b>Source: 8I00809-10</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	19.83	0.040	0.606	µg/L	20.500	0.073	96.4	70-130			AS
Chromium	400.2	0.20	1.01	µg/L	410.00	0.38	97.5	70-130			AS
Iron	1959	11	101	µg/L	2050.0	115	89.9	70-130			AS
Antimony	19.19	0.091	0.202	µg/L	20.500	0.296	92.2	70-130			AS
Thallium	19.38	0.061	0.202	µg/L	20.500	ND	94.6	70-130			AS
<b>Matrix Spike (F810306-MS5)</b>		<b>Source: 8I00809-15</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	19.30	0.040	0.606	µg/L	20.500	0.044	93.9	70-130			AS
Chromium	394.6	0.20	1.01	µg/L	410.00	0.69	96.1	70-130			AS
Iron	2571	11	101	µg/L	2050.0	764	88.2	70-130			AS
Antimony	19.49	0.091	0.202	µg/L	20.500	0.541	92.4	70-130			AS
Thallium	19.45	0.061	0.202	µg/L	20.500	ND	94.9	70-130			AS
<b>Matrix Spike (F810306-MS8)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	40.03	0.101	1.52	µg/L	40.010	ND	100	70-130			
Chromium	52.27	0.51	2.53	µg/L	49.990	ND	105	70-130			
Iron	1286	28	253	µg/L	1250.0	128	92.6	70-130			
Antimony	39.09	0.228	0.506	µg/L	40.030	0.904	95.4	70-130			
<b>Matrix Spike (F810306-MSA)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	45.15	0.101	1.51	µg/L	51.250	ND	88.1	70-130			AS
Chromium	995.5	0.50	2.52	µg/L	1025.0	ND	97.1	70-130			AS
Iron	4751	28	252	µg/L	5125.0	128	90.2	70-130			AS
Antimony	46.56	0.227	0.505	µg/L	51.250	0.904	89.1	70-130			AS
<b>Matrix Spike (F810306-MSB)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 18-Oct-18						
Thallium	36.21	0.152	0.506	µg/L	39.990	ND	90.5	70-130			

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Amy Goodall, Project Manager

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Frontier Global Sciences

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Underwood Engineers  
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Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
05-Dec-18 12:27

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Matrix Spike (F810306-MSD1)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 18-Oct-18						
Thallium	43.15	0.151	0.505	µg/L	51.250	ND	84.2	70-130			AS
<b>Matrix Spike Dup (F810306-MSD1)</b>		<b>Source: 8I00809-10</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	38.78	0.040	0.607	µg/L	40.010	0.073	96.7	70-130	0.732	20	
Chromium	50.37	0.20	1.01	µg/L	49.990	0.38	100	70-130	0.388	20	
Iron	1834	11	101	µg/L	1250.0	115	138	70-130	41.2	20	QM-07, QR-08
Antimony	40.51	0.091	0.202	µg/L	40.030	0.296	100	70-130	0.533	20	QB-01
Thallium	38.92	0.061	0.202	µg/L	39.990	ND	97.3	70-130	0.181	20	
<b>Matrix Spike Dup (F810306-MSD2)</b>		<b>Source: 8I00809-15</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	37.05	0.040	0.607	µg/L	40.010	0.044	92.5	70-130	1.50	20	
Chromium	49.46	0.20	1.01	µg/L	49.990	0.69	97.6	70-130	4.32	20	
Iron	1845	11	101	µg/L	1250.0	764	86.4	70-130	2.69	20	
Antimony	39.77	0.091	0.202	µg/L	40.030	0.541	98.0	70-130	5.34	20	
Thallium	38.10	0.061	0.202	µg/L	39.990	ND	95.3	70-130	1.70	20	
<b>Matrix Spike Dup (F810306-MSD4)</b>		<b>Source: 8I00809-10</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	19.15	0.040	0.606	µg/L	20.500	0.073	93.1	70-130	3.45	20	AS
Chromium	389.6	0.20	1.01	µg/L	410.00	0.38	94.9	70-130	2.68	20	AS
Iron	1920	11	101	µg/L	2050.0	115	88.0	70-130	2.01	20	AS
Antimony	19.17	0.091	0.202	µg/L	20.500	0.296	92.1	70-130	0.111	20	AS
Thallium	19.35	0.061	0.202	µg/L	20.500	ND	94.4	70-130	0.194	20	AS
<b>Matrix Spike Dup (F810306-MSD5)</b>		<b>Source: 8I00809-15</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	19.09	0.040	0.606	µg/L	20.500	0.044	92.9	70-130	1.10	20	AS
Chromium	391.8	0.20	1.01	µg/L	410.00	0.69	95.4	70-130	0.714	20	AS
Iron	2586	11	101	µg/L	2050.0	764	88.9	70-130	0.549	20	AS
Antimony	19.03	0.091	0.202	µg/L	20.500	0.541	90.2	70-130	2.42	20	AS
Thallium	19.26	0.061	0.202	µg/L	20.500	ND	94.0	70-130	0.955	20	AS

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Amy Goodall, Project Manager



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25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
05-Dec-18 12:27

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810306 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F810306-MSD8)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	41.51	0.101	1.52	µg/L	40.010	ND	104	70-130	3.63	20	
Chromium	53.92	0.51	2.53	µg/L	49.990	ND	108	70-130	3.10	20	
Iron	1350	28	253	µg/L	1250.0	128	97.7	70-130	4.87	20	
Antimony	38.36	0.228	0.506	µg/L	40.030	0.904	93.6	70-130	1.90	20	
<b>Matrix Spike Dup (F810306-MSDA)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 16-Oct-18						
Beryllium	43.33	0.101	1.51	µg/L	51.250	ND	84.6	70-130	4.11	20	AS
Chromium	999.9	0.50	2.52	µg/L	1025.0	ND	97.6	70-130	0.446	20	AS
Iron	4846	28	252	µg/L	5125.0	128	92.0	70-130	1.98	20	AS
Antimony	46.54	0.227	0.505	µg/L	51.250	0.904	89.0	70-130	0.0605	20	AS
<b>Matrix Spike Dup (F810306-MSDB)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 18-Oct-18						
Thallium	37.10	0.152	0.506	µg/L	39.990	ND	92.8	70-130	2.45	20	
<b>Matrix Spike Dup (F810306-MSDC)</b>		<b>Source: 8I00810-04RE1</b>			Prepared: 15-Oct-18 Analyzed: 18-Oct-18						
Thallium	45.31	0.151	0.505	µg/L	51.250	ND	88.4	70-130	4.90	20	AS

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Amy Goodall, Project Manager

Page 24 of 37

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Steven Clifton

Reported:  
05-Dec-18 12:27

### Notes and Definitions

- U Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
- R-05 The sample was diluted due to the presence of high levels of non-target analytes or particulates resulting in elevated reporting limits.
- QR-08 The RPD value for the MS/MSD was outside of acceptance limits. Batch QC acceptable based on matrix duplicate and/or LCS/LCSD RPD values within control limits.
- QM-12 Continuing calibration verification (CCV) and/or blank spike/blank spike duplicate (BS/BSD) recoveries above upper control limits. All reported sample concentrations were below the reporting limit.
- QM-07 The spike recovery was outside control limits for the MS and/or MSD. The batch was accepted based on LCS and LCSD recoveries within control limits and, when analysis permits, acceptable AS/ASD.
- QM-05 The spike recovery was outside acceptance limits for the MS/MSD and or AS/ASD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
- QB-06 The blank was preserved to 5% BrCl rather than 1%. The control limit for blanks preserved to greater than 1% BrCl is the preservation percentage multiplied by the MRL.
- QB-01 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the blank concentration(s) are less than 10% of the sample result.
- J The result is an estimated concentration.
- AS This MS and/or MSD is an analytical spike and/or an analytical spike duplicate.
- AD This matrix duplicate is an analytical duplicate.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the method detection limit if reported to the MDL or above the reporting limit if reported to the MRL.
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference





Supplemental Report 1

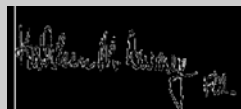
The original report has been revised/corrected.

**WORK ORDER NUMBER: 18-09-2146***The difference is service*

AIR | SOIL | WATER | MARINE CHEMISTRY

**Analytical Report For****Client:** Eurofins Frontier Global Sciences, Inc.**Client Project Name:** 8I00810

**Attention:** Amy Goodall  
 11720 North Creek Parkway North  
 Suite 4  
 Bothell, WA 98011-8244



Approved for release on 10/19/2018 by:  
 Carla Hollowell  
 Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience (Calscience) certifies that the test results provided in this report meet all NELAC Institute requirements for parameters for which accreditation is required or available. Any exceptions to NELAC Institute requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

## Contents

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Work Order Number: 18-09-2146

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5	Glossary of Terms and Qualifiers. . . . .	7
6	Chain-of-Custody/Sample Receipt Form. . . . .	8

**Condition Upon Receipt:**

Samples were received under Chain-of-Custody (COC) on 09/28/18. They were assigned to Work Order 18-09-2146.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

**Holding Times:**

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

**Quality Control:**

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

**Subcontractor Information:**

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

**Additional Comments:**

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

**DoD Projects:**

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

**Sample Summary**

---

Client: Eurofins Frontier Global Sciences, Inc.	Work Order: 18-09-2146
11720 North Creek Parkway North, Suite 4	Project Name: 8I00810
Bothell, WA 98011-8244	PO Number:
	Date/Time Received: 09/28/18 11:00
	Number of Containers: 3

---

Attn: Amy Goodall

---

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
River-01 Total Cn-1	18-09-2146-1	09/17/18 13:40	1	Aqueous
River-01 Total Cn-2	18-09-2146-2	09/17/18 13:40	1	Aqueous
River-01 Total Cn-Blank	18-09-2146-3	09/17/18 13:40	1	Aqueous

## Analytical Report

Eurofins Frontier Global Sciences, Inc.  
 11720 North Creek Parkway North, Suite 4  
 Bothell, WA 98011-8244

Date Received: 09/28/18  
 Work Order: 18-09-2146  
 Preparation: N/A  
 Method: SM 4500-CN E  
 Units: mg/L

Project: 8I00810

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
River-01 Total Cn-1	18-09-2146-1-A	09/17/18 13:40	Aqueous	UV 9	10/01/18	10/01/18 18:08	I1001CNL2

Comment(s): - Results were evaluated to the MDL (DL), concentrations  $\geq$  to the MDL (DL) but  $<$  RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cyanide, Total	ND	0.020	0.0070	1.00	

River-01 Total Cn-2	18-09-2146-2-A	09/17/18 13:40	Aqueous	UV 9	10/01/18	10/01/18 18:08	I1001CNL2
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Comment(s): - Results were evaluated to the MDL (DL), concentrations  $\geq$  to the MDL (DL) but  $<$  RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cyanide, Total	ND	0.020	0.0070	1.00	

River-01 Total Cn-Blank	18-09-2146-3-A	09/17/18 13:40	Aqueous	UV 9	10/01/18	10/01/18 18:08	I1001CNL2
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Comment(s): - Results were evaluated to the MDL (DL), concentrations  $\geq$  to the MDL (DL) but  $<$  RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cyanide, Total	ND	0.020	0.0070	1.00	

Method Blank	099-05-061-4300	N/A	Aqueous	UV 9	10/01/18	10/01/18 18:08	I1001CNL2
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Comment(s): - Results were evaluated to the MDL (DL), concentrations  $\geq$  to the MDL (DL) but  $<$  RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cyanide, Total	ND	0.020	0.0070	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

## Quality Control - LCS/LCSD

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 09/28/18  
Work Order: 18-09-2146  
Preparation: N/A  
Method: SM 4500-CN E

Project: 8I00810

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-05-061-4300	LCS	Aqueous	UV 9	10/01/18	10/01/18 18:08	I1001CNL2			
099-05-061-4300	LCSD	Aqueous	UV 9	10/01/18	10/01/18 18:08	I1001CNL2			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Cyanide, Total	0.2000	0.1710	85	0.1727	86	80-120	1	0-20	

## Glossary of Terms and Qualifiers

Work Order: 18-09-2146

Page 1 of 1

<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

**SUBCONTRACT ORDER**  
**Eurofins Frontier Global Sciences, Inc.**  
**8100810**

**18-09-2146**

**SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
 11720 North Creek Parkway North, Suite 400  
 Bothell, WA 98011  
 Phone: (425) 686-1996  
 Fax: (425) 686-3096  
 Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
 7440 Lincoln Way  
 Garden Grove, CA 92841  
 Phone :7148955494  
 Fax: x

**Analysis****Comments**

**Sample ID: River-01 Total Cn-1**

**EFGS Lab ID: 8100810-09**      **Matrix: Water**  
**Sampled: 17-Sep-18 13:40 (GMT-05:00) Eastern Time (US &**

**Due: 17-Oct-18 19:00**

**Misc. Subcontract 1**

**EPA SM4500 CNE**

*Containers Supplied:*

23 Client Specific Bottle

**Sample ID: River-01 Total Cn-2**

**EFGS Lab ID: 8100810-10**      **Matrix: Water**  
**Sampled: 17-Sep-18 13:40 (GMT-05:00) Eastern Time (US &**

**Due: 17-Oct-18 19:00**

**Misc. Subcontract 1**

**EPA SM4500 CNE**

*Containers Supplied:*

23 Client Specific Bottle

**Sample ID: River-01 Total Cn-Blank**

**EFGS Lab ID: 8100810-11**      **Matrix: Water**  
**Sampled: 17-Sep-18 13:40 (GMT-05:00) Eastern Time (US &**

**Due: 17-Oct-18 19:00**

**Misc. Subcontract 1**

**EPA SM4500 CNE**

*Containers Supplied:*

23 Client Specific Bottle

Released By

Date

Received By

Date

*[Signature]*      9/25/18      1100

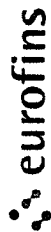
Released By

Date

Received By

Date





Frontier Global Sciences

## Sample Receipt Checklist

Client: Winkler wood Date & Time Received: 9/14/18 9:00 AM Date Labeled: 9/14/18 Labeled By: CS  
Project: \_\_\_\_\_ Received By: CS Label Verified By: CS  
# of Coolers Received: 2 Samples Arrived By: 1 Shipping Service \_\_\_\_\_ Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (Specify): \_\_\_\_\_  
Coolant: ☐ None/Ambient ☐ Loose Ice ☒ Gel Ice ☐ Dry Ice Coolant Required: Y / N Temp Blank Used Y / N for Cooler(s): 1

Notify Project Manager if packages/coolers are received without coolant and at a temperature in excess of 6°C. PM notified: Y / N

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>Y</u>	
Custody seals signed:	<u>Y</u>	

TID: <u>1224425CF:0.1</u>	°C	Date/time: <u>9/14/18 9:00 AM</u>	°C
Cooler 1: <u>2.0</u>	w/ CF: <u>9.0</u>	Cooler 4: _____	°C w/ CF: _____
Cooler 2: _____	°C w/ CF: _____	Cooler 5: _____	°C w/ CF: _____
Cooler 3: _____	°C w/ CF: _____	Cooler 6: _____	°C w/ CF: _____

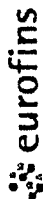
Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Preservation type:	<u>Y</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
Internal COC required:	<u>Y</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>Y</u>	

Anomalies/Non-conformances (attach additional pages if needed):

8100810





Frontier Global Sciences

**Chain of Custody Record & Laboratory Analysis Request:**  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@frontiergs.com  
http://www.frontiergs.com

Client: <u>Underwood Engineering</u>		Contact: <u>Tim Puls</u>		Page <u>1</u> of <u>1</u>	
Address: <u>25000 148th Ave NE, Bothell, WA 98011</u>		Phone: <u>425-436-6192</u>		EFGS PM: <u>15 10 5 4 3 2 24 hrs.</u>	
Project Name: <u>Anti-Degradation</u>		E-mail: <u>tim.puls@underwoodeng.com</u>		TAT (business days): <u>20 (std)</u>	
Report To: <u>Tim Puls</u>		Contract/PO: <u>90300</u>		(For TAT < 10 days, contact PM)	
Address: <u>25000 148th Ave NE, Bothell, WA 98011</u>		Invoice To: <u>same</u>		Surcharges apply for expedited TAT	
Phone: <u>425-436-6192</u>		Address: <u>same</u>		Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N	
E-mail: <u>tim.puls@underwoodeng.com</u>		Phone: <u>same</u>		(If yes, please contact PM)	
E-mail: <u>tim.puls@underwoodeng.com</u>		Fax: <u>same</u>		EDD <input type="checkbox"/> Y <input type="checkbox"/> N	
Engraved Bottle ID		Sample ID		QA <input type="checkbox"/> Standard <input type="checkbox"/> High	
No.		# of Bottles		Comments	
1	River - 01	Dissolved - 1	1	1333	* Dissolved Hg
2		Dissolved - 2	1	1333	Sample bottles are labeled as Total Hg
3		TM-1	1	1333	* No blank included for Dissolved Metals
4		TM-2	1	1333	
5		TM-Blank	1	1333	
6		Dissolved Hg - 1	1	1333	
7		Dissolved Hg - 2	1	1333	
8		Dissolved Hg - Blank	1	1333	
9		Total CN-1	1	1340	
10		Total CN-2	1	1340	
11		Total CN-Blank	1	1340	
12					

For Laboratory Use Only		Matrix Codes:		Relinquished By: <u>U. Underwood</u>		Received By: <u>MS</u>	
COC Seal: <u>NO</u>	Comments:	FW: Fresh Water		Name: <u>Megan H. H. H. H. H.</u>		Name:	
Cooler Temp: <u>4.0</u>		WW: Waste Water		Organization: <u>U. Underwood</u>		Organization:	
Carrier: <u>W</u>		SS: Sea and Brackish Water		Date & Time: <u>9-18-18</u>		Date & Time:	
VTSR: <u>10.20</u>		TS: Soil and Sediment		Tracking number: <u>7452 496 3196</u>			
# of Coolers: <u>2</u>		HC: Plant and Animal Tissue					
		TR: Trap					
		OT: Other					

By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.

Customer Approval: \_\_\_\_\_ Date: \_\_\_\_\_

Sample Disposal:  
☐ Return (shipping fees may apply)  
☐ Standard Disposal - 30 Days after report  
☐ Retain for \_\_\_\_\_ weeks after report (storage fees may apply)

2146

FRONT DESK  
(425) 886-1996  
FRONTIER GLOBAL SCIENCES  
11720 N CREEK PKWY N  
BOTHELL WA 98011-8244

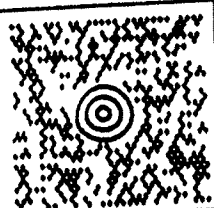
37 LBS

1 OF 1

DWT: 24,13,14

**SHIP TO:**

SAMPLE RECEIVING  
(714) 855-5494  
EUROFINS CALSCIENCE, INC.  
7440 LINCOLN WAY  
**GARDEN GROVE CA 92841**



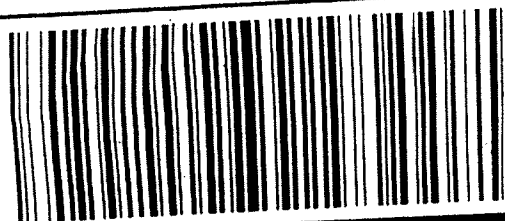
**CA 927 9-09**



**UPS NEXT DAY AIR**

TRACKING #: 1Z 86W 050 01 5166 4242

1



BILLING: P/P

EUROFINS CAL  
7440 LINC

GARDEN

P: V

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# SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: EFGS

DATE: 09 / 28 / 2018

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: -0.5°C); Temperature (w/o CF): 2.9 °C (w/ CF): 2.4 °C; ☐ Blank ☒ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: \_\_\_\_\_)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter

Checked by: WGP

## CUSTODY SEAL:

Cooler ☐ Present and Intact ☐ Present but Not Intact ☒ Not Present ☐ N/A

Checked by: WGP

Sample(s) ☐ Present and Intact ☐ Present but Not Intact ☒ Not Present ☐ N/A

Checked by: WFSO

## SAMPLE CONDITION:

Chain-of-Custody (COC) document(s) received with samples ..... ☒ Yes ☐ No ☐ N/A

COC document(s) received complete ..... ☐ Yes ☒ No ☐ N/A

☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers

☐ No analysis requested ☒ Not relinquished ☒ No relinquished date ☒ No relinquished time

Sampler's name indicated on COC ..... ☐ Yes ☐ No ☒ N/A

Sample container label(s) consistent with COC ..... ☒ Yes ☐ No ☐ N/A

Sample container(s) intact and in good condition ..... ☒ Yes ☐ No ☐ N/A

Proper containers for analyses requested ..... ☒ Yes ☐ No ☐ N/A

Sufficient volume/mass for analyses requested ..... ☒ Yes ☐ No ☐ N/A

Samples received within holding time ..... ☒ Yes ☐ No ☐ N/A

Aqueous samples for certain analyses received within 15-minute holding time

☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen ..... ☐ Yes ☐ No ☒ N/A

Proper preservation chemical(s) noted on COC and/or sample container ..... ☒ Yes ☐ No ☐ N/A

Unpreserved aqueous sample(s) received for certain analyses

☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals

Acid/base preserved samples - pH within acceptable range ..... ☒ Yes ☐ No ☐ N/A

Container(s) for certain analysis free of headspace ..... ☐ Yes ☐ No ☒ N/A

☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)

☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)

Tedlar™ bag(s) free of condensation ..... ☐ Yes ☐ No ☒ N/A

## CONTAINER TYPE:

(Trip Blank Lot Number: \_\_\_\_\_)

Aqueous: ☐ VOA ☐ VOAh ☐ VOAna<sub>2</sub> ☐ 100PJ ☐ 100PJna<sub>2</sub> ☐ 125AGB ☐ 125AGBh ☐ 125AGBp ☐ 125PB ☐ 125PBz<sub>2</sub>na (pH\_\_9)

☐ 250AGB ☐ 250CGB ☐ 250CGBs (pH\_\_2) ☐ 250PB ☐ 250PBn (pH\_\_2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJs (pH\_\_2) ☐ 500PB

☐ 1AGB ☐ 1AGBna<sub>2</sub> ☐ 1AGBs (pH\_\_2) ☐ 1AGBs (O&G) ☐ 1PB ☒ 1PBna (pH 7 12) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (\_\_\_\_) ☐ EnCores® (\_\_\_\_) ☐ TerraCores® (\_\_\_\_) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ \_\_\_\_\_ Other Matrix (\_\_\_\_): ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Container: A = Amber, B = Bottle, C = Clear, E = Envelope, G = Glass, J = Jar, P = Plastic, and Z = Ziploc/Resealable Bag

Preservative: b = buffered, f = filtered, h = HCl, n = HNO<sub>3</sub>, na = NaOH, na<sub>2</sub> = Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, p = H<sub>3</sub>PO<sub>4</sub>, Labeled/Checked by: WFSO

s = H<sub>2</sub>SO<sub>4</sub>, u = ultra-pure, x = Na<sub>2</sub>SO<sub>3</sub>+NaHSO<sub>4</sub>.H<sub>2</sub>O, z<sub>2</sub>na = Zn (CH<sub>3</sub>CO<sub>2</sub>)<sub>2</sub> + NaOH

Reviewed by: WGP

\* COC received via E-mail, 9/28/18

## APPENDIX B

Laboratory Reports of Sample Results and Chain of Custody

Round 2 – October 17-18, 2018

EnviroSystems, Inc.,  
One Lafayette Road  
P.O. Box 778  
Hampton, N.H. 03843-0778  
p 603 926 3345 • f 603 926 3521  
envirosystems.com

Steve Clifton  
Underwood Engineers, Inc.  
25 Vaughan Mall  
Portsmouth, NH 03801

PO Number: None  
Report Number: 31233  
Date Received: 10/18/18  
Date Reported: 11/12/18

Project: Piscataqua River

Attached please find results for analyses performed on samples received on 10/18/18 at 1100 and 164. The total phenol results were provided by Alpha Analytical of Westborough, Massachusetts. Total phenol results are included in Appendix 1 of this report.

Samples were received in acceptable condition, except where noted, and under chain of custody.

Instruments used in analysis were calibrated with the appropriate frequency and to the specifications of the referenced methods.

Analytes in blanks were below levels affecting sample results.

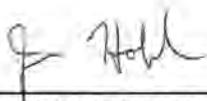
Matrix effects as monitored by matrix spike recovery or unusual physical properties were not apparent unless otherwise noted.

Accuracy and precision as monitored by laboratory control sample analyses were within acceptance limits unless otherwise noted.

Accreditations may be viewed at [www.envirosystems.com](http://www.envirosystems.com).

The results presented in this report relate only to the samples described on the chain(s) of custody and sample receipt log(s), and are intended to be used only by the submitter.

EnviroSystems, Incorporated



Jason Hobbs - Technical Manager of Analytical Chemistry

Date 11/13/18

Report No: 31233  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_002  
Matrix: Water  
Sampled: 10/18/18 0935

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31233-016	3.64	0.2	NTU	10/19/18 1500	10/19/18 1500	JLH/SM 2130 B

Notes:

ESI

Report No: 31233  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_002  
Matrix: Water  
Sampled: 10/18/18 0925

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	31233-011	ND	5	mg/L	10/24/18 1300	10/30/18 0900	RK /EPA 1664A

Notes:

ND = Not Detected

ESI



Report No: 31233  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_002  
Matrix: Water  
Sampled: 10/18/18 0000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved solids	31233-014	1800	5	mg/L	10/24/18 1640	10/30/18 1255	CA /SM 2540C
Total suspended solids	31233-005	6.1	1	mg/L	10/22/18 1000	10/30/18 1315	CA /SM 2540D
Biochemical Oxygen Demand	31233-001	ND	5	mg/L	10/19/18	10/24/18	KL /SM 5210 B
Ammonia-N	31233-006	2.1	0.1	mg/L as N	10/25/18 1130	10/25/18 1130	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31233-009	2.8	0.5	mg/L as N	10/25/18 0859	10/28/18	CA /SM 4500-NH3 G
Total Nitrogen	31233-009	6.5	0.5	mg/L as N	11/09/18	11/09/18	AM/Calculation
Nitrate plus nitrite-N	31233-009	3.7	0.25	mg/L as N	10/24/18 0900	10/24/18 1145	JHW/SM 4500-NO3 F
Total phosphorus	31233-012	51	2	mg/L	10/23/18 1045	10/26/18 1530	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31233 SDG:  
Project: Piscataqua River

Sample ID: PEASE\_002DUP  
Matrix: Water  
Sampled: 10/18/18 0000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved solids	31233-015	1800	5	mg/L	10/24/18 1640	10/30/18 1255	CA /SM 2540C
Biochemical Oxygen Demand	31233-002	ND	5	mg/L	10/19/18	10/24/18	KL /SM 5210 B
Ammonia-N	31233-007	2.1	0.1	mg/L as N	10/25/18 1130	10/25/18 1130	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31233-010	1.6	0.5	mg/L as N	10/25/18 0859	10/28/18	CA /SM 4500-NH3 G
Total Nitrogen	31233-010	5.1	0.5	mg/L as N	11/09/18	11/09/18	AM/Calculation
Nitrate plus nitrite-N	31233-010	3.5	0.25	mg/L as N	10/31/18 1000	10/31/18 1000	JHW/SM 4500-NO3 F
Total phosphorus	31233-013	51	2	mg/L	10/23/18 1045	10/26/18 1530	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31233  
Project: Piscataqua River

SDG:

Sample ID: NEW\_002  
Matrix: Water  
Sampled: 10/18/18 0835

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31233-040	2.04	0.2	NTU	10/19/18 1500	10/19/18 1500	JLH/SM 2130 B

Notes:

ESI

Report No: 31233 SDG:  
Project: Piscataqua River

Sample ID: NEW\_002  
Matrix: Water  
Sampled: 10/18/18 0825

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	31233-036	ND	5	mg/L	10/24/18 1300	10/30/18 0900	RK /EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31233  
Project: Piscataqua River

SDG:

Sample ID: NEW\_002  
Matrix: Water  
Sampled: 10/18/18 0000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved solids	31233-039	740	5	mg/L	10/24/18 1640	10/30/18 1255	CA /SM 2540C
Total suspended solids	31233-030	4.6	1	mg/L	10/22/18 1000	10/30/18 1315	CA /SM 2540D
Biochemical Oxygen Demand	31233-027	ND	5	mg/L	10/19/18	10/24/18	KL /SM 5210 B
Ammonia-N	31233-031	ND	0.1	mg/L as N	10/25/18 1130	10/25/18 1130	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31233-034	1	0.5	mg/L as N	10/25/18 0859	10/28/18	CA /SM 4500-NH3 G
Total Nitrogen	31233-034	2.4	0.5	mg/L as N	11/09/18	11/09/18	AM/Calculation
Nitrate plus nitrite-N	31233-034	1.4	0.05	mg/L as N	10/24/18 0900	10/24/18 1145	JHW/SM 4500-NO3 F
Total phosphorus	31233-037	0.25	0.04	mg/L	10/29/18 1135	10/30/18 1510	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31233 SDG:  
 Project: Piscataqua River  
 Sample ID: NEW\_002DUP  
 Matrix: Water  
 Sampled: 10/18/18 0000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31233-032	ND	0.1	mg/L as N	10/25/18 1130	10/25/18 1130	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31233-035	1.3	0.5	mg/L as N	10/25/18 0859	10/28/18	CA /SM 4500-NH3 G
Total Nitrogen	31233-035	2.7	0.5	mg/L as N	11/09/18	11/09/18	AM/Calculation
Nitrate plus nitrite-N	31233-035	1.4	0.05	mg/L as N	10/24/18 0900	10/24/18 1145	JHW/SM 4500-NO3 F
Total phosphorus	31233-038	0.25	0.04	mg/L	10/29/18 1135	10/30/18 1510	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31233  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_002  
Matrix: Water  
Sampled: 10/18/18 1600

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31233-062	0.87	0.2	NTU	10/19/18 1500	10/19/18 1500	JLH/SM 2130 B

Notes:

ESI

Report No: 31233  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_002  
Matrix: Water  
Sampled: 10/18/18 1610

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31233-053	3.9	1	mg/L	10/22/18 1000	10/30/18 1315	CA /SM 2540D

Notes:

ESI



Report No: 31233  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_002  
Matrix: Water  
Sampled: 10/18/18 1550

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Biochemical Oxygen Demand	31233-050	ND	5	mg/L	10/19/18	10/24/18	KL /SM 5210 B
Ammonia-N	31233-054	ND	0.1	mg/L as N	10/25/18 1130	10/25/18 1130	JHW/SM 4500-NH3 G

Notes:

ND = Not Detected

ESI

Report No: 31233 SDG:  
Project: Piscataqua River

Sample ID: RIVER\_002  
Matrix: Water  
Sampled: 10/18/18 1545

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved solids	31233-061	26000	5	mg/L	10/24/18 1640	10/30/18 1255	CA /SM 2540C
Oil and grease	31233-058	ND	5	mg/L	10/24/18 1300	10/30/18 0900	RK /EPA 1664A
Total Kjeldahl Nitrogen	31233-056	ND	2.5	mg/L as N	10/25/18 0859	10/28/18	CA /SM 4500-NH3 G
Total Nitrogen	31233-056	ND	2.5	mg/L as N	11/09/18	11/09/18	AM/Calculation
Nitrate plus nitrite-N	31233-056	0.06	0.05	mg/L as N	10/24/18 0900	10/24/18 1145	JHW/SM 4500-NO3 F
Total phosphorus	31233-059	1.4	0.04	mg/L	10/29/18 1135	10/30/18 1510	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31233 SDG  
Project: Piscataqua River

Sample ID: RIVER\_002DUP  
Matrix: Water  
Sampled: 10/18/18 1545

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31233-055	ND	0.1	mg/L as N	10/25/18 1130	10/25/18 1130	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31233-057	ND	2.5	mg/L as N	10/25/18 0859	10/28/18	CA /SM 4500-NH3 G
Total Nitrogen	31233-057	ND	2.5	mg/L as N	11/09/18	11/09/18	AM/Calculation
Nitrate plus nitrite-N	31233-057	0.06	0.05	mg/L as N	10/24/18 0900	10/24/18 1145	JHW/SM 4500-NO3 F
Total phosphorus	31233-060	0.58	0.04	mg/L	10/29/18 1135	10/30/18 1510	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Lab Number: 31233-020  
Sample Designation: PEASE\_002  
Date Sampled: 10/18/18 0930  
Date Analyzed: 10/22/18  
Matrix: Water

# VOLATILE ORGANICS

Method Reference: EPA Method 624.

	Concentration (ug/L)	Quantitation Limit (ug/L)
acrolein	U	10
acrylonitrile	U	10
dichlorodifluoromethane	U	2
chloromethane	U	2
vinyl chloride	U	2
bromomethane	U	2
chloroethane	U	2
trichlorofluoromethane	U	2
1,1-dichloroethene	U	2
methylene chloride	U	2
trans-1,2-dichloroethene	U	2
1,1-dichloroethane	U	2
cis-1,2-dichloroethene	U	2
chloroform	92	2
1,1,1-trichloroethane	U	2
carbon tetrachloride	U	2
benzene	U	2
1,2-dichloroethane	U	2
trichloroethene	U	2
1,2-dichloropropane	U	2
dibromomethane	U	2
bromodichloromethane	40	2
cis-1,3-dichloropropene	U	2
2-chloroethylvinylether	U	4
toluene	U	2
trans-1,3-dichloropropene	U	2
1,1,2-trichloroethane	U	2
tetrachloroethene	U	2
1,3-dichloropropane	U	2
dibromochloromethane	18	2
chlorobenzene	U	2
ethylbenzene	U	2
bromoform	U	2
1,1,2,2-tetrachloroethane	U	2
1,2-dichlorobenzene	U	2
1,3-dichlorobenzene	U	2
1,4-dichlorobenzene	U	2

## SURROGATE STANDARDS

	% Recovery	Acceptance Limits
dibromofluoromethane	104	70 - 130
toluene-d8	100	70 - 130
4-bromofluorobenzene	104	70 - 130

U = Below quantitation limit

ESI

Lab Number: 31233-043  
Sample Designation: NEW\_002  
Date Sampled: 10/18/18 0840  
Date Analyzed: 10/23/18  
Matrix: Water

# VOLATILE ORGANICS

Method Reference: EPA Method 624.

	Concentration (ug/L)	Quantitation Limit (ug/L)
acrolein	U	10
acrylonitrile	U	10
dichlorodifluoromethane	U	2
chloromethane	U	2
vinyl chloride	U	2
bromomethane	U	2
chloroethane	U	2
trichlorofluoromethane	U	2
1,1-dichloroethene	U	2
methylene chloride	U	2
trans-1,2-dichloroethene	U	2
1,1-dichloroethane	U	2
cis-1,2-dichloroethene	U	2
chloroform	220	2
1,1,1-trichloroethane	U	2
carbon tetrachloride	U	2
benzene	U	2
1,2-dichloroethane	U	2
trichloroethene	U	2
1,2-dichloropropane	U	2
dibromomethane	U	2
bromodichloromethane	140	2
cis-1,3-dichloropropene	U	2
2-chloroethylvinylether	U	4
toluene	U	2
trans-1,3-dichloropropene	U	2
1,1,2-trichloroethane	U	2
tetrachloroethene	U	2
1,3-dichloropropane	U	2
dibromochloromethane	79	2
chlorobenzene	U	2
ethylbenzene	U	2
bromoform	7	2
1,1,2,2-tetrachloroethane	U	2
1,2-dichlorobenzene	U	2
1,3-dichlorobenzene	U	2
1,4-dichlorobenzene	U	2

SURROGATE STANDARDS	% Recovery	Acceptance Limits
dibromofluoromethane	108	70 - 130
toluene-d8	102	70 - 130
4-bromofluorobenzene	104	70 - 130

U = Below quantitation limit

ESI

Lab Number: 31233-065  
Sample Designation: RIVER\_002  
Date Sampled: 10/18/18 1530  
Date Analyzed: 10/23/18  
Matrix: Water

# VOLATILE ORGANICS

Method Reference: EPA Method 624.

	Concentration (ug/L)	Quantitation Limit (ug/L)
acrolein	U	10
acrylonitrile	U	10
dichlorodifluoromethane	U	2
chloromethane	U	2
vinyl chloride	U	2
bromomethane	U	2
chloroethane	U	2
trichlorofluoromethane	U	2
1,1-dichloroethene	U	2
methylene chloride	U	2
trans-1,2-dichloroethene	U	2
1,1-dichloroethane	U	2
cis-1,2-dichloroethene	U	2
chloroform	U	2
1,1,1-trichloroethane	U	2
carbon tetrachloride	U	2
benzene	U	2
1,2-dichloroethane	U	2
trichloroethene	U	2
1,2-dichloropropane	U	2
dibromomethane	U	2
bromodichloromethane	U	2
cis-1,3-dichloropropene	U	2
2-chloroethylvinylether	U	4
toluene	U	2
trans-1,3-dichloropropene	U	2
1,1,2-trichloroethane	U	2
tetrachloroethene	U	2
1,3-dichloropropane	U	2
dibromochloromethane	U	2
chlorobenzene	U	2
ethylbenzene	U	2
bromoform	U	2
1,1,2,2-tetrachloroethane	U	2
1,2-dichlorobenzene	U	2
1,3-dichlorobenzene	U	2
1,4-dichlorobenzene	U	2

## SURROGATE STANDARDS

	% Recovery	Acceptance Limits
dibromofluoromethane	100	70 - 130
toluene-d8	102	70 - 130
4-bromofluorobenzene	108	70 - 130

U = Below quantitation limit

ESI

Lab Number: 31233-066  
Sample Designation: RIVER\_002TP  
Date Sampled: 10/18/18 1530  
Date Analyzed: 10/23/18  
Matrix: Water

**VOLATILE ORGANICS**

Method Reference: EPA Method 624.

	Concentration (ug/L)	Quantitation Limit (ug/L)
acrolein	U	10
acrylonitrile	U	10
dichlorodifluoromethane	U	2
chloromethane	U	2
vinyl chloride	U	2
bromomethane	U	2
chloroethane	U	2
trichlorofluoromethane	U	2
1,1-dichloroethene	U	2
methylene chloride	U	2
trans-1,2-dichloroethene	U	2
1,1-dichloroethane	U	2
cis-1,2-dichloroethene	U	2
chloroform	U	2
1,1,1-trichloroethane	U	2
carbon tetrachloride	U	2
benzene	U	2
1,2-dichloroethane	U	2
trichloroethene	U	2
1,2-dichloropropane	U	2
dibromomethane	U	2
bromodichloromethane	U	2
cis-1,3-dichloropropene	U	2
2-chloroethylvinylether	U	4
toluene	U	2
trans-1,3-dichloropropene	U	2
1,1,2-trichloroethane	U	2
tetrachloroethene	U	2
1,3-dichloropropane	U	2
dibromochloromethane	U	2
chlorobenzene	U	2
ethylbenzene	U	2
bromoform	U	2
1,1,2,2-tetrachloroethane	U	2
1,2-dichlorobenzene	U	2
1,3-dichlorobenzene	U	2
1,4-dichlorobenzene	U	2

SURROGATE STANDARDS	% Recovery	Acceptance Limits
dibromofluoromethane	98	70 - 130
toluene-d8	104	70 - 130
4-bromofluorobenzene	104	70 - 130

U = Below quantitation limit

**ESI**

Lab Number: 31233-024  
Sample Designation: PEASE\_002  
Date Sampled: 10/18/18  
Date Extracted: 10/23/18  
Date Analyzed: 10/30/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	22
2-chlorophenol	U	3	4-nitrophenol	U	5
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	5
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	5	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	22
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	22	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	56	25-175	nitrobenzene-d5	67	22-178
phenol-d5	49	24-176	2-fluorobiphenyl	62	38-162
2,4,6-tribromophenol	109	24-176	terphenyl-d14	86	53-147

U = Below quantitation limit

ESI



Lab Number: 31233-047  
Sample Designation: NEW\_002  
Date Sampled: 10/18/18  
Date Extracted: 10/23/18  
Date Analyzed: 10/30/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	21
2-chlorophenol	U	3	4-nitrophenol	U	5
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	5
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	5	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	U	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	21
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	21	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	56	25-175	nitrobenzene-d5	67	22-178
phenol-d5	46	24-176	2-fluorobiphenyl	63	38-162
2,4,6-tribromophenol	115	24-176	terphenyl-d14	85	53-147

U = Below quantitation limit

ESI

Lab Number: 31233-069  
Sample Designation: RIVER\_002  
Date Sampled: 10/18/18  
Date Extracted: 10/23/18  
Date Analyzed: 10/31/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	21
2-chlorophenol	U	3	4-nitrophenol	U	5
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	5
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	5	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	26, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	21
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	21	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	57	25-175	nitrobenzene-d5	71	22-178
phenol-d5	63	24-176	2-fluorobiphenyl	63	38-162
2,4,6-tribromophenol	90	24-176	terphenyl-d14	67	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank with a concentration of 4 ug/L.

ESI

Lab Number: 31233-070  
Sample Designation: RIVER\_002TP  
Date Sampled: 10/18/18  
Date Extracted: 10/23/18  
Date Analyzed: 10/31/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	21
2-chlorophenol	U	3	4-nitrophenol	U	5
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	5
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	5	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	4.6, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	21
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	21	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	54	25-175	nitrobenzene-d5	78	22-178
phenol-d5	46	24-176	2-fluorobiphenyl	71	38-162
2,4,6-tribromophenol	119	24-176	terphenyl-d14	113	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 4 ug/L

ESI

## BACTERIAL ANALYSIS REPORT

ESI STUDY No.: 31233  
Client: Underwood Engineers  
Sample Receipt: 10/18/18 1100 & 1645

### Fecal Coliform

Method: SM 9222D

Sample Identification	Lab ID Number	Sample Collection		Sample Analysis		Result (CFU/100mL)	Analyst
		Date	Time	Date	Time		
PEASE_002	31233-004	10/18/18	0935	10/18/18	1414	1	MW
NEW_002	31233-029	10/18/18	0830	10/18/18	1303	1	MW
RIVER_002	31233-052	10/18/18	1610	10/18/18	1726	1	MW

### Enterococcus

Method: EPA 1600

Sample Identification	Lab ID Number	Sample Collection		Sample Analysis		Result (CFU/100mL)	Analyst
		Date	Time	Date	Time		
PEASE_002	31233-003	10/18/18	0935	10/18/18	1300	<1	MW
NEW_002	31233-028	10/18/18	0830	10/18/18	1303	<1	MW
RIVER_002	31233-051	10/18/18	1610	10/18/18	1724	1	MW

### Effluent Chemistry

Total Residual Chlorine (mg/L)	- <sup>a</sup>
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<sup>a</sup> TRC was not measured at the lab prior to analysis.

Analytical Methods: APHA. 2012. *Standard Methods for the Examination of Water and Wastewater*, 22<sup>nd</sup> Edition. Washington D.C.

U.S. Environmental Protection Agency Office of Water (4303T). 2003. *Method 1600: Membrane Filter Test for Enterococci in Water*. Washington D.C.

Report No: 31233  
 Project: Piscataqua River  
 Sample ID: PEASE\_002  
 Matrix: Water

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved Solids	PB	ND	0.00	ND	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total dissolved Solids	LCS	493.00	450.00	110%R	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total dissolved Solids	LCSD	527.00	450.00	117%R, 7%RPD	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total Suspended Solids	PB	ND	0.00	ND	mg/L	10/22/18 1000	10/30/18 1315	SM 2540D
Total Suspended Solids	LCS	7.50	10.00	75%R	mg/L	10/22/18 1000	10/30/18 1315	SM 2540D
Total Suspended Solids	LCSD	9.50	9.80	97%R, 24%RPD	mg/L	10/22/18 1000	10/30/18 1315	SM 2540D
Biochemical Oxygen Demand	PBA	0.08	0.00	ND	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	PBB	0.02	0.00	ND	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCS	174.00	198.00	88%R	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCSD	168.00	198.00	85%R	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCST	172.50	198.00	87%R, 1%RR	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Oil and grease	PB	ND	0.00	ND	mg/L	10/24/18 1300	10/30/18 0900	EPA 1664A
Oil and grease	LCS	35.50	40.00	89%R	mg/L	10/24/18 1300	10/30/18 0900	EPA 1664A
Oil and grease	LCSD	30.00	40.00	75%R, 16%RR	mg/L	10/24/18 1300	10/30/18 0900	EPA 1664A
Ammonia-N	PB	ND	0.00	ND	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R, 0%RPD	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0.00	ND	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.21	10.00	92%R	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.38	10.00	94%R, 2%RPD	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Nitrate plus nitrite-N	PB	ND	0.00	ND	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.00	1.00	100%R	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.00	1.00	100%R, 0%RPD	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Total phosphorus	PB	ND	0.00	ND	mg/L	10/26/18 1530	10/26/18 1530	SM 4500-P E
Total phosphorus	LCS	0.50	0.50	101%R	mg/L	10/23/18 1045	10/26/18 1530	SM 4500-P E
Total phosphorus	LCSD	0.50	0.50	99%R, 2%RPD	mg/L	10/23/18 1045	10/26/18 1530	SM 4500-P E
Total phosphorus	S1D	0.34	0.29	17%RPD	mg/L	10/23/18 1045	10/23/18 1045	SM 4500-P E
Total phosphorus	S1S	0.50	0.50	60%R	mg/L	10/23/18 1045	10/23/18 1045	SM 4500-P E

Report No: 31233  
 Project: Piscataqua River  
 Sample ID: PEASE\_002DUP  
 Matrix: Water

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved Solids	PB	ND	0.00	ND	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total dissolved Solids	LCS	493.00	450.00	110%R	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total dissolved Solids	LCSD	527.00	450.00	117%R, 7%RPD	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Biochemical Oxygen Demand	PBA	0.08	0.00	ND	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	PBB	0.02	0.00	ND	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCS	174.00	198.00	88%R	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCSD	168.00	198.00	85%R	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCST	172.50	198.00	87%R, 1%RR	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Ammonia-N	PB	ND	0.00	ND	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R, 0%RPD	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0.00	ND	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.21	10.00	92%R	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.38	10.00	94%R, 2%RPD	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Nitrate plus nitrite-N	PB	ND	0.00	ND	mg/L as N	10/31/18 1000	10/31/18 1000	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.00	1.00	100%R	mg/L as N	10/31/18 1000	10/31/18 1000	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.00	1.00	100%R, 0%RPD	mg/L as N	10/31/18 1000	10/31/18 1000	SM 4500-NO3 F
Total phosphorus	PB	ND	0.00	ND	mg/L	10/26/18 1530	10/26/18 1530	SM 4500-P E
Total phosphorus	LCS	0.50	0.50	101%R	mg/L	10/23/18 1045	10/26/18 1530	SM 4500-P E
Total phosphorus	LCSD	0.50	0.50	99%R, 2%RPD	mg/L	10/23/18 1045	10/26/18 1530	SM 4500-P E
Total phosphorus	S1D	0.34	0.29	17%RPD	mg/L	10/23/18 1045	10/23/18 1045	SM 4500-P E
Total phosphorus	S1S	0.50	0.50	60%R	mg/L	10/23/18 1045	10/23/18 1045	SM 4500-P E

ESI

Report No. 31233  
 Project: Piscataqua River  
 Sample ID: NEW\_002  
 Matrix: Water

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved Solids	PB	ND	0.00	ND	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total dissolved Solids	LCS	493.00	450.00	110%R	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total dissolved Solids	LCSD	527.00	450.00	117%R, 7%RPD	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total Suspended Solids	PB	ND	0.00	ND	mg/L	10/22/18 1000	10/30/18 1315	SM 2540D
Total Suspended Solids	LCS	7.50	10.00	75%R	mg/L	10/22/18 1000	10/30/18 1315	SM 2540D
Total Suspended Solids	LCSD	9.50	9.80	97%R, 24%RPD	mg/L	10/22/18 1000	10/30/18 1315	SM 2540D
Biochemical Oxygen Demand	PBA	0.08	0.00	ND	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	PBB	0.02	0.00	ND	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCS	174.00	198.00	88%R	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCSD	168.00	198.00	85%R	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCST	172.50	198.00	87%R, 1%RR	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Oil and grease	PB	ND	0.00	ND	mg/L	10/24/18 1300	10/30/18 0900	EPA 1664A
Oil and grease	LCS	35.50	40.00	89%R	mg/L	10/24/18 1300	10/30/18 0900	EPA 1664A
Oil and grease	LCSD	30.00	40.00	75%R, 16%RR	mg/L	10/24/18 1300	10/30/18 0900	EPA 1664A
Ammonia-N	PB	ND	0.00	ND	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R, 0%RPD	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0.00	ND	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.21	10.00	92%R	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.38	10.00	94%R, 2%RPD	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Nitrate plus nitrite-N	PB	ND	0.00	ND	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.00	1.00	100%R	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.00	1.00	100%R, 0%RPD	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Total phosphorus	PB	ND	0.00	ND	mg/L	10/26/18 1530	10/26/18 1530	SM 4500-P E
Total phosphorus	LCS	0.50	0.50	101%R	mg/L	10/23/18 1045	10/26/18 1530	SM 4500-P E
Total phosphorus	LCSD	0.50	0.50	99%R, 2%RPD	mg/L	10/23/18 1045	10/26/18 1530	SM 4500-P E
Total phosphorus	S1D	0.34	0.29	17%RPD	mg/L	10/23/18 1045	10/23/18 1045	SM 4500-P E
Total phosphorus	S1S	0.50	0.50	60%R	mg/L	10/23/18 1045	10/23/18 1045	SM 4500-P E



Report No: 31233  
 Project: Piscataqua River  
 Sample ID: NEW\_002DUP  
 Matrix: Water

SDG

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	PB	ND	0.00	ND	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R, 0%RPD	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0.00	ND	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.21	10.00	92%R	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.38	10.00	94%R, 2%RPD	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Nitrate plus nitrite-N	PB	ND	0.00	ND	mg/L as N	10/31/18 1000	10/31/18 1000	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.00	1.00	100%R	mg/L as N	10/31/18 1000	10/31/18 1000	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.00	1.00	100%R, 0%RPD	mg/L as N	10/31/18 1000	10/31/18 1000	SM 4500-NO3 F
Total phosphorus	PB	ND	0.00	ND	mg/L	10/30/18 1510	10/30/18 1510	SM 4500-P E
Total phosphorus	LCS	0.51	0.50	102%R	mg/L	10/29/18 1135	10/30/18 1510	SM 4500-P E
Total phosphorus	LCSD	0.51	0.50	102%R, 0%RPD	mg/L	10/29/18 1135	10/30/18 1510	SM 4500-P E
Total phosphorus	S1D	0.26	0.25	3%RPD	mg/L	10/29/18 1135	10/29/18 1135	SM 4500-P E
Total phosphorus	S1MS	0.78	0.50	105%R	mg/L	10/29/18 1135	10/29/18 1135	SM 4500-P E

ESI



Report No: 31233  
 Project: Piscataqua River  
 Sample ID: RIVER\_002  
 Matrix: Water

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved Solids	PB	ND	0.00	ND	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total dissolved Solids	LCS	493.00	450.00	110%R	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total dissolved Solids	LCSD	527.00	450.00	117%R, 7%RPD	mg/L	10/24/18 1640	10/30/18 1255	SM 2540C
Total Suspended Solids	PB	ND	0.00	ND	mg/L	10/22/18 1000	10/30/18 1315	SM 2540D
Total Suspended Solids	LCS	7.50	10.00	75%R	mg/L	10/22/18 1000	10/30/18 1315	SM 2540D
Total Suspended Solids	LCSD	9.50	9.80	97%R, 24%RPD	mg/L	10/22/18 1000	10/30/18 1315	SM 2540D
Biochemical Oxygen Demand	PBA	0.08	0.00	ND	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	PBB	0.02	0.00	ND	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCS	174.00	198.00	88%R	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCSD	168.00	198.00	85%R	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Biochemical Oxygen Demand	LCST	172.50	198.00	87%R, 1%RR	mg/L DO depletion	10/19/18	10/24/18	SM 5210 B
Oil and grease	PB	ND	0.00	ND	mg/L	10/24/18 1300	10/30/18 0900	EPA 1664A
Oil and grease	LCS	35.50	40.00	89%R	mg/L	10/24/18 1300	10/30/18 0900	EPA 1664A
Oil and grease	LCSD	30.00	40.00	75%R, 16%RR	mg/L	10/24/18 1300	10/30/18 0900	EPA 1664A
Ammonia-N	PB	ND	0.00	ND	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R, 0%RPD	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0.00	ND	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.21	10.00	92%R	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.38	10.00	94%R, 2%RPD	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Nitrate plus nitrite-N	PB	ND	0.00	ND	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.00	1.00	100%R	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.00	1.00	100%R, 0%RPD	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Total phosphorus	PB	ND	0.00	ND	mg/L	10/26/18 1530	10/26/18 1530	SM 4500-P E
Total phosphorus	LCS	0.50	0.50	101%R	mg/L	10/23/18 1045	10/26/18 1530	SM 4500-P E
Total phosphorus	LCSD	0.50	0.50	99%R, 2%RPD	mg/L	10/23/18 1045	10/26/18 1530	SM 4500-P E
Total phosphorus	S1D	0.34	0.29	17%RPD	mg/L	10/23/18 1045	10/23/18 1045	SM 4500-P E
Total phosphorus	S1S	0.50	0.50	60%R	mg/L	10/23/18 1045	10/23/18 1045	SM 4500-P E

ESI

Report No: 31233  
 Project: Piscataqua River  
 Sample ID: RIVER\_002DUP  
 Matrix: Water

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	PB	ND	0.00	ND	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Ammonia-N	LCS	9.80	10.00	98%R, 0%RPD	mg/L as N	10/25/18 1130	10/25/18 1130	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0.00	ND	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.21	10.00	92%R	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.38	10.00	94%R, 2%RPD	mg/L as N	10/25/18 0859	10/28/18	SM 4500-N C
Nitrate plus nitrite-N	PB	ND	0.00	ND	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.00	1.00	100%R	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.00	1.00	100%R, 0%RPD	mg/L as N	10/24/18 0900	10/24/18 1145	SM 4500-NO3 F
Total phosphorus	PB	ND	0.00	ND	mg/L	10/26/18 1530	10/26/18 1530	SM 4500-P E
Total phosphorus	LCS	0.50	0.50	101%R	mg/L	10/23/18 1045	10/26/18 1530	SM 4500-P E
Total phosphorus	LCSD	0.50	0.50	99%R, 2%RPD	mg/L	10/23/18 1045	10/26/18 1530	SM 4500-P E
Total phosphorus	S1D	0.34	0.29	17%RPD	mg/L	10/23/18 1045	10/23/18 1045	SM 4500-P E
Total phosphorus	S1S	0.50	0.50	60%R	mg/L	10/23/18 1045	10/23/18 1045	SM 4500-P E

ESI

Lab Number: CCB102218W  
Sample Designation: Laboratory Blank  
Date Sampled: 10/22/18  
Date Analyzed: 10/22/18  
Matrix: Water

# VOLATILE ORGANICS

Method Reference: EPA Method 624.

	Concentration (ug/L)	Quantitation Limit (ug/L)
acrolein	U	10
acrylonitrile	U	10
dichlorodifluoromethane	U	2
chloromethane	U	2
vinyl chloride	U	2
bromomethane	U	2
chloroethane	U	2
trichlorofluoromethane	U	2
1,1-dichloroethene	U	2
methylene chloride	U	2
trans-1,2-dichloroethene	U	2
1,1-dichloroethane	U	2
cis-1,2-dichloroethene	U	2
chloroform	U	2
1,1,1-trichloroethane	U	2
carbon tetrachloride	U	2
benzene	U	2
1,2-dichloroethane	U	2
trichloroethene	U	2
1,2-dichloropropane	U	2
dibromomethane	U	2
bromodichloromethane	U	2
cis-1,3-dichloropropene	U	2
2-chloroethylvinylether	U	2
toluene	U	2
trans-1,3-dichloropropene	U	2
1,1,2-trichloroethane	U	2
tetrachloroethene	U	2
1,3-dichloropropane	U	2
dibromochloromethane	U	2
chlorobenzene	U	2
ethylbenzene	U	2
bromoform	U	2
1,1,2,2-tetrachloroethane	U	2
1,2-dichlorobenzene	U	5
1,3-dichlorobenzene	U	2
1,4-dichlorobenzene	U	5

SURROGATE STANDARDS	% Recovery	Acceptance Limits
1,2-dichloroethane-d4	96.5	70 - 130
toluene-d8	104.5	70 - 130
4-bromofluorobenzene	79.8	70 - 130

U = Below quantitation limit

Lab Number: LCS102218W  
Sample Designation: Laboratory Control Sample  
Date Sampled: 10/22/18  
Date Analyzed: 10/22/18  
Matrix: Water

# VOLATILE ORGANICS

Method Reference: EPA Method 624.

	LCS Concentration (ug/L)	Amount Added (ug/L)	Recovery (%)	Acceptance Limits (%)
acrolein	14	20	72	NA - NA
acrylonitrile	16	20	78	NA - NA
dichlorodifluoromethane	17	20	86	NA - NA
chloromethane	16	20	80	1 - 273
vinyl chloride	17	20	84	1 - 251
bromomethane	14	20	72	1 - 242
chloroethane	17	20	84	14 - 230
trichlorofluoromethane	18	20	91	17 - 181
1,1-dichloroethene	18	20	91	1 - 234
methylene chloride	15	20	74	1 - 221
trans-1,2-dichloroethene	18	20	91	54 - 156
1,1-dichloroethane	18	20	92	59 - 155
cis-1,2-dichloroethene	18	20	89	NA - NA
chloroform	19	20	97	51 - 138
1,1,1-trichloroethane	18	20	91	52 - 162
carbon tetrachloride	18	20	92	70 - 140
benzene	19	20	93	37 - 151
1,2-dichloroethane	19	20	94	49 - 155
trichloroethene	19	20	97	71 - 157
1,2-dichloropropane	18	20	90	1 - 210
dibromomethane	19	20	95	NA - NA
bromodichloromethane	19	20	97	35 - 155
cis-1,3-dichloropropene	18	20	89	1 - 227
2-chloroethylvinylether	13	20	66	1 - 305
toluene	17	20	86	47 - 150
trans-1,3-dichloropropene	17	20	85	17 - 183
1,1,2-trichloroethane	18	20	92	52 - 150
tetrachloroethene	18	20	91	64 - 148
1,3-dichloropropane	20	20	98	NA - NA
dibromochloromethane	20	20	98	53 - 149
chlorobenzene	19	20	97	37 - 160
ethylbenzene	19	20	94	37 - 162
bromoform	18	20	92	45 - 169
1,1,2,2-tetrachloroethane	17	20	83	46 - 157
1,2-dichlorobenzene	18	20	89	18 - 190
1,3-dichlorobenzene	19	20	93	59 - 156
1,4-dichlorobenzene	18	20	92	18 - 190

SURROGATE STANDARDS	% Recovery	Acceptance Limits
dibromofluoromethane	103.0	70 - 130
toluene-d8	100.3	70 - 130
4-bromofluorobenzene	100.5	70 - 130

U = Below quantitation limit  
NA = Not added or evaluated.

Lab Number: 31233-020S  
Sample Designation: PEASE\_002 (Matrix Spike)  
Date Sampled: 10/18/18 0930  
Date Analyzed: 10/22/18  
Matrix: Water

# VOLATILE ORGANICS

Method Reference: EPA Method 624.

	Sample Concentration	Matrix Spike Concentration	Amount Added	Recovery (%)	Acceptance Limits (%)
acrolein	NA	NA	NA	NA	NA
acrylonitrile	NA	NA	NA	NA	NA
dichlorodifluoromethane	U	18	20	89	NA
chloromethane	U	18	20	89	1-273
vinyl chloride	U	18	20	91	1-251
bromomethane	U	17	20	83	1-242
chloroethane	U	19	20	96	14-230
trichlorofluoromethane	U	19	20	96	17-181
1,1-dichloroethene	U	19	20	97	1-234
methylene chloride	U	20	20	98	1-221
trans-1,2-dichloroethene	U	19	20	96	54-156
1,1-dichloroethane	U	20	20	100	59-155
cis-1,2-dichloroethene	U	19	20	95	NA
chloroform	92	110	20	84	51-138
1,1,1-trichloroethane	U	19	20	93	52-162
carbon tetrachloride	U	20	20	98	70-140
benzene	U	20	20	98	37-151
1,2-dichloroethane	U	20	20	97	49-155
trichloroethene	U	19	20	95	71-157
1,2-dichloropropane	U	19	20	96	1-210
dibromomethane	U	20	20	100	NA
bromodichloromethane	40	60	20	97	35-155
cis-1,3-dichloropropene	U	19	20	97	1-227
toluene	U	18	20	90	47-150
trans-1,3-dichloropropene	U	19	20	97	17-183
1,1,2-trichloroethane	U	20	20	99	52-150
tetrachloroethene	U	19	20	94	64-148
1,3-dichloropropane	U	21	20	103	NA
dibromochloromethane	18	38	20	104	53-149
chlorobenzene	U	20	20	101	37-160
ethylbenzene	U	19	20	97	37-162
bromoform	U	21	20	98	45-169
1,1,2,2-tetrachloroethane	U	19	20	96	46-157
1,2-dichlorobenzene	U	18	20	92	18-190
1,3-dichlorobenzene	U	19	20	97	59-156
1,4-dichlorobenzene	U	19	20	97	59-156

## SURROGATE STANDARDS

	% Recovery	% Recovery	Acceptance Limits
1,2-dichloroethane-d4	104.0	104.5	70 - 130
toluene-d8	100.0	99.5	70 - 130
4-bromofluorobenzene	104.0	101.1	70 - 130

U = Below quantitation limit  
NA = Not added or evaluated.

ESI

Lab Number: PB167W  
Sample Designation: Laboratory Blank  
Date Sampled: 10/23/18 0930  
Date Extracted: 10/23/18 0930  
Date Analyzed: 10/30/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Quantitation Limit (ug/L)		Concentration (ug/L)	Quantitation Limit (ug/L)
N-nitrosodimethylamine	U	3	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	20
2-chlorophenol	U	3	4-nitrophenol	U	5
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	3	4,6-dinitro-2-methylphenol	U	5
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	3
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azoben:	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	5	hexachlorobenzene	U	3
4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	4, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	20
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	3	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	3
hexachlorocyclopentadiene	U	20	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	3
2-chloronaphthalene	U	3	benzo(k)fluoranthene	U	3
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits ( %)		Recovery (%)	Acceptance Limits ( %)
2-fluorophenol	62	25-175	nitrobenzene-d5	60	22-178
phenol-d5	56	24-176	2-fluorobiphenyl	54	38-162
2,4,6-tribromophenol	116	24-176	terphenyl-d14	89	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 4 ug/L.

ESI

Lab Number: LCS167W  
Sample Designation: Laboratory Control Sample  
Date Sampled: 10/23/18 0930  
Date Extracted: 10/23/18 0930  
Date Analyzed: 10/30/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)
N-nitrosodimethylamine	82	100	82	30-150	acenaphthene	70	100	70	47-145
phenol	51	100	51	5-120	2,4-dinitrophenol	38	100	38	1-191
2-chlorophenol	82	100	82	23-134	4-nitrophenol	46	100	46	1-132
bis(2-chloroethyl)ether	63	100	63	12-158	fluorene	73	100	73	59-121
1,3-dichlorobenzene	61	100	61	30-150	4-chlorophenyl-phenylether	79	100	79	25-158
1,4-dichlorobenzene	60	100	60	30-150	diethylphthalate	70	100	70	1-120
1,2-dichlorobenzene	61	100	61	30-150	4,6-dinitro-2-methylphenol	59	100	59	1-181
2-methylphenol (m-cresol)	NA	NA	NA	30-150	N-nitrosodiphenylamine	92	100	92	30-150
bis(2-chloroisopropyl)ether	76	100	76	36-166	1,2-diphenylhydrazine	NA	NA	NA	30-150
hexachloroethane	51	100	51	40-120	4-bromophenyl-phenylether	85	100	85	53-127
N-nitroso-di-n-propylamine	72	100	72	1-230	hexachlorobenzene	81	100	81	1-152
4-methylphenol (p-cresol)	NA	NA	NA	30-150	pentachlorophenol	92	100	92	14-176
nitrobenzene	73	100	73	35-180	phenanthrene	79	100	79	54-120
isophorone	83	100	83	21-196	anthracene	79	100	79	27-133
2-nitrophenol	79	100	79	29-182	di-n-butylphthalate	84	100	84	1-120
2,4-dimethylphenol	79	100	79	32-119	fluoranthene	86	100	86	26-137
bis(2-chloroethoxy)methane	82	100	82	33-184	benzidine	NA	NA	NA	30-150
2,4-dichlorophenol	77	100	77	39-135	pyrene	89	100	89	52-120
1,2,4-trichlorobenzene	59	100	59	44-142	butylbenzylphthalate	88	100	88	1-152
naphthalene	59	100	59	21-133	benzo(a)anthracene	89	100	89	33-143
hexachloro-1,3-butadiene	57	100	57	24-120	chrysene	85	100	85	17-168
4-chloro-3-methylphenol	87	100	87	22-147	3,3'-dichlorobenzidine	NA	NA	NA	1-262
hexachlorocyclopentadiene	51	100	51	30-150	bis(2-ethylhexyl)phthalate	89	100	89	8-158
2,4,6-trichlorophenol	85	100	85	37-144	di-n-octylphthalate	97	100	97	4-146
2-chloronaphthalene	66	100	66	60-120	benzo(b)fluoranthene	97	100	97	24-159
acenaphthylene	67	100	67	33-145	benzo(k)fluoranthene	97	100	97	11-162
dimethylphthalate	63	100	63	1-120	benzo(a)pyrene	98	100	98	17-163
2,6-dinitrotoluene	81	100	81	50-158	indeno(1,2,3-cd)pyrene	117	100	117	1-171
2,4-dinitrotoluene	85	100	85	39-139	dibenzo(a,h)anthracene	108	100	108	1-227
					benzo(g,h,i)perylene	117	100	117	1-219

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	59	25-175	nitrobenzene-d5	81	22-178
phenol-d5	48	24-176	2-fluorobiphenyl	72	38-162
2,4,6-tribromophenol	114	24-176	terphenyl-d14	103	53-147

U = Below quantitation limit  
NA = Not added or evaluated.

ESI



Lab Number: LCSD167W  
Sample Designation: Laboratory Control Sample Duplicate  
Date Sampled: 10/23/18 0930  
Date Extracted: 10/23/18 0930  
Date Analyzed: 10/30/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)
N-nitrosodimethylamine	86	100	86	30-150	acenaphthene	73	100	73	47-145
phenol	50	100	50	5-120	2,4-dinitrophenol	57	100	57	1-191
2-chlorophenol	84	100	84	23-134	4-nitrophenol	43	100	43	1-132
bis(2-chloroethyl)ether	63	100	63	12-128	fluorene	77	100	77	59-121
1,3-dichlorobenzene	60	100	60	30-150	4-chlorophenyl-phenylether	83	100	83	25-158
1,4-dichlorobenzene	62	100	62	30-150	diethylphthalate	71	100	71	1-120
1,2-dichlorobenzene	62	100	62	30-150	4,6-dinitro-2-methylphenol	71	100	71	1-181
2-methylphenol (m-cresol)	NA	NA	NA	30-150	N-nitrosodiphenylamine	94	100	94	30-150
bis(2-chloroisopropyl)ether	76	100	76	36-166	1,2-diphenylhydrazine	NA	NA	NA	30-150
hexachloroethane	53	100	53	40-120	4-bromophenyl-phenylether	88	100	88	53-127
N-nitroso-di-n-propylamine	73	100	73	1-230	hexachlorobenzene	85	100	85	1-152
4-methylphenol (p-cresol)	NA	NA	NA	30-150	pentachlorophenol	100	100	100	14-176
nitrobenzene	72	100	72	35-180	phenanthrene	81	100	81	54-120
isophorone	85	100	85	21-196	anthracene	81	100	81	27-133
2-nitrophenol	95	100	95	29-182	di-n-butylphthalate	85	100	85	1-120
2,4-dimethylphenol	81	100	81	32-119	fluoranthene	89	100	89	26-137
bis(2-chloroethoxy)methane	83	100	83	33-184	benzidine	NA	NA	NA	30-150
2,4-dichlorophenol	82	100	82	39-135	pyrene	92	100	92	52-120
1,2,4-trichlorobenzene	61	100	61	44-142	butylbenzylphthalate	88	100	88	1-152
naphthalene	59	100	59	21-133	benzo(a)anthracene	88	100	88	33-143
hexachloro-1,3-butadiene	59	100	59	24-120	chrysene	87	100	87	17-168
4-chloro-3-methylphenol	89	100	89	22-147	3,3'-dichlorobenzidine	NA	NA	NA	1-262
hexachlorocyclopentadiene	54	100	54	30-150	bis(2-ethylhexyl)phthalate	45	100	45	8-158
2,4,6-trichlorophenol	92	100	92	37-144	di-n-octylphthalate	49	100	49	4-146
2-chloronaphthalene	66	100	66	60-120	benzo(b)fluoranthene	100	100	100	24-159
acenaphthylene	69	100	69	33-145	benzo(k)fluoranthene	100	100	100	11-162
dimethylphthalate	61	100	61	1-120	benzo(a)pyrene	100	100	100	17-163
2,6-dinitrotoluene	86	100	86	50-158	indeno(1,2,3-cd)pyrene	118	100	118	1-171
2,4-dinitrotoluene	91	100	91	39-139	dibenzo(a,h)anthracene	111	100	111	1-227
					benzo(g,h,i)perylene	119	100	119	1-219

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	58	25-175	nitrobenzene-d5	80	22-178
phenol-d5	49	24-176	2-fluorobiphenyl	74	38-162
2,4,6-tribromophenol	122	24-176	terphenyl-d14	106	53-147

U = Below quantitation limit  
NA = Not added or evaluated.

ESI



Lab Number: 31233-024  
Sample Designation: PEASE\_002 (Matrix Spike)  
Date Sampled: 10/18/18 0000  
Date Extracted: 10/23/18 0930  
Date Analyzed: 10/31/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration	Added	Recovery	Limits		Concentration	Added	Recovery	Limits
	(ug/L)	(ug/L)	(%)	(%)		(ug/L)	(ug/L)	(%)	(%)
N-nitrosodimethylamine	77	100	77	30-150	acenaphthene	71	100	71	47-145
phenol	51	100	51	5-120	2,4-dinitrophenol	50	100	50	1-191
2-chlorophenol	85	100	85	23-134	4-nitrophenol	40	100	40	1-132
bis(2-chloroethyl)ether	61	100	61	12-128	fluorene	71	100	71	59-121
1,3-dichlorobenzene	63	100	63	30-150	4-chlorophenyl-phenylether	76	100	76	25-158
1,4-dichlorobenzene	64	100	64	30-150	diethylphthalate	71	100	71	1-120
1,2-dichlorobenzene	64	100	64	30-150	4,6-dinitro-2-methylphenol	64	100	64	1-181
2-methylphenol (m-cresol)	NA	NA	NA	30-150	N-nitrosodiphenylamine	88	100	88	30-150
bis(2-chloroisopropyl)ether	76	100	76	36-166	1,2-diphenylhydrazine	NA	NA	NA	30-150
hexachloroethane	56	100	56	40-120	4-bromophenyl-phenylether	79	100	79	53-127
N-nitroso-di-n-propylamine	70	100	70	1-230	hexachlorobenzene	75	100	75	1-152
4-methylphenol (p-cresol)	NA	NA	NA	30-150	pentachlorophenol	95	100	95	14-176
nitrobenzene	74	100	74	35-180	phenanthrene	74	100	74	54-120
isophorone	80	100	80	21-196	anthracene	73	100	73	27-133
2-nitrophenol	82	100	82	29-182	di-n-butylphthalate	80	100	80	1-120
2,4-dimethylphenol	72	100	72	32-119	fluoranthene	80	100	80	26-137
bis(2-chloroethoxy)methane	80	100	80	33-184	benzidine	U	NA	NA	30-150
2,4-dichlorophenol	76	100	76	39-135	pyrene	82	100	82	52-120
1,2,4-trichlorobenzene	62	100	62	44-142	butylbenzylphthalate	82	100	82	1-152
naphthalene	61	100	61	21-133	benzo(a)anthracene	81	100	81	33-143
hexachloro-1,3-butadiene	57	100	57	24-120	chrysene	78	100	78	17-168
4-chloro-3-methylphenol	89	100	89	22-147	3,3'-dichlorobenzidine	U	NA	NA	1-262
hexachlorocyclopentadiene	50	100	50	30-150	bis(2-ethylhexyl)phthalate	41	100	41	8-158
2,4,6-trichlorophenol	88	100	88	37-144	di-n-octylphthalate	46	100	46	4-146
2-chloronaphthalene	66	100	66	60-120	benzo(b)fluoranthene	90	100	90	24-159
acenaphthylene	68	100	68	33-145	benzo(k)fluoranthene	90	100	90	11-162
dimethylphthalate	73	100	73	1-120	benzo(a)pyrene	88	100	88	17-163
2,6-dinitrotoluene	77	100	77	50-158	indeno(1,2,3-cd)pyrene	106	100	106	1-171
2,4-dinitrotoluene	81	100	81	39-139	dibenzo(a,h)anthracene	99	100	99	1-227
					benzo(g,h,i)perylene	100	100	100	1-219

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	57	25-175	nitrobenzene-d5	76	22-178
phenol-d5	47	24-176	2-fluorobiphenyl	72	38-162
2,4,6-tribromophenol	117	24-176	terphenyl-d14	92	53-147

U = Below quantitation limit  
NA = Not added or evaluated.

ESI

[illegible]

[illegible]

10/19/18

MW

[illegible]

10119118

Counted By: MW

# MICROBIOLOGICAL ASSAY DATA SHEET

Client: Underwood Engineers	Date: 10/18/18	Initials: MW
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ESI #: 31233	Col.Dil.H <sub>2</sub> O: M-3323	M-El: M-3322
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Date collected: 10/18/18	Pipette Used: A-5025, A-5003	Positive lot #: EF8092818A
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Col.Dil.H<sub>2</sub>O: M-3323

M-El: M-3322

Pipette Used: A-5025, A-5003

Positive lot #: EFB092818A

[illegible]

M-EI stored in Incubator #309	Temp: 40.8	1318	10/18/18	to	1437	10/19/18
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Method EPA 1600	Counted:	1437	10/19/18	Counted By: MW
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## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 1 of 2

STUDY NO: 31233  
 SDG No: October 2018  
 Project: Piscataqua River  
 Delivered via: ESI  
 Date and Time Received: 10/18/18 1100 Date and Time Logged into Lab: 10/18/18 1338  
 Received By: MW Logged into Lab by: ELJ *ELJ*  
 Air bill / Way bill: No Air bill included in folder if received? NA  
 Cooler on ice/packs: Yes Custody Seals present? NA  
 Cooler Blank Temp (C) at arrival: 13.1 Custody Seals intact? NA  
 Number of COC Pages: 5  
 COC Serial Number(s): A1016844  
 COC Complete: Does the info on the COC match the samples? Yes  
     Sampled Date: Yes Were samples received within holding time? Yes  
     Field ID complete: Yes Were all samples properly labeled? Yes  
     Sampled Time: No Were proper sample containers used? Yes  
     Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
 COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
 Were all samples received? Yes Were VOC vials free of headspace? Yes  
 Client notification/authorization: Required pH Test strip ID number: A-5084

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
PEASE_002	31233-001	W	BOD	500 P	4 C	Yes
PEASE_002DUP	31233-002	W	BOD	500 P	4 C	Yes
PEASE_002	31233-003	W	Enterococci	100 mL Ster	4 C	Yes
PEASE_002	31233-004	W	FC	100 mL Ster	4 C	Yes
PEASE_002	31233-005	W	TSS	1000 P	4 C	Yes
PEASE_002	31233-006	W	NH3	125 mL P	H2SO4	Yes
PEASE_002DUP	31233-007	W	NH3	125 mL P	H2SO4	Yes
PEASE_002	31233-008	W	TRC	500 mL P	4 C	Yes
PEASE_002	31233-009	W	TKN,NO3+NO2,TN	500 mL P	H2SO4	Yes
PEASE_002DUP	31233-010	W	TKN,NO3+NO2,TN	500 mL P	H2SO4	Yes
PEASE_002	31233-011	W	OG	2x1000 G	H2SO4	Yes
PEASE_002	31233-012	W	TP	250mL	H2SO4	Yes
PEASE_002DUP	31233-013	W	TP	250mL	H2SO4	Yes
PEASE_002	31233-014	W	TDS	1000 P	4 C	Yes
PEASE_002DUP	31233-015	W	TDS	1000 P	4 C	Yes
PEASE_002	31233-016	W	Turbidity	250 P	4 C	Yes
PEASE_002	31233-017	W	TPhen	1000 G	H2SO4	Yes
PEASE_002DUP	31233-018	W	TPhen	1000 G	H2SO4	Yes
PEASE_002	31233-020	W	VOC624	2x40 mL	4 C	Yes
PEASE_002	31233-022	W	HOLD VOC624	2x40 mL	HCl	Yes
PEASE_002	31233-024	W	ABN625	2x1000 G	4 C	Yes
PEASE_002	31233-026	W	DO,pH, Temperature, Conductivity	1000 P	4 C	Yes
NEW_002	31233-027	W	BOD	500 P	4 C	Yes

Notes and qualifications:

See COC

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 2 of 2

STUDY NO: 31233  
 SDG No: October 2018  
 Project: Piscataqua River  
 Delivered via: ESI  
 Date and Time Received: 10/18/18 1100 Date and Time Logged into Lab: 10/18/18 1338  
 Received By: MW Logged into Lab by: ELJ  
 Air bill / Way bill: No Air bill included in folder if received? NA  
 Cooler on ice/packs: Yes Custody Seals present? NA  
 Cooler Blank Temp (C) at arrival: 13.1 Custody Seals intact? NA  
 Number of COC Pages: 5  
 COC Serial Number(s): A1016844  
 COC Complete: Does the info on the COC match the samples? Yes  
     Sampled Date: Yes Were samples received within holding time? Yes  
     Field ID complete: Yes Were all samples properly labeled? Yes  
     Sampled Time: No Were proper sample containers used? Yes  
     Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
 COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
 Were all samples received? Yes Were VOC vials free of headspace? Yes  
 Client notification/authorization: Required pH Test strip ID number: A-5084

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NEW_002	31233-028	W	Enterococci	100 mL Steri 4 C		Yes
NEW_002	31233-029	W	FC	100 mL Steri 4 C		Yes
NEW_002	31233-030	W	TSS	1000 P	4 C	Yes
NEW_002	31233-031	W	NH3	125 mL P	H2SO4	Yes
NEW_002DUP	31233-032	W	NH3	125 mL P	H2SO4	Yes
NEW_002	31233-033	W	TRC	500 mL P	4 C	Yes
NEW_002	31233-034	W	TKN,NO3+NO2,TN	500 mL P	H2SO4	Yes
NEW_002DUP	31233-035	W	TKN,NO3+NO2,TN	500 mL P	H2SO4	Yes
NEW_002	31233-036	W	OG	2x1000 G	H2SO4	Yes
NEW_002	31233-037	W	TP	250mL	H2SO4	Yes
NEW_002DUP	31233-038	W	TP	250mL	H2SO4	Yes
NEW_002	31233-039	W	TDS	1000 P	4 C	Yes
NEW_002	31233-040	W	Turbidity	250 P	4 C	Yes
NEW_002	31233-041	W	TPhen	1000 G	H2SO4	Yes
NEW_002	31233-043	W	VOC624	2x40 mL	4 C	Yes
NEW_002	31233-045	W	HOLD VOC624	2x40 mL	HCl	Yes
NEW_002	31233-047	W	ABN625	2x1000 G	4 C	Yes
NEW_002	31233-049	W	DO,pH,Temperature,Conductivity	1000 P	4 C	Yes

Notes and qualifications:

See COC



## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 1 of 1

STUDY NO: 31233  
SDG No:  
Project: Piscataqua River  
Delivered via: ESI  
Date and Time Received: 10/18/18 1645 Date and Time Logged into Lab: 10/19/18 1145  
Received By: MG Logged into Lab by: KL *KL*  
Air bill / Way bill: No Air bill included in folder if received? NA  
Cooler on ice/packs: Yes Custody Seals present? NA  
Cooler Blank Temp (C) at arrival: 2.3 Custody Seals intact? NA  
Number of COC Pages: 2  
COC Serial Number(s): A1016844  
COC Complete: Does the info on the COC match the samples? Yes  
Sampled Date: Yes Were samples received within holding time? Yes  
Field ID complete: Yes Were all samples properly labeled? Yes  
Sampled Time: Yes Were proper sample containers used? Yes  
Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
Were all samples received? Yes Were VOC vials free of headspace? NA  
Client notification/authorization: Not required pH Test strip ID number: A-4177

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
RIVER_002	31233-050	W	BOD	500mL P	4 C	Yes
RIVER_002	31233-051	W	Enterococci	100mL le	4 C	Yes
RIVER_002	31233-052	W	FC	100mL le	4 C	Yes
RIVER_002	31233-053	W	TSS	1000mL P	4 C	Yes
RIVER_002	31233-054	W	NH3	125mL P	H2SO4	Yes
RIVER_002DUP	31233-055	W	NH3	125mL P	H2SO4	Yes
RIVER_002	31233-056	W	TKN,NO3+NO2,TN	500mL P	H2SO4	Yes
RIVER_002DUP	31233-057	W	TKN,NO3+NO2,TN	500mL P	H2SO4	Yes
RIVER_002	31233-058	W	OG	2x1000mL G	H2SO4	Yes
RIVER_002	31233-059	W	TP	250mL P	H2SO4	Yes
RIVER_002DUP	31233-060	W	TP	250mL P	H2SO4	Yes
RIVER_002	31233-061	W	TDS	1000mL P	4 C	Yes
RIVER_002	31233-062	W	Turbidity	250mL P	4 C	Yes
RIVER_002	31233-063	W	TPhen	1000mL G	H2SO4	Yes
RIVER_002TP	31233-064	W	TPhen	1000mL G	H2SO4	Yes
RIVER_002	31233-065	W	VOC624	2x40mL G	4 C	Yes
RIVER_002TP	31233-066	W	VOC624	2x40mL G	4 C	Yes
RIVER_002	31233-067	W	HOLD VOC624	2x40mL G	HCl	Yes
RIVER_002TP	31233-068	W	HOLD VOC624	2x40mL G	HCl	Yes
RIVER_002	31233-069	W	ABN625	2x1000mL G	4 C	Yes
RIVER_002TP	31233-070	W	ABN625	2x1000mL G	4 C	Yes

Notes and qualifications:

## CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River								
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001								
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton								
Voice: 603-436-6192		Fax:		email: <i>S.Clifton@underwoodengineers.com</i>								
Protocol: NPDES												
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Grab or composite (G/C)	Container Size (mL)	No	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:		
001	PEASE_002	10/17/18	24hr	C	500	1	4 C	Water	N	BOD ✓		
002	PEASE_002DUP	11	11	C	500	1	4 C	Water	N	BOD ✓		
003	PEASE_002	10/18/18	9:35A	G	100	1	4 C	Water	N	Enterococci ✓		
004	PEASE_002	10/18/18	9:35A	G	100	1	4 C	Water	N	FC ✓		
005	PEASE_002	10/17/18	24hr	C	1000	1	4 C	Water	N	TSS ✓		
006	PEASE_002	11	11	C	125	1	H2SO4	Water	N	NH3 ✓		
007	PEASE_002DUP	11	11	C	125	1	H2SO4	Water	N	NH3 ✓		
008	PEASE_002	10/18/18	9:35A	G	500	1	4 C	Water	N	TRC ✓		
009	PEASE_002	10/17/18	24hr	C	500	1	H2SO4	Water	N	TKN, NO3+NO2, TN ✓		
010	PEASE_002DUP	11	11	C	500	1	H2SO4	Water	N	TKN, NO3+NO2, TN ✓		
011	PEASE_002	10/18/18	9:35A	G	1000	2	H2SO4	Water	N	OG ✓		
012	PEASE_002	10/17/18	24hr	C	250mL	1	H2SO4	Water	N	TP ✓		
Relinquished By: <i>Tom Dale</i>		Date: 10/18/18		Time: 11AM		Received By: <i>Mutter</i>					Date: 10/18/18	Time: 1100
Relinquished By:		Date:		Time:		Received at Lab By:					Date:	Time:

Comments: Analysis for Sample -008 completed in field.

T: 13.7°C

COC Number: A1016844

Sample Delivery Group No: October 2018

Page 1 of 3

## CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River							
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001							
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton							
Voice: 603-436-6192		Fax:		email:							
Protocol: NPDES											
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Grab or com- posite (G/C)	Container Size (mL)	No	Type (P/G/T)	Field Preser- vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
013 PEASE_002DUP		10/17/18	24hr	C	250m	1	mL	H2SO4	Water	N	TP ✓
014 PEASE_002		"	"	C	1000	1	P	4 C	Water	N	TDS ✓
015 PEASE_002DUP		"	"	C	1000	1	P	4 C	Water	N	TDS ✓
016 PEASE_002		10/18/18	9:25A	G	250	1	P	4 C	Water	N	Turbidity ✓
017 PEASE_002		10/17/18	24hr	C	1000	1	G	H2SO4	Water	N	TPhen ✓
018 PEASE_002DUP		"	"	C	1000	1	G	H2SO4	Water	N	TPhen ✓
019 PEASE_002TP		"	"	C	1000	1	G	H2SO4	Water	N	TPhen ✓
020 PEASE_002		10/18/18	9:30A	G	40m	2	mL	4 C	Water	N	VOC624 ✓
021 PEASE_002TP		"	9:30A	G	40m	2	mL	4 C	Water	N	VOC624 ✓
022 PEASE_002		"	9:30A	G	40m	2	mL	HCl	Water	N	HOLD VOC624 ✓
023 PEASE_002TP		"	9:30A	G	40m	2	mL	HCl	Water	N	HOLD VOC624 ✓
024 PEASE_002		10/17/18	24hr	C	1000	2	G	4 C	Water	N	ABN625 ✓
Relinquished By: <i>Sam Reed</i>		Date: 10/18/18		Time: 11AM		Received By: <i>Mustafa Hudaib</i>		Date: 10/18/18		Time: 1100	
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:	

Comments: 7-13.7°C

## CHAIN OF CUSTODY DOCUMENTATION

[illegible]

Comments: Analysis for sample -026 completed in field.

$T = 13.7^{\circ}\text{C}$

COC Number: A1016844



## CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River								
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001								
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton								
Voice: 603-436-6192		Fax:		email:								
Protocol: NPDES												
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com- posite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preser- vation	Matrix S-Solid W-Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
027 NEW_002		10/17/18	24h	UE	C	1	500	P	4 C	Water	N	BOD ✓
028 NEW_002		10/18/18	8:30A		G	1	100	le	4 C	Water	N	Enterococci ✓
029 NEW_002		10/18/18	8:30A		G	1	100	le	4 C	Water	N	FC ✓
030 NEW_002		10/18/18	8:30A		C	1	1000	P	4 C	Water	N	TSS ✓
031 NEW_002		11	24h		C	1	125	P	H2SO4	Water	N	NH3 ✓
032 NEW_002DUP		11	11		C	1	125	P	H2SO4	Water	N	NH3 ✓
033 NEW_002		10/18/18	8:45A		G	1	500	P	4 C	Water	N	TRC ✓
034 NEW_002		10/17/18	24h		C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN ✓
035 NEW_002DUP		11	11		C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN ✓
036 NEW_002		10/18/18	8:35A		G	2	1000	G	H2SO4	Water	N	OG ✓
037 NEW_002		10/17/18	24h		C	1	250m	mL	H2SO4	Water	N	TP ✓
038 NEW_002DUP		11	11		C	1	250m	mL	H2SO4	Water	N	TP ✓
Relinquished By: <i>Teri Paul</i>		Date: 10/18/18		Time: 11AM		Received By: <i>Mudrot/Water</i>		Date: 10/18/18		Time: 1100		
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:		

Comments: Analysis for sample -033 completed in field.

T: 13.1°C



EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No:

31233

# CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River								
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001								
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton								
Voice: 603-436-6192		Fax:		email: <i>sc.clifton@underwoodengr.com</i>								
Protocol: NPDES												
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
039	NEW_002	10/17/18	24-hr 03:00	UE	C	1	1000	P	4 C	Water	N	TDS ✓
040	NEW_002	10/18/18	8:35A	"	G	1	250	P	4 C	Water	N	Turbidity ✓
041	NEW_002	10/17/18	24-hr 03:00	UE	C	1	1000	G	H2SO4	Water	N	TPhen ✓
042	NEW_002TP				C	1	1000	G	H2SO4	Water	N	TPhen
043	NEW_002	10/18/18	8:40A		G	2	40 mL	mL	4 C	Water	N	VOC624 ✓
044	NEW_002TP					2	40 mL	mL	4 C	Water	N	VOC624
045	NEW_002	10/18/18	8:40A		G	2	40 mL	mL	HCl	Water	N	HOLD VOC624 ✓
046	NEW_002TP					2	40 mL	mL	HCl	Water	N	HOLD VOC624
047	NEW_002	10/17/18	24-hr 03:00	UE	C	2	1000	G	4 C	Water	N	ABN625 ✓
048	NEW_002TP					2	1000	G	4 C	Water	N	ABN625
049	NEW_002	10/18/18	8:45A		G	1	1000	P	4 C	Water	N	DO, pH, Temperature, Conductivity ✓
Relinquished By: <i>Tim Doherty</i>		Date: 10/18/18		Time: 11AM		Received By: <i>Steve Clifton</i>		Date: 10/18/18		Time: 1100		
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:		

Comments: Analysis for sample -049 completed in field.

24hr Composite 10/17/18 7:51AM - 10/18/18 12:54AM

COC Number: A1016844

T=13.1°C

Sample Delivery Group No: October 2018

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EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31273

# CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River								
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001								
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton								
Voice: 603-436-6192		Fax:		email:								
Protocol: NPDES												
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
050 RIVER_002		10/19/18	15:50	SS	G	1	500	P	4 C	Water	N	BOD
051 RIVER_002			16:10			1	100	le	4 C	Water	N	Enterococci
052 RIVER_002			16:10			1	100	le	4 C	Water	N	FC
053 RIVER_002			15:50			1	1000	P	4 C	Water	N	TSS
054 RIVER_002			15:45			1	125	P	H2SO4	Water	N	NH3
055 RIVER_002DUP						1	125	P	H2SO4	Water	N	NH3
056 RIVER_002						1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
057 RIVER_002DUP						1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
058 RIVER_002						2	1000	G	H2SO4	Water	N	OG
059 RIVER_002						1	250m	mL	H2SO4	Water	N	TP
060 RIVER_002DUP						1	250m	mL	H2SO4	Water	N	TP
061 RIVER_002			15:50			1	1000	P	4 C	Water	N	TDS
Relinquished By: S. Jones		Date: 10/19/18	Time: 2:45 PM	Received By: M. Gagne		Date: 10/18/18	Time: 4:45					
Relinquished By:		Date:	Time:	Received at Lab By:		Date:	Time:					

Comments:

2.75 0.112

COC Number: A1016944

Sample Delivery Group No: October 2018

Page of



EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31233

### CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River								
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001								
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton								
Voice: 603-436-6192		Fax:		email:								
Protocol: NPDES												
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
062 RIVER_002		10/18/18	16 <sup>00</sup>	SJ	G	1	250	P	4 C	Water	N	Turbidity
063 RIVER_002			15 <sup>30</sup>			1	1000	G	H2SO4	Water	N	TPhen
064 RIVER_002TP			15 <sup>30</sup>			1	1000	G	H2SO4	Water	N	TPhen
065 RIVER_002						2	40 m	mL	4 C	Water	N	VOC624
066 RIVER_002TP						2	40 m	mL	4 C	Water	N	VOC624
067 RIVER_002			15 <sup>40</sup>			2	40 m	mL	HCl	Water	N	HOLD VOC624
068 RIVER_002TP			15 <sup>40</sup>			2	40 m	mL	HCl	Water	N	HOLD VOC624
069 RIVER_002			16 <sup>00</sup>			2	1000	G	4 C	Water	N	ABN625
070 RIVER_002TP						2	1000	G	4 C	Water	N	ABN625
071 RIVER_002						1	1000	P	4 C	Water	N	DO, pH, Temperature, Conductivity
Relinquished By: SJ		Date: 10/18/18		Time: 4:45 PM		Received By: M. G. [Signature]		Date: 10/18/18		Time: 4:45		
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:		

Comments: Analysis for sample -071 completed in field.

2.3° on ice

COC Number: A1016844

Sample Delivery Group No: October 2018

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## ANALYTICAL REPORT

Lab Number:	L1842635
Client:	Enthalpy Analytical 1 Lafayette Road PO Box 778 Hampton, NH 03843
ATTN:	Jason Hobbs
Phone:	(603) 926-3345
Project Name:	31233
Project Number:	Not Specified
Report Date:	10/30/18

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

---

Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



Project Name: 31233  
Project Number: Not Specified

Lab Number: L1842635  
Report Date: 10/30/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1842635-01	31233-017	WATER	Not Specified	10/18/18 00:00	10/19/18
L1842635-02	31233-018	WATER	Not Specified	10/18/18 00:00	10/19/18
L1842635-03	31233-041	WATER	Not Specified	10/18/18 00:00	10/19/18
L1842635-04	31233-063	WATER	Not Specified	10/18/18 15:30	10/19/18
L1842635-05	31233-064	WATER	Not Specified	10/18/18 15:30	10/19/18

**Project Name:** 31233  
**Project Number:** Not Specified

**Lab Number:** L1842635  
**Report Date:** 10/30/18

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE" respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

#### HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

**Project Name:** 31233  
**Project Number:** Not Specified

**Lab Number:** L1842635  
**Report Date:** 10/30/18


**Case Narrative (continued)**

**Sample Receipt**

The samples were received at the laboratory above the required temperature range and were not on ice.  
The analyses performed were specified by the client.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Michelle M. Morris

Title: Technical Director/Representative

Date: 10/30/18

# **INORGANICS & MISCELLANEOUS**

**Project Name:** 31233  
**Project Number:** Not Specified

**Lab Number:** L1842635  
**Report Date:** 10/30/18

**SAMPLE RESULTS**

**Lab ID:** L1842635-01  
**Client ID:** 31233-017  
**Sample Location:** Not Specified

**Date Collected:** 10/18/18 00:00  
**Date Received:** 10/19/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	—	1	10/22/18 04:44	10/23/18 05:52	4,420.1	GD



**Project Name:** 31233  
**Project Number:** Not Specified

**Lab Number:** L1842635  
**Report Date:** 10/30/18

**SAMPLE RESULTS**

**Lab ID:** L1842635-02  
**Client ID:** 31233-018  
**Sample Location:** Not Specified

**Date Collected:** 10/18/18 00:00  
**Date Received:** 10/19/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	10/22/18 04:44	10/23/18 05:53	4,420.1	GD



**Project Name:** 31233  
**Project Number:** Not Specified

**Lab Number:** L1842635  
**Report Date:** 10/30/18

**SAMPLE RESULTS**

**Lab ID:** L1842635-03  
**Client ID:** 31233-041  
**Sample Location:** Not Specified

**Date Collected:** 10/18/18 00:00  
**Date Received:** 10/19/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	—	1	10/22/18 04:44	10/23/18 05:54	4,420.1	GD





Serial\_No:10301812:22

**Project Name:** 31233  
**Project Number:** Not Specified

**Lab Number:** L1842635  
**Report Date:** 10/30/18

### SAMPLE RESULTS

**Lab ID:** L1842635-04  
**Client ID:** 31233-063  
**Sample Location:** Not Specified

**Date Collected:** 10/18/18 15:30  
**Date Received:** 10/19/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	10/22/18 04:44	10/23/18 05:55	4,420.1	GD



Serial\_No:10301812:22

**Project Name:** 31233  
**Project Number:** Not Specified

**Lab Number:** L1842635  
**Report Date:** 10/30/18

### SAMPLE RESULTS

**Lab ID:** L1842635-05  
**Client ID:** 31233-064  
**Sample Location:** Not Specified

**Date Collected:** 10/18/18 15:30  
**Date Received:** 10/19/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	—	1	10/22/18 04:44	10/23/18 05:56	4,420.1	GD



Project Name: 31233  
Project Number: Not Specified

Lab Number: L1842635  
Report Date: 10/30/18

**Method Blank Analysis**  
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1170758-1										
Phenolics, Total	ND		mg/l	0.030	--	1	10/22/18 04:44	10/23/18 05:50	4,420.1	GD



## Lab Control Sample Analysis

Batch Quality Control

Lab Number: L1842635  
Report Date: 10/30/18

Project Name: 31233  
Project Number: Not Specified

Parameter	LCS		LCSD		%Recovery		Limits		RPD	Qual	RPD Limits
General Chemistry - Westborough Lab	Associated sample(s):	01-05	Batch: WG1170758-2								
Phenolics, Total	93						70-130				

**Matrix Spike Analysis**  
Batch Quality Control

Project Name: 31233

Project Number: Not Specified

Lab Number: L1842635

Report Date: 10/30/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1170758-4 QC Sample: L1842635-05 Client ID: 31233-064									
Phenolics, Total	ND	0.4	0.45	113	-	-	70-130	-	20

**Lab Duplicate Analysis**  
*Batch Quality Control*

Project Name: 31233

Project Number: Not Specified

Lab Number: L1842635

Report Date: 10/30/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1170758-3 QC Sample: L1842635-05 Client ID: 31233-064						
Phenolics, Total	ND	ND	mg/l	NC		20

Serial\_No:10301812:22  
Lab Number: L1842635  
Report Date: 10/30/18

Project Name: 31233  
Project Number: Not Specified

Sample Receipt and Container Information

YES

Were project specific reporting limits specified?

Cooler Information  
Cooler A  
Custody Seal Absent

Container Information		Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
Container ID	Container Type								
L1842635-01A	Glass 1000ml unpreserved	A	<2	<2	8.6	Y	Absent		TPHENOL-420(28)
L1842635-02A	Glass 1000ml unpreserved	A	<2	<2	8.6	Y	Absent		TPHENOL-420(28)
L1842635-03A	Glass 1000ml unpreserved	A	<2	<2	8.6	Y	Absent		TPHENOL-420(28)
L1842635-04A	Glass 1000ml unpreserved	A	<2	<2	8.6	Y	Absent		TPHENOL-420(28)
L1842635-05A	Glass 1000ml unpreserved	A	<2	<2	8.6	Y	Absent		TPHENOL-420(28)

**Project Name:** 31233  
**Project Number:** Not Specified

**Lab Number:** L1842635  
**Report Date:** 10/30/18

## GLOSSARY

### Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'hold'.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

**Report Format:** Data Usability Report





**Project Name:** 31233  
**Project Number:** Not Specified

**Lab Number:** L1842635  
**Report Date:** 10/30/18

#### Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

**Project Name:** 31233  
**Project Number:** Not Specified

**Lab Number:** L1842635  
**Report Date:** 10/30/18

#### REFERENCES

- 4 Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983.

#### LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.  
 Facility: **Company-wide**  
 Department: **Quality Assurance**  
 Title: **Certificate/Approval Program Summary**

ID No.: **17873**  
 Revision **12**  
 Published Date: 10/9/2018 4:58:19 PM  
 Page 1 of 1

## Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

### Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene  
 EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.  
 EPA 8270D: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.  
 EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

SM 2540D: TSS  
 EPA 8082A: NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.  
 EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.  
 Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

### Westborough Facility:

#### Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; EPA 353.2: Nitrate-N, Nitrite-N; SM4500NO<sub>3</sub>-F: Nitrate-N, Nitrite-N; SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B  
 EPA 332: Perchlorate; EPA 524.2: THMs and VOCs; EPA 504.1: EDB, DBCP.  
 Microbiology: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.

#### Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH<sub>3</sub>-BH: Ammonia-N and Kjeldahl-N, EPA 350.1: Ammonia-N, LACHAT 10-107-06-1-B: Ammonia-N, EPA 351.1, SM4500NO<sub>3</sub>-F, EPA 353.2: Nitrate-N, SM4500P-E, SM4500P-B, E, SM4500SO<sub>4</sub>-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.  
 EPA 624.1: Volatile Halocarbons & Aromatics,  
 EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs  
 EPA 625.1: SVOC (Acid/Base/Neutral Extractables), EPA 600/4-81-045: PCB-Oil.  
 Microbiology: SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.

### Mansfield Facility:

#### Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. EPA 200.8: Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. EPA 245.1 Hg.  
 EPA 522.

#### Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.  
 EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.  
 EPA 245.1 Hg.  
 SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

L-1842-635

**ENVIROSYSTEMS, INCORPORATED**

P.O. Box 778, Hampton, New Hampshire 03842

**EnviroSystems, Inc.**

CONTACT:  
Jason Hobbs  
Email: [jason@redhat.com](mailto:jason@redhat.com)  
CC: [catherine@redhat.com](mailto:catherine@redhat.com)

REPORT TO: Jason Hobbs

P.O. Box 778

**INVOICE TO:**  
**Jason Hobbs**

Hampton, NH 03843

ESI Study Number: 31233

**Customer Services: Phone # (603) 926-3345  
Fax # (603) 926-3521**

PAGE 4 OF 1

PROJECT NAME:

P.O. #

Email: [jason.hobbs@enthalpy.com](mailto:jason.hobbs@enthalpy.com)  
CC: [catherine.sasso@enthalpy.com](mailto:catherine.sasso@enthalpy.com)

PHONE  
Ext. 208

SAMPLED BY

١٢٤

Program Requirements: ☐ NPDES ☐ RCRA ☐ USACE ☐ EPA ☐ OTHER

SAMPLE #	YOUR FIELD IDENTIFICATION (MUST AGREE WITH CONTAINER)	DATE SAMPLED	TIME SAMPLED	COMPOSITE (GRAB)	E-EFFLUENT D-DILUENT O-OTHER	CONTAINER #VOLUME	FIELD PRESERVED	ANALYSIS REQUESTED (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
	31233-017	10/18/18	0000	C		1x 1000 mL G	H2504	
	31233-018	10/18/18	0000	C		1x 1000 mL G	H2504	
	31233-041	10/18/18	0000	C		1x 1000 mL G	H2504	
	31233-063	10/18/18	1530	C		1x 1000 mL G	H2504	
	31233-064	10/18/18	1530	C		1x 1000 mL G	H2504	
								Reminders below:
								Please email report
								NH ELAP Cert. with report

RELINQUISHED BY:

ACQUIRED BY: *M. GRENE*

DATE: 10/19/18

TIME: 8:59

RECEIVED BY:

RECEIVED BY: *Chin - leen*

DATE: TIME:

DATE: 10/19/18 TIME: 8:59

## Analytical Report Review Checklist

DATE IN: 10/18/2018  
 DATE DUE: 11/01/2018

STUDY #: 31233  
 CLIENT: Underwood Engineers, Inc.  
 PROJECT: Piscataqua River

EDD Required Yes ☒ No

QC Report Pages Required: Yes ☒ No

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	10/18/18	ELJ	REVIEWED 10/22/18 AM
Sample Receipt Complete	10/18/18	ELJ	↓
QC Reports Generated			
EDD Generated			
Analytical Components Complete	11/09/18	AM	
Data Acceptability Review	↓	↓	
Analytical Reports Generated	↓	↓	
Microbiology Report Generated	11/7/18	LF	MICRO reviewed: 11/12/18

Technical Report Review	Date	Initials	Comments
All Elements of QC Reports Incorporated, MDL, etc.			
EDD Checked and Results Saved			
Data Appendix Compiled			
Analytical Report Reviewed	11/12/18	AM	
QA Audit / Review Complete			
Final Report Reviewed and Authorized	11/12/18	JWT	
Final Reports Printed - PDF	11/13/18	AM	
Hard Copy Sent or E-Mailed To Client	↓	↓	
Report Logged Out / Invoice Sent	↓	↓	
Report Scanned to Archive	↓	↓	

## Microbiology Report Review Checklist

STUDY #: 31233

CLIENT: Underwood Engineers

PROJECT: \_\_\_\_\_

DATE IN: 10/18/18

DATE DUE: \_\_\_\_\_

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	10/19/18	MW	
Sample Receipt Complete	↓	↓	
Bench Sheets Complete (dates, times, initials, etc...)	↓	↓	

Technical Report Review	Date	Initials	Comments
Data Acceptability Review	11/7/18	LF	
Draft Report	↓	↓	
Final Report Reviewed	11/12/18	CS	
QA Audit / Review Complete			
Report Printed to PDF	11/12/18	CS	
Report scanned to archive	/		See Analytical report review checklist
Report Sent to Client			
Invoice Sent			





Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

02 January 2019

Tim Puls  
Underwood Engineers  
25 Vaughan Mall  
Portsmouth, NH 03801  
RE: Trace Metals In Wastewater

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Amy Goodall". The signature is written in a cursive, flowing style.

Amy Goodall  
Project Manager





Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
NEW_02 NEW_01_TM	8J01082-01	Water	18-Oct-18 00:00	29-Oct-18 10:10
NEW_02 NEW_02_TM	8J01082-02	Water	18-Oct-18 00:00	29-Oct-18 10:10
NEW_02 NEW_EB_TM	8J01082-03	Water	17-Oct-18 06:50	29-Oct-18 10:10
NEW_02 NEW_01_THg	8J01082-06	Water	18-Oct-18 00:00	29-Oct-18 10:10
NEW_02 NEW_02_THg	8J01082-07	Water	18-Oct-18 00:00	29-Oct-18 10:10
NEW_02 NEW_EB_THg	8J01082-08	Water	17-Oct-18 06:55	29-Oct-18 10:10
PEASE_02 PEASE_01_TM	8J01082-10	Water	18-Oct-18 00:00	29-Oct-18 10:10
PEASE_02 PEASE_02_TM	8J01082-11	Water	18-Oct-18 00:00	29-Oct-18 10:10
PEASE_02 PEASE_EB_TM	8J01082-12	Water	17-Oct-18 07:40	29-Oct-18 10:10
PEASE_02 PEASE_01_THg	8J01082-15	Water	18-Oct-18 00:00	29-Oct-18 10:10
PEASE_02 PEASE_02_THg	8J01082-16	Water	18-Oct-18 00:00	29-Oct-18 10:10
PEASE_02 PEASE_EB_THg	8J01082-17	Water	17-Oct-18 07:45	29-Oct-18 10:10

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager

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Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

#### SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 29-Oct-18 10:10. The samples were received intact, on-ice within a sealed cooler at

Cooler	Temp C°
Default Cooler	16.2

Samples were shipped to Eurofins Calscience in Garden Grove, CA for the EPA SM4500 Total CN analysis per the initial project setup.

The subcontract report is located after the notes and definitions section of the EFGS report.

#### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total mercury by flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631E.

Samples were prepared and analyzed for total recoverable metals by inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 200.8 (EFGS-054).

#### ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries.

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Amy Goodall, Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
02-Jan-19 15:03

All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

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Amy Goodall, Project Manager

# Sample Receipt Checklist

Client: Underwood

Date & Time Received: 10/29/18 10:10

Date Labeled: 10/29/18 Labeled By: n

Project: Anti-Deg WWTF

Received By: [Signature]

Label Verified By: LEL 10-29-18

# of Coolers Received: 1 Samples Arrived By: \_\_\_\_\_ Shipping Service \_\_\_\_\_ Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (Specify: \_\_\_\_\_)

Coolant: ☒ None/Ambient ☐ Loose Ice ☐ Gel Ice ☐ Dry Ice Coolant Required ☒ Y/N Temp Blank Used ☒ Y/N for Cooler(s): 1

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y/N

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>Y</u>	
Custody seals signed:	<u>LEL</u>	

TID: <u>-240525</u> CF: <u>0.5</u> °C	Date/time: <u>10/29/18 10:10</u>	By: <u>LEL</u>
Cooler 1: <u>15.7</u> °C w/ CF: <u>16.2</u> °C	Cooler 4: °C w/ CF: °C	
Cooler 2: °C w/ CF: °C	Cooler 5: °C w/ CF: °C	
Cooler 3: °C w/ CF: °C	Cooler 6: °C w/ CF: °C	

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Preservation type:	<u>Y</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
Internal COC required:	<u>NA</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>Y</u>	

Anomalies/Non-conformances (attach additional pages if needed):

TCN samples in this work order were recieved  
on 10-26-18 within temperature range. LEL 10-30-18

8J01082





Frontier Global Sciences

# Chain of Custody Record & Laboratory Analysis Request:

Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

Page 1 of 2

8501082

Client: UNDERWOOD ENGINEERS, INC.						Contact: Tim Puls			Analyses Requested				EFGS PM:	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Phone: (603) 436-6192 Fax:							Date:	
Project Name: Anti-Degradation - WWTF						E-mail: tpuls@underwoodengineers.com							TAT (business days): <u>20</u> (std)	
Report To: Tim Puls						Contract/PO:							15 10 5 4 3 2 24 hrs.	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Invoice To: Client							(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)	
Phone: (603) 436-6192 Fax:						Address:							Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
E-mail: tpuls@underwoodengineers.com						Phone: Fax:							(If yes, please contact PM)	
E-mail: tpuls@underwoodengineers.com						E-mail:							EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	
													QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High	
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Total Metals (TM)	Total Cn (TCn)	Total Mercury (THg)	Comments		
1	NEW_02	NEW_01_TM	1	WW	10/15/18 24hr	UE	N	---	X			Total Metals include: Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Ni, Se, Ag, Tl, Zn		
2	NEW_02	NEW_02_TM	1	WW	"	UE	N	---	X					
3	NEW_02	NEW_EB_TM	1	RW	10/17/18 06:50	UE	N	---	X					
4	NEW_02	NEW_MS_TM	1	WW	10/18/18 24hr	UE	N	---	X					
5	NEW_02	NEW_01_TCn	1	WW	"	UE	N	NaOH		X				
6	NEW_02	NEW_01_THg	1	WW	"	UE	N	---			X			
7	NEW_02	NEW_02_THg	1	WW	"	UE	N	---			X			
8	NEW_02	NEW_EB_THg	1	RW	10/17/18 06:55	UE	N	---			X			
9	NEW_02	NEW_MS_THg	1	WW	10/18/18 24hr	UE	N	---			X			
10	PEASE_02	PEASE_01_TM	1	WW	"	UE	N	---	X					
11	PEASE_02	PEASE_02_TM	1	WW	"	UE	N	---	X					
12	PEASE_02	PEASE_EB_TM	1	RW	10/17/18 07:40	UE	N	---	X					
For Laboratory Use Only						Matrix Codes:			Relinquished By:		Received By:			
COC Seal: <u>W</u>						FW: Fresh Water			<u>Tim Puls</u>		<u>SN</u>			
Cooler Temp: <u>16.2</u>						WW: Waste Water			Name: <u>Tim Puls</u>		Name: <u>SN</u>			
Carrier: <u>UA</u>						SB: Sea and Brackish Water			Organization: <u>UE</u>		Organization: <u>SN</u>			
VTSR: <u>10/10</u>						SS: Soil and Sediment			Date & Time: <u>10/18/18 4PM</u>		Date & Time: <u>10/23/18 16:00</u>			
# of Coolers: <u>1</u>						TS: Plant and Animal Tissue			Tracking number: <u>34524468385</u>					
Sample Disposal:						TR: Trap			By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.					
<input type="checkbox"/> Return (shipping fees may apply)						OT: Other			Customer Approval: _____		Date: _____			
<input checked="" type="checkbox"/> Standard Disposal - 30 Days after report						RW: Reagent Water								
<input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)														



Frontier Global Sciences

Chain of Custody Record & Laboratory Analysis Request:  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

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http://www.FrontierGS.com

Page 2 of 2

Client: UNDERWOOD ENGINEERS, INC.						Contact: Tim Puls		Analyses Requested Total Metals (TM) Total Cn (TCn) Total Mercury (THg)	EFGS PM:	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Phone: (603) 436-6192 Fax:			Date:	
Project Name: Anti-Degradation - WWTF						E-mail: tpuls@underwoodengineers.com			TAT (business days): <u>20</u> (std)	
Report To: Tim Puls						Contract/PO:			15 10 5 4 3 2 24 hrs.	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Invoice To: Client			(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)	
Phone: (603) 436-6192 Fax:						Phone: Fax:		Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N		
E-mail: tpuls@underwoodengineers.com						E-mail:		(If yes, please contact PM)		
								EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N		
								QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High		
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)		Comments
1	PEASE_02	PEASE_MS_TM	1	WW	10/16/18 24-hr	UE	N	-	X	Total Metals include: Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Ni, Se, Ag, Tl, Zn
2	PEASE_02	PEASE_01_TCn	1	WW	"	"	N	NaOH	X	
3	PEASE_02	PEASE_01_THg	1	WW	"	"	N	-	X	
4	PEASE_02	PEASE_02_THg	1	WW	"	"	N	-	X	
5	PEASE_02	PEASE_EB_THg	1	RW	10/17/18 07:45	UE	N	-	X	
6	PEASE_02	PEASE_MS_THg	1	WW	10/16/18 24-hr	UE	N	-	X	
7										
8										
9										
10										
11										
12										

For Laboratory Use Only		Matrix Codes:		Relinquished By:		Received By:		Received By:	
COC Seal:	Comments:	FW: Fresh Water	TS: Plant and Animal Tissue TR: Trap OT: Other	Name: <u>Tim Puls</u>		Name:		Name:	
Cooler Temp:		WW: Waste Water		Name: <u>Tim Puls</u>		Name:		Name:	
Carrier:		SB: Sea and Brackish Water		Organization: <u>UE</u>		Organization:		Organization:	
VTSR:		SS: Soil and Sediment		Date & Time: <u>10/16/18 4PM</u>		Date & Time:		Date & Time:	
# of Coolers:		HC: Hydrocarbons		Tracking number:					

Sample Disposal:

☐ Return (shipping fees may apply)

☒ Standard Disposal - 30 Days after report

☐ Retain for \_\_\_\_\_ weeks after report (storage fees may apply)

RW: Reagent Water

By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.

Customer Approval: \_\_\_\_\_ Date: \_\_\_\_\_

**SUBCONTRACT ORDER**  
Eurofins Frontier Global Sciences, Inc.  
**8J01082**

**SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

**Analysis**

**Comments**

Sample ID: NEW\_02 NEW\_01\_TCn

EFGS Lab ID: 8J01082-05

Matrix: Water

Sampled: 18-Oct-18 00:00 (GMT-05:00) Eastern Time (US &  
Arrived on 10/26/18, temp 0.4C LEL 10/29/18

Due: 28-Nov-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

*Containers Supplied:*

250 mL PETG (A)

Sample ID: PEASE\_02 PEASE\_01\_TCn

EFGS Lab ID: 8J01082-14

Matrix: Water

Sampled: 18-Oct-18 00:00 (GMT-05:00) Eastern Time (US &  
Arrived on 10/26/18, temp 0.4C LEL 10/29/18

Due: 28-Nov-18 19:00

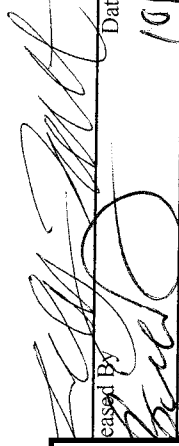
Misc. Subcontract 1

EPA SM4500 CN E

*Containers Supplied:*

250 mL PETG (A)

12 86w 050 01 51744334

  
Released By \_\_\_\_\_ Date 10-30-18  
Received By \_\_\_\_\_ Date 10/30/18



Frontier Global Sciences

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Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

NEW\_02 NEW\_01\_TM

8J01082-01

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	0.160	0.009	0.020	µg/L	1	F811325	12-Nov-18	8K16011	16-Nov-18	EPA 200.8	
Arsenic	0.87	0.10	0.30	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Beryllium	0.007	0.004	0.061	µg/L	1	F811325	12-Nov-18	8K26022	20-Nov-18	EPA 200.8	J
Cadmium	0.015	0.008	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	J
Chromium	0.42	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Copper	2.40	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Iron	57	1	10	µg/L	1	F811325	12-Nov-18	8K26022	20-Nov-18	EPA 200.8	
Lead	2.00	0.005	0.040	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Nickel	2.31	0.04	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Selenium	1.11	0.44	0.61	µg/L	1	F811325	12-Nov-18	8K26022	20-Nov-18	EPA 200.8	
Silver	0.267	0.002	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Zinc	93.2	0.16	0.50	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	

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Amy Goodall, Project Manager

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

NEW\_02 NEW\_02\_TM  
8J01082-02

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	0.169	0.009	0.020	µg/L	1	F811325	12-Nov-18	8K16011	16-Nov-18	EPA 200.8	
Arsenic	0.85	0.10	0.30	µg/L	1	F811271	12-Nov-18	8K26023	21-Nov-18	EPA 200.8	
Beryllium	0.005	0.004	0.061	µg/L	1	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	J
Cadmium	0.016	0.008	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	J
Chromium	0.29	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K26023	21-Nov-18	EPA 200.8	
Copper	2.30	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K26023	21-Nov-18	EPA 200.8	
Iron	57	1	10	µg/L	1	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	
Lead	1.96	0.005	0.040	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Nickel	2.12	0.04	0.10	µg/L	1	F811271	12-Nov-18	8K26023	21-Nov-18	EPA 200.8	
Selenium	1.31	0.44	0.61	µg/L	1	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	
Silver	0.263	0.002	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Zinc	91.2	0.16	0.50	µg/L	1	F811271	12-Nov-18	8K26023	21-Nov-18	EPA 200.8	

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

NEW\_02 NEW\_EB\_TM  
8J01082-03

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	ND	0.009	0.020	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	U
Arsenic	ND	0.10	0.30	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	U
Beryllium	ND	0.004	0.061	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	U
Cadmium	ND	0.008	0.020	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	U
Chromium	ND	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	U
Copper	0.03	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	J
Iron	ND	1	10	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	U
Lead	ND	0.005	0.040	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	U
Nickel	ND	0.04	0.10	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	U
Selenium	ND	0.44	0.61	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	U
Silver	ND	0.002	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Thallium	ND	0.006	0.020	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	U
Zinc	9.86	0.16	0.50	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
02-Jan-19 15:03

**NEW\_02 NEW\_01\_THg**  
**8J01082-06**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	1.45	0.08	0.50	ng/L	1	F810476	29-Oct-18	8K01002	31-Oct-18	EPA 1631E	

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
02-Jan-19 15:03

**NEW\_02 NEW\_02\_THg**  
**8J01082-07**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Mercury</b>	<b>0.75</b>	0.08	0.50	ng/L	1	F810476	29-Oct-18	8K01002	31-Oct-18	EPA 1631E	

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Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
02-Jan-19 15:03

**NEW\_02 NEW\_EB\_THg**  
**8J01082-08**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	ND	0.08	0.50	ng/L	1	F810476	29-Oct-18	8K01002	31-Oct-18	EPA 1631E	U

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Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

**PEASE\_02 PEASE\_01\_TM**  
**8J01082-10**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	0.315	0.009	0.020	µg/L	1	F811325	12-Nov-18	8K26022	20-Nov-18	EPA 200.8	
Arsenic	4.57	0.10	0.30	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Beryllium	ND	0.004	0.061	µg/L	1	F811325	12-Nov-18	8K26022	20-Nov-18	EPA 200.8	U
Cadmium	0.095	0.008	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Chromium	0.48	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Copper	19.8	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Iron	254	1	10	µg/L	1	F811325	12-Nov-18	8K26022	20-Nov-18	EPA 200.8	
Lead	0.224	0.005	0.040	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Nickel	4.61	0.04	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Selenium	1.35	0.44	0.61	µg/L	1	F811325	12-Nov-18	8K26022	20-Nov-18	EPA 200.8	
Silver	0.016	0.002	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	J
Thallium	ND	0.006	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Zinc	84.9	0.16	0.50	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	

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Reported:  
02-Jan-19 15:03

**PEASE\_02 PEASE\_02\_TM**  
**8J01082-11**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	0.193	0.009	0.020	µg/L	1	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	
Arsenic	4.52	0.10	0.30	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Beryllium	ND	0.004	0.061	µg/L	1	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	U
Cadmium	0.098	0.008	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Chromium	0.50	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Copper	19.1	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Iron	234	1	10	µg/L	1	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	
Lead	0.322	0.005	0.040	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Nickel	4.56	0.04	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	
Selenium	1.45	0.44	0.61	µg/L	1	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	
Silver	0.013	0.002	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	J
Thallium	ND	0.006	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Zinc	84.6	0.16	0.50	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	

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Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

PEASE\_02 PEASE\_EB\_TM  
8J01082-12

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	ND	0.009	0.020	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	U
Arsenic	0.14	0.10	0.30	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	J
Beryllium	ND	0.004	0.061	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	U
Cadmium	ND	0.008	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Chromium	0.05	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	J
Copper	0.07	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	J
Iron	3	1	10	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	J
Lead	0.010	0.005	0.040	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	J
Nickel	0.20	0.04	0.10	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	
Selenium	1.71	0.44	0.61	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	
Silver	ND	0.002	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Thallium	ND	0.006	0.020	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	U
Zinc	9.25	0.16	0.50	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	

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**PEASE\_02 PEASE\_01\_THg**  
**8J01082-15**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Mercury</b>	<b>2.16</b>	0.08	0.50	ng/L	1	F810476	29-Oct-18	8K01002	31-Oct-18	EPA 1631E	

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**PEASE\_02 PEASE\_02\_THg**  
**8J01082-16**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Mercury</b>	<b>2.14</b>	0.08	0.50	ng/L	1	F810476	29-Oct-18	8K01002	31-Oct-18	EPA 1631E	

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**PEASE\_02 PEASE\_EB\_THg**  
**8J01082-17**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	ND	0.08	0.50	ng/L	1	F810476	29-Oct-18	8K01002	31-Oct-18	EPA 1631E	U

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F810476 - EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Blank (F810476-BLK1)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810476-BLK2)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810476-BLK3)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810476-BLK4)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	ND	1.65	9.90	ng/L							QB-08, U
<b>LCS (F810476-BS1)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	14.30	0.08	0.50	ng/L	14.688		97.4	80-120			
<b>LCS Dup (F810476-BSD1)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	14.37	0.08	0.50	ng/L	14.688		97.8	80-120	0.481	24	
<b>Duplicate (F810476-DUP1)</b>		<b>Source: 8J00788-06</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	7.83	0.08	0.50	ng/L		7.96			1.66	24	AD
<b>Matrix Spike (F810476-MS1)</b>		<b>Source: 8J01082-06</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	5.83	0.08	0.50	ng/L	5.0702	1.45	86.5	71-125			AS
<b>Matrix Spike (F810476-MS2)</b>		<b>Source: 8J01082-15</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	11.16	0.08	0.50	ng/L	10.140	2.16	88.7	71-125			AS
<b>Matrix Spike (F810476-MS3)</b>		<b>Source: 8J01083-11</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	5.99	0.08	0.50	ng/L	5.0702	1.38	90.9	71-125			AS

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810476 - EFGS SOP2796 EPA 1631 Oxidation

<b>Matrix Spike Dup (F810476-MSD1)</b>		<b>Source: 8J01082-06</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	5.72	0.08	0.50	ng/L	5.0702	1.45	84.3	71-125	1.90	24	AS
<b>Matrix Spike Dup (F810476-MSD2)</b>		<b>Source: 8J01082-15</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	11.42	0.08	0.50	ng/L	10.140	2.16	91.3	71-125	2.33	24	AS
<b>Matrix Spike Dup (F810476-MSD3)</b>		<b>Source: 8J01083-11</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	5.71	0.08	0.50	ng/L	5.0702	1.38	85.3	71-125	4.83	24	AS

#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Blank (F811271-BLK1)</b>		Prepared: 12-Nov-18 Analyzed: 14-Nov-18									
Silver	0.002	0.002	0.020	µg/L							J
<b>Blank (F811271-BLK2)</b>		Prepared: 12-Nov-18 Analyzed: 14-Nov-18									
Silver	ND	0.002	0.020	µg/L							U
<b>Blank (F811271-BLK3)</b>		Prepared: 12-Nov-18 Analyzed: 15-Nov-18									
Arsenic	ND	0.10	0.30	µg/L							U
Silver	ND	0.002	0.020	µg/L							U
<b>Blank (F811271-BLK4)</b>		Prepared: 12-Nov-18 Analyzed: 15-Nov-18									
Arsenic	ND	0.10	0.30	µg/L							U
Silver	ND	0.002	0.020	µg/L							U
<b>LCS (F811271-BS1)</b>		Prepared: 12-Nov-18 Analyzed: 14-Nov-18									
Silver	25.00	0.010	0.100	µg/L	25.000		100	85-115			

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## Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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## Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>LCS (F811271-BS2)</b>					Prepared: 12-Nov-18 Analyzed: 15-Nov-18						
Arsenic	43.99	0.50	1.50	µg/L	50.000		88.0	85-115			
Silver	22.77	0.010	0.100	µg/L	25.000		91.1	85-115			
<b>LCS (F811271-BS3)</b>					Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	46.85	0.50	1.50	µg/L	50.000		93.7	85-115			
<b>LCS Dup (F811271-BSD1)</b>					Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	24.71	0.010	0.100	µg/L	25.000		98.8	85-115	1.18	20	
<b>LCS Dup (F811271-BSD2)</b>					Prepared: 12-Nov-18 Analyzed: 15-Nov-18						
Arsenic	42.68	0.50	1.50	µg/L	50.000		85.4	85-115	3.03	20	
Silver	21.80	0.010	0.100	µg/L	25.000		87.2	85-115	4.33	20	
<b>LCS Dup (F811271-BSD3)</b>					Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	47.99	0.50	1.50	µg/L	50.000		96.0	85-115	2.40	20	
<b>Matrix Spike (F811271-MS1)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	25.05	0.020	0.202	µg/L	25.000	0.267	99.1	70-130			
<b>Matrix Spike (F811271-MS2)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	23.85	0.020	0.202	µg/L	25.000	ND	95.4	70-130			
<b>Matrix Spike (F811271-MS3)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	58.20	1.01	3.04	µg/L	50.000	3.36	110	70-130			
Silver	21.78	0.020	0.202	µg/L	25.000	ND	87.1	70-130			
<b>Matrix Spike (F811271-MS4)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	59.38	1.01	3.04	µg/L	50.000	3.47	112	70-130			
Silver	21.63	0.020	0.202	µg/L	25.000	ND	86.5	70-130			

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811271-MS5)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	16.82	0.020	0.202	µg/L	20.500	0.267	80.7	70-130			AS
<b>Matrix Spike (F811271-MS6)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	14.78	0.020	0.202	µg/L	20.500	ND	72.1	70-130			AS
<b>Matrix Spike (F811271-MS7)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	371.4	1.01	3.03	µg/L	410.00	3.36	89.8	70-130			AS
Silver	15.09	0.020	0.202	µg/L	20.500	ND	73.6	70-130			AS
<b>Matrix Spike (F811271-MS8)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	363.2	1.01	3.03	µg/L	410.00	3.47	87.7	70-130			AS
Silver	14.85	0.020	0.202	µg/L	20.500	ND	72.4	70-130			AS
<b>Matrix Spike (F811271-MS9)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	47.34	1.01	3.04	µg/L	50.000	ND	94.7	70-130			
Silver	23.28	0.020	0.202	µg/L	25.000	0.267	92.1	70-130			
<b>Matrix Spike (F811271-MSA)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	53.92	1.01	3.04	µg/L	50.000	4.57	98.7	70-130			
Silver	23.56	0.020	0.202	µg/L	25.000	ND	94.2	70-130			
<b>Matrix Spike (F811271-MSB)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	402.8	1.01	3.03	µg/L	410.00	ND	98.2	70-130			AS
Silver	20.62	0.020	0.202	µg/L	20.500	0.267	99.3	70-130			AS
<b>Matrix Spike (F811271-MSC)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	419.0	1.01	3.03	µg/L	410.00	4.57	101	70-130			AS
Silver	20.11	0.020	0.202	µg/L	20.500	ND	98.1	70-130			AS

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02-Jan-19 15:03

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Matrix Spike (F811271-MSD)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	47.99	2.53	7.59	µg/L	50.000	ND	96.0	70-130			
<b>Matrix Spike Dup (F811271-MSD1)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	25.17	0.020	0.202	µg/L	25.000	0.267	99.6	70-130	0.485	20	
<b>Matrix Spike Dup (F811271-MSD2)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	24.91	0.020	0.202	µg/L	25.000	ND	99.6	70-130	4.33	20	
<b>Matrix Spike Dup (F811271-MSD3)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	57.97	1.01	3.04	µg/L	50.000	3.36	109	70-130	0.401	20	
Silver	21.73	0.020	0.202	µg/L	25.000	ND	86.9	70-130	0.206	20	
<b>Matrix Spike Dup (F811271-MSD4)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	58.98	1.01	3.04	µg/L	50.000	3.47	111	70-130	0.674	20	
Silver	22.47	0.020	0.202	µg/L	25.000	ND	89.9	70-130	3.80	20	
<b>Matrix Spike Dup (F811271-MSD5)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	16.03	0.020	0.202	µg/L	20.500	0.267	76.9	70-130	4.77	20	AS
<b>Matrix Spike Dup (F811271-MSD6)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	15.97	0.020	0.202	µg/L	20.500	ND	77.9	70-130	7.76	20	AS
<b>Matrix Spike Dup (F811271-MSD7)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	340.7	1.01	3.03	µg/L	410.00	3.36	82.3	70-130	8.64	20	AS
Silver	13.99	0.020	0.202	µg/L	20.500	ND	68.2	70-130	7.60	20	AS, QM-05
<b>Matrix Spike Dup (F811271-MSD8)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	368.5	1.01	3.03	µg/L	410.00	3.47	89.0	70-130	1.46	20	AS
Silver	14.91	0.020	0.202	µg/L	20.500	ND	72.7	70-130	0.386	20	AS

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Matrix Spike Dup (F811271-MSD9)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	49.40	1.01	3.04	µg/L	50.000	ND	98.8	70-130	4.27	20	
Silver	24.61	0.020	0.202	µg/L	25.000	0.267	97.4	70-130	5.52	20	
<b>Matrix Spike Dup (F811271-MSDA)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	53.57	1.01	3.04	µg/L	50.000	4.57	98.0	70-130	0.649	20	
Silver	23.92	0.020	0.202	µg/L	25.000	ND	95.7	70-130	1.54	20	
<b>Matrix Spike Dup (F811271-MSDB)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	403.7	1.01	3.03	µg/L	410.00	ND	98.5	70-130	0.219	20	AS
Silver	20.79	0.020	0.202	µg/L	20.500	0.267	100	70-130	0.794	20	AS
<b>Matrix Spike Dup (F811271-MSDC)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	421.7	1.01	3.03	µg/L	410.00	4.57	102	70-130	0.650	20	AS
Silver	20.20	0.020	0.202	µg/L	20.500	ND	98.6	70-130	0.470	20	AS
<b>Matrix Spike Dup (F811271-MSDD)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	47.81	2.53	7.59	µg/L	50.000	ND	95.6	70-130	0.386	20	
<b>Matrix Spike Dup (F811271-MSDE)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Arsenic	51.28	2.53	7.59	µg/L	50.000	4.57	93.4	70-130	1.98	20	
<b>Matrix Spike Dup (F811271-MSDF)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	1003	2.52	7.57	µg/L	1025.0	ND	97.9	70-130	0.485	20	AS
<b>Matrix Spike Dup (F811271-MSDG)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Arsenic	1020	2.52	7.57	µg/L	1025.0	4.57	99.0	70-130	0.361	20	AS
<b>Matrix Spike (F811271-MSE)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Arsenic	52.30	2.53	7.59	µg/L	50.000	4.57	95.5	70-130			

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811271-MSF)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	1008	2.52	7.57	µg/L	1025.0	ND	98.3	70-130			AS
<b>Matrix Spike (F811271-MSG)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Arsenic	1016	2.52	7.57	µg/L	1025.0	4.57	98.7	70-130			AS

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

**Blank (F811271-BLK2)** Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Cadmium	ND	0.008	0.020	µg/L							U
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**Blank (F811271-BLK3)** Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Chromium	ND	0.02	0.10	µg/L							U
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Nickel	ND	0.04	0.10	µg/L							U
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Copper	ND	0.02	0.10	µg/L							U
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Zinc	0.16	0.16	0.50	µg/L							J
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Cadmium	ND	0.008	0.020	µg/L							U
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Thallium	ND	0.006	0.020	µg/L							U
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Lead	ND	0.005	0.040	µg/L							U
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**Blank (F811271-BLK4)** Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Chromium	ND	0.02	0.10	µg/L							U
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Nickel	ND	0.04	0.10	µg/L							U
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Copper	ND	0.02	0.10	µg/L							U
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Zinc	0.32	0.16	0.50	µg/L							J
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Cadmium	ND	0.008	0.020	µg/L							U
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Thallium	ND	0.006	0.020	µg/L							U
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Lead	ND	0.005	0.040	µg/L							U
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**LCS (F811271-BS2)** Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Zinc	47.20	0.80	2.50	µg/L	50.010		94.4	85-115			
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Cadmium	36.41	0.040	0.100	µg/L	40.010		91.0	85-115			
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Thallium	35.20	0.030	0.100	µg/L	39.990		88.0	85-115			
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Lead	46.08	0.025	0.200	µg/L	50.010		92.1	85-115			
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**LCS (F811271-BS3)** Prepared: 12-Nov-18 Analyzed: 20-Nov-18

Chromium	48.05	0.10	0.50	µg/L	49.990		96.1	85-115			
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Nickel	49.10	0.20	0.50	µg/L	50.010		98.2	85-115			
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Copper	48.43	0.10	0.50	µg/L	50.000		96.9	85-115			
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Zinc	48.46	0.80	2.50	µg/L	50.010		96.9	85-115			
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### Quality Control Data

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### LCS Dup (F811271-BSD2)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Zinc	43.41	0.80	2.50	µg/L	50.010		86.8	85-115	8.36	20	
Cadmium	35.03	0.040	0.100	µg/L	40.010		87.6	85-115	3.86	20	
Thallium	36.16	0.030	0.100	µg/L	39.990		90.4	85-115	2.68	20	
Lead	46.71	0.025	0.200	µg/L	50.010		93.4	85-115	1.36	20	

##### LCS Dup (F811271-BSD3)

Prepared: 12-Nov-18 Analyzed: 20-Nov-18

Chromium	49.37	0.10	0.50	µg/L	49.990		98.8	85-115	2.70	20	
Nickel	50.87	0.20	0.50	µg/L	50.010		102	85-115	3.53	20	
Copper	50.70	0.10	0.50	µg/L	50.000		101	85-115	4.57	20	
Zinc	49.72	0.80	2.50	µg/L	50.010		99.4	85-115	2.56	20	

##### Matrix Spike (F811271-MS1)

Source: 8J01082-01

Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Thallium	38.04	0.061	0.202	µg/L	39.990	ND	95.1	70-130			
Lead	51.14	0.051	0.405	µg/L	50.010	2.002	98.2	70-130			

##### Matrix Spike (F811271-MS2)

Source: 8J01082-10

Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Thallium	39.59	0.061	0.202	µg/L	39.990	ND	99.0	70-130			
Lead	51.25	0.051	0.405	µg/L	50.010	0.224	102	70-130			

##### Matrix Spike (F811271-MS3)

Source: 8J01083-01

Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Chromium	48.61	0.20	1.01	µg/L	49.990	0.43	96.4	70-130			
Nickel	44.70	0.40	1.01	µg/L	50.010	0.62	88.1	70-130			
Copper	44.41	0.20	1.01	µg/L	50.000	0.61	87.6	70-130			
Zinc	57.34	1.62	5.06	µg/L	50.010	2.90	109	70-130			
Cadmium	37.45	0.081	0.202	µg/L	40.010	ND	93.6	70-130			
Thallium	45.92	0.061	0.202	µg/L	39.990	ND	115	70-130			
Lead	55.39	0.051	0.405	µg/L	50.010	0.314	110	70-130			

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811271-MS4)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	48.26	0.20	1.01	µg/L	49.990	ND	96.5	70-130			
Nickel	44.11	0.40	1.01	µg/L	50.010	0.63	87.0	70-130			
Copper	43.40	0.20	1.01	µg/L	50.000	0.55	85.7	70-130			
Zinc	60.07	1.62	5.06	µg/L	50.010	2.43	115	70-130			
Cadmium	37.46	0.081	0.202	µg/L	40.010	ND	93.6	70-130			
Thallium	46.91	0.061	0.202	µg/L	39.990	ND	117	70-130			
Lead	55.92	0.051	0.405	µg/L	50.010	ND	112	70-130			
<b>Matrix Spike (F811271-MS5)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Cadmium	33.90	0.081	0.202	µg/L	41.000	ND	82.7	70-130			AS
Thallium	15.39	0.061	0.202	µg/L	20.500	ND	75.1	70-130			AS
Lead	80.71	0.050	0.404	µg/L	102.50	2.002	76.8	70-130			AS
<b>Matrix Spike (F811271-MS6)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Thallium	14.36	0.061	0.202	µg/L	20.500	ND	70.0	70-130			AS
Lead	73.06	0.050	0.404	µg/L	102.50	0.224	71.1	70-130			AS
<b>Matrix Spike (F811271-MS7)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	307.1	0.20	1.01	µg/L	410.00	0.43	74.8	70-130			AS
Nickel	353.2	0.40	1.01	µg/L	512.50	0.62	68.8	70-130			AS, QM-05
Copper	351.0	0.20	1.01	µg/L	512.50	0.61	68.4	70-130			AS, QM-05
Zinc	842.1	1.62	5.05	µg/L	1025.0	2.90	81.9	70-130			AS
Cadmium	31.02	0.081	0.202	µg/L	41.000	ND	75.7	70-130			AS
Thallium	19.00	0.061	0.202	µg/L	20.500	ND	92.7	70-130			AS
Lead	90.68	0.050	0.404	µg/L	102.50	0.314	88.2	70-130			AS
<b>Matrix Spike (F811271-MS8)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	301.3	0.20	1.01	µg/L	410.00	ND	73.5	70-130			AS
Nickel	348.5	0.40	1.01	µg/L	512.50	0.63	67.9	70-130			AS, QM-05
Copper	346.0	0.20	1.01	µg/L	512.50	0.55	67.4	70-130			AS, QM-05
Zinc	833.5	1.62	5.05	µg/L	1025.0	2.43	81.1	70-130			AS
Cadmium	30.12	0.081	0.202	µg/L	41.000	ND	73.5	70-130			AS
Thallium	18.75	0.061	0.202	µg/L	20.500	ND	91.5	70-130			AS
Lead	89.91	0.050	0.404	µg/L	102.50	ND	87.7	70-130			AS

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811271-MS9)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	126.5	1.62	5.06	µg/L	50.010	93.15	66.6	70-130			QM-07
Cadmium	37.58	0.081	0.202	µg/L	40.010	ND	93.9	70-130			
Thallium	39.55	0.061	0.202	µg/L	39.990	ND	98.9	70-130			
Lead	53.44	0.051	0.405	µg/L	50.010	2.002	103	70-130			
<b>Matrix Spike (F811271-MSA)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	129.0	1.62	5.06	µg/L	50.010	84.88	88.3	70-130			
Cadmium	40.99	0.081	0.202	µg/L	40.010	0.095	102	70-130			
Thallium	40.03	0.061	0.202	µg/L	39.990	ND	100	70-130			
Lead	51.59	0.051	0.405	µg/L	50.010	0.224	103	70-130			
<b>Matrix Spike (F811271-MSB)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	1073	1.62	5.05	µg/L	1025.0	93.15	95.6	70-130			AS
Cadmium	40.16	0.081	0.202	µg/L	41.000	ND	98.0	70-130			AS
Thallium	19.88	0.061	0.202	µg/L	20.500	ND	97.0	70-130			AS
Lead	104.1	0.050	0.404	µg/L	102.50	2.002	99.6	70-130			AS
<b>Matrix Spike (F811271-MSC)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	1091	1.62	5.05	µg/L	1025.0	84.88	98.1	70-130			AS
Cadmium	41.27	0.081	0.202	µg/L	41.000	0.095	100	70-130			AS
Thallium	20.16	0.061	0.202	µg/L	20.500	ND	98.4	70-130			AS
Lead	103.5	0.050	0.404	µg/L	102.50	0.224	101	70-130			AS
<b>Matrix Spike (F811271-MSD)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Chromium	49.48	0.51	2.53	µg/L	49.990	ND	99.0	70-130			
Nickel	51.31	1.01	2.53	µg/L	50.010	2.31	98.0	70-130			
Copper	51.23	0.51	2.53	µg/L	50.000	2.40	97.7	70-130			
Zinc	130.5	4.05	12.6	µg/L	50.010	93.15	74.6	70-130			

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F811271-MSD1)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Thallium	38.24	0.061	0.202	µg/L	39.990	ND	95.6	70-130	0.530	20	
Lead	51.64	0.051	0.405	µg/L	50.010	2.002	99.3	70-130	0.985	20	
<b>Matrix Spike Dup (F811271-MSD2)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Thallium	39.04	0.061	0.202	µg/L	39.990	ND	97.6	70-130	1.41	20	
Lead	50.73	0.051	0.405	µg/L	50.010	0.224	101	70-130	1.02	20	
<b>Matrix Spike Dup (F811271-MSD3)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	47.60	0.20	1.01	µg/L	49.990	0.43	94.4	70-130	2.11	20	
Nickel	43.85	0.40	1.01	µg/L	50.010	0.62	86.5	70-130	1.91	20	
Copper	43.86	0.20	1.01	µg/L	50.000	0.61	86.5	70-130	1.25	20	
Zinc	53.91	1.62	5.06	µg/L	50.010	2.90	102	70-130	6.17	20	
Cadmium	37.70	0.081	0.202	µg/L	40.010	ND	94.2	70-130	0.660	20	
Thallium	45.45	0.061	0.202	µg/L	39.990	ND	114	70-130	1.02	20	
Lead	54.63	0.051	0.405	µg/L	50.010	0.314	109	70-130	1.38	20	
<b>Matrix Spike Dup (F811271-MSD4)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	48.85	0.20	1.01	µg/L	49.990	ND	97.7	70-130	1.21	20	
Nickel	44.40	0.40	1.01	µg/L	50.010	0.63	87.5	70-130	0.663	20	
Copper	44.52	0.20	1.01	µg/L	50.000	0.55	87.9	70-130	2.55	20	
Zinc	56.63	1.62	5.06	µg/L	50.010	2.43	108	70-130	5.89	20	
Cadmium	37.94	0.081	0.202	µg/L	40.010	ND	94.8	70-130	1.25	20	
Thallium	46.85	0.061	0.202	µg/L	39.990	ND	117	70-130	0.126	20	
Lead	56.12	0.051	0.405	µg/L	50.010	ND	112	70-130	0.354	20	
<b>Matrix Spike Dup (F811271-MSD5)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Cadmium	31.78	0.081	0.202	µg/L	41.000	ND	77.5	70-130	6.45	20	AS
Thallium	14.64	0.061	0.202	µg/L	20.500	ND	71.4	70-130	4.96	20	AS
Lead	76.99	0.050	0.404	µg/L	102.50	2.002	73.2	70-130	4.72	20	AS

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Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Matrix Spike Dup (F811271-MSD6)

Source: 8J01082-10

Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Thallium	15.24	0.061	0.202	µg/L	20.500	ND	74.4	70-130	6.01	20	AS
Lead	78.52	0.050	0.404	µg/L	102.50	0.224	76.4	70-130	7.21	20	AS

##### Matrix Spike Dup (F811271-MSD7)

Source: 8J01083-01

Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Chromium	282.3	0.20	1.01	µg/L	410.00	0.43	68.7	70-130	8.44	20	AS, QM-05
Nickel	326.0	0.40	1.01	µg/L	512.50	0.62	63.5	70-130	8.02	20	AS, QM-05
Copper	323.1	0.20	1.01	µg/L	512.50	0.61	62.9	70-130	8.30	20	AS, QM-05
Zinc	770.4	1.62	5.05	µg/L	1025.0	2.90	74.9	70-130	8.89	20	AS
Cadmium	27.78	0.081	0.202	µg/L	41.000	ND	67.8	70-130	11.0	20	AS, QM-05
Thallium	17.22	0.061	0.202	µg/L	20.500	ND	84.0	70-130	9.81	20	AS
Lead	83.23	0.050	0.404	µg/L	102.50	0.314	80.9	70-130	8.57	20	AS

##### Matrix Spike Dup (F811271-MSD8)

Source: 8J01083-07

Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Chromium	306.8	0.20	1.01	µg/L	410.00	ND	74.8	70-130	1.82	20	AS
Nickel	356.0	0.40	1.01	µg/L	512.50	0.63	69.3	70-130	2.14	20	AS, QM-05
Copper	349.5	0.20	1.01	µg/L	512.50	0.55	68.1	70-130	1.01	20	AS, QM-05
Zinc	839.5	1.62	5.05	µg/L	1025.0	2.43	81.7	70-130	0.716	20	AS
Cadmium	31.09	0.081	0.202	µg/L	41.000	ND	75.8	70-130	3.16	20	AS
Thallium	18.99	0.061	0.202	µg/L	20.500	ND	92.6	70-130	1.26	20	AS
Lead	91.16	0.050	0.404	µg/L	102.50	ND	88.9	70-130	1.39	20	AS

##### Matrix Spike Dup (F811271-MSD9)

Source: 8J01082-01

Prepared: 12-Nov-18 Analyzed: 16-Nov-18

Zinc	131.8	1.62	5.06	µg/L	50.010	93.15	77.2	70-130	4.10	20	
Cadmium	40.24	0.081	0.202	µg/L	40.010	ND	101	70-130	6.85	20	
Thallium	39.37	0.061	0.202	µg/L	39.990	ND	98.5	70-130	0.452	20	
Lead	52.54	0.051	0.405	µg/L	50.010	2.002	101	70-130	1.71	20	

##### Matrix Spike Dup (F811271-MSDA)

Source: 8J01082-10

Prepared: 12-Nov-18 Analyzed: 16-Nov-18

Zinc	127.5	1.62	5.06	µg/L	50.010	84.88	85.1	70-130	1.22	20	
Cadmium	40.31	0.081	0.202	µg/L	40.010	0.095	101	70-130	1.67	20	
Thallium	39.14	0.061	0.202	µg/L	39.990	ND	97.9	70-130	2.25	20	
Lead	50.67	0.051	0.405	µg/L	50.010	0.224	101	70-130	1.79	20	

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Project Manager: Tim Puls

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### Quality Control Data

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F811271-MSDB)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	1066	1.62	5.05	µg/L	1025.0	93.15	94.9	70-130	0.616	20	AS
Cadmium	40.21	0.081	0.202	µg/L	41.000	ND	98.1	70-130	0.114	20	AS
Thallium	20.00	0.061	0.202	µg/L	20.500	ND	97.6	70-130	0.618	20	AS
Lead	104.3	0.050	0.404	µg/L	102.50	2.002	99.8	70-130	0.215	20	AS

<b>Matrix Spike Dup (F811271-MSDC)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	1097	1.62	5.05	µg/L	1025.0	84.88	98.7	70-130	0.586	20	AS
Cadmium	41.36	0.081	0.202	µg/L	41.000	0.095	101	70-130	0.225	20	AS
Thallium	20.43	0.061	0.202	µg/L	20.500	ND	99.7	70-130	1.31	20	AS
Lead	104.6	0.050	0.404	µg/L	102.50	0.224	102	70-130	1.04	20	AS

<b>Matrix Spike Dup (F811271-MSDD)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Chromium	50.95	0.51	2.53	µg/L	49.990	ND	102	70-130	2.92	20	QM-05
Nickel	51.12	1.01	2.53	µg/L	50.010	2.31	97.6	70-130	0.371	20	
Copper	51.66	0.51	2.53	µg/L	50.000	2.40	98.5	70-130	0.826	20	
Zinc	125.6	4.05	12.6	µg/L	50.010	93.15	64.9	70-130	3.79	20	

<b>Matrix Spike Dup (F811271-MSDE)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Chromium	50.28	0.51	2.53	µg/L	49.990	ND	101	70-130	0.459	20	
Nickel	55.05	1.01	2.53	µg/L	50.010	4.61	101	70-130	0.976	20	
Copper	70.51	0.51	2.53	µg/L	50.000	19.84	101	70-130	1.15	20	
Zinc	123.6	4.05	12.6	µg/L	50.010	84.88	77.5	70-130	0.0994	20	

<b>Matrix Spike Dup (F811271-MSDF)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Chromium	1003	0.50	2.52	µg/L	1025.0	ND	97.8	70-130	2.36	20	AS
Nickel	1250	1.01	2.52	µg/L	1281.2	2.31	97.4	70-130	1.73	20	AS
Copper	1276	0.50	2.52	µg/L	1281.2	2.40	99.4	70-130	0.872	20	AS
Zinc	2587	4.04	12.6	µg/L	2562.5	93.15	97.3	70-130	1.28	20	AS

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

Matrix Spike Dup (F811271-MSDG)		Source: 8J01082-10			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Chromium	1015	0.50	2.52	µg/L	1025.0	ND	99.0	70-130	0.647	20	AS
Nickel	1273	1.01	2.52	µg/L	1281.2	4.61	99.0	70-130	0.468	20	AS
Copper	1279	0.50	2.52	µg/L	1281.2	19.84	98.3	70-130	0.984	20	AS
Zinc	2597	4.04	12.6	µg/L	2562.5	84.88	98.0	70-130	1.18	20	AS

Matrix Spike (F811271-MSE)		Source: 8J01082-10			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Chromium	50.51	0.51	2.53	µg/L	49.990	ND	101	70-130			
Nickel	54.52	1.01	2.53	µg/L	50.010	4.61	99.8	70-130			
Copper	71.32	0.51	2.53	µg/L	50.000	19.84	103	70-130			
Zinc	123.5	4.05	12.6	µg/L	50.010	84.88	77.2	70-130			

Matrix Spike (F811271-MSF)		Source: 8J01082-01			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Chromium	1027	0.50	2.52	µg/L	1025.0	ND	100	70-130			AS
Nickel	1272	1.01	2.52	µg/L	1281.2	2.31	99.1	70-130			AS
Copper	1287	0.50	2.52	µg/L	1281.2	2.40	100	70-130			AS
Zinc	2620	4.04	12.6	µg/L	2562.5	93.15	98.6	70-130			AS

Matrix Spike (F811271-MSG)		Source: 8J01082-10			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Chromium	1022	0.50	2.52	µg/L	1025.0	ND	99.7	70-130			AS
Nickel	1279	1.01	2.52	µg/L	1281.2	4.61	99.5	70-130			AS
Copper	1292	0.50	2.52	µg/L	1281.2	19.84	99.3	70-130			AS
Zinc	2628	4.04	12.6	µg/L	2562.5	84.88	99.2	70-130			AS

#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

Blank (F811325-BLK1)		Prepared: 12-Nov-18 Analyzed: 15-Nov-18									
Beryllium	ND	0.004	0.060	µg/L							U
Iron	ND	1	10	µg/L							U
Selenium	ND	0.44	0.60	µg/L							U
Antimony	0.013	0.009	0.020	µg/L							J

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#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F811325-BLK2)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Beryllium	ND	0.004	0.060	µg/L							U
Iron	ND	1	10	µg/L							U
Selenium	ND	0.44	0.60	µg/L							U
Antimony	ND	0.009	0.020	µg/L							U

##### LCS (F811325-BS1)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Antimony	38.26	0.045	0.100	µg/L	40.030		95.6	85-115			
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##### LCS (F811325-BS3)

Prepared: 12-Nov-18 Analyzed: 20-Nov-18

Beryllium	42.22	0.020	0.301	µg/L	40.010		106	85-115			
Iron	1166	6	50	µg/L	1250.0		93.3	85-115			
Selenium	49.14	2.20	3.01	µg/L	49.990		98.3	85-115			

##### LCS Dup (F811325-BSD1)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Antimony	38.90	0.045	0.100	µg/L	40.030		97.2	85-115	1.68	20	
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##### LCS Dup (F811325-BSD3)

Prepared: 12-Nov-18 Analyzed: 20-Nov-18

Beryllium	42.41	0.020	0.301	µg/L	40.010		106	85-115	0.441	20	
Iron	1184	6	50	µg/L	1250.0		94.7	85-115	1.51	20	
Selenium	48.99	2.20	3.01	µg/L	49.990		98.0	85-115	0.306	20	

##### Matrix Spike (F811325-MS1)

Source: 8J01082-01RE1

Prepared: 12-Nov-18 Analyzed: 16-Nov-18

Antimony	42.47	0.091	0.202	µg/L	40.030	0.160	106	70-130			
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##### Matrix Spike (F811325-MS2)

Source: 8J01082-10RE1

Prepared: 12-Nov-18 Analyzed: 16-Nov-18

Antimony	40.01	0.091	0.202	µg/L	40.030	0.272	99.3	70-130			
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##### Matrix Spike (F811325-MS5)

Source: 8J01082-01RE1

Prepared: 12-Nov-18 Analyzed: 16-Nov-18

Antimony	19.46	0.091	0.202	µg/L	20.500	0.160	94.2	70-130			AS
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#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811325-MS6)</b>		<b>Source: 8J01082-10RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	19.42	0.091	0.202	µg/L	20.500	0.272	93.4	70-130			AS
<b>Matrix Spike (F811325-MS7)</b>		<b>Source: 8J01083-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	18.93	0.091	0.202	µg/L	20.500	0.409	90.3	70-130			AS
<b>Matrix Spike (F811325-MS8)</b>		<b>Source: 8J01083-07RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	19.04	0.091	0.202	µg/L	20.500	0.263	91.6	70-130			AS
<b>Matrix Spike (F811325-MS9)</b>		<b>Source: 8J01082-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 20-Nov-18							
Beryllium	42.94	0.101	1.52	µg/L	40.010	ND	107	70-130			
Iron	1241	28	253	µg/L	1250.0	62	94.4	70-130			
Selenium	50.13	11.1	15.2	µg/L	49.990	ND	100	70-130			
<b>Matrix Spike (F811325-MSA)</b>		<b>Source: 8J01082-10RE1</b>		Prepared: 12-Nov-18 Analyzed: 21-Nov-18							
Beryllium	40.52	0.101	1.52	µg/L	40.010	ND	101	70-130			
Iron	1461	28	253	µg/L	1250.0	274	94.9	70-130			
Selenium	51.93	11.1	15.2	µg/L	49.990	ND	104	70-130			
<b>Matrix Spike (F811325-MSB)</b>		<b>Source: 8J01083-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 21-Nov-18							
Beryllium	41.33	0.101	1.52	µg/L	40.010	ND	103	70-130			
Iron	1423	28	253	µg/L	1250.0	213	96.8	70-130			
Selenium	65.49	11.1	15.2	µg/L	49.990	13.20	105	70-130			
Antimony	40.96	0.228	0.506	µg/L	40.030	0.409	101	70-130			
<b>Matrix Spike (F811325-MSC)</b>		<b>Source: 8J01083-07RE1</b>		Prepared: 12-Nov-18 Analyzed: 21-Nov-18							
Beryllium	41.60	0.101	1.52	µg/L	40.010	ND	104	70-130			
Iron	1262	28	253	µg/L	1250.0	66	95.7	70-130			
Selenium	70.66	11.1	15.2	µg/L	49.990	22.60	96.1	70-130			
Antimony	40.98	0.228	0.506	µg/L	40.030	0.263	102	70-130			

Eurofins Frontier Global Sciences, LLC

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amy Goodall, Project Manager

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Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Matrix Spike (F811325-MSD)</b>		<b>Source: 8J01082-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Beryllium	51.90	0.101	1.51	µg/L	51.250	ND	101	70-130			AS
Iron	5033	28	252	µg/L	5125.0	62	97.0	70-130			AS
Selenium	1023	11.1	15.1	µg/L	1025.0	ND	99.8	70-130			AS
<b>Matrix Spike Dup (F811325-MSD1)</b>		<b>Source: 8J01082-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Antimony	40.49	0.091	0.202	µg/L	40.030	0.160	101	70-130	4.77	20	
<b>Matrix Spike Dup (F811325-MSD2)</b>		<b>Source: 8J01082-10RE1</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Antimony	39.90	0.091	0.202	µg/L	40.030	0.272	99.0	70-130	0.274	20	
<b>Matrix Spike Dup (F811325-MSD5)</b>		<b>Source: 8J01082-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Antimony	19.32	0.091	0.202	µg/L	20.500	0.160	93.5	70-130	0.732	20	AS
<b>Matrix Spike Dup (F811325-MSD6)</b>		<b>Source: 8J01082-10RE1</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Antimony	19.76	0.091	0.202	µg/L	20.500	0.272	95.1	70-130	1.73	20	AS
<b>Matrix Spike Dup (F811325-MSD7)</b>		<b>Source: 8J01083-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Antimony	18.86	0.091	0.202	µg/L	20.500	0.409	90.0	70-130	0.380	20	AS
<b>Matrix Spike Dup (F811325-MSD8)</b>		<b>Source: 8J01083-07RE1</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Antimony	18.57	0.091	0.202	µg/L	20.500	0.263	89.3	70-130	2.47	20	AS
<b>Matrix Spike Dup (F811325-MSD9)</b>		<b>Source: 8J01082-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Beryllium	44.18	0.101	1.52	µg/L	40.010	ND	110	70-130	2.85	20	
Iron	1252	28	253	µg/L	1250.0	62	95.3	70-130	0.883	20	
Selenium	49.17	11.1	15.2	µg/L	49.990	ND	98.4	70-130	1.94	20	
<b>Matrix Spike Dup (F811325-MSDA)</b>		<b>Source: 8J01082-10RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	39.78	0.101	1.52	µg/L	40.010	ND	99.4	70-130	1.82	20	
Iron	1427	28	253	µg/L	1250.0	274	92.2	70-130	2.34	20	
Selenium	49.34	11.1	15.2	µg/L	49.990	ND	98.7	70-130	5.13	20	

Eurofins Frontier Global Sciences, LLC

*Amy Goodall*

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Amy Goodall, Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F811325-MSDB)</b>		<b>Source: 8J01083-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	40.99	0.101	1.52	µg/L	40.010	ND	102	70-130	0.825	20	
Iron	1394	28	253	µg/L	1250.0	213	94.5	70-130	2.03	20	
Selenium	68.03	11.1	15.2	µg/L	49.990	13.20	110	70-130	3.81	20	
Antimony	40.42	0.228	0.506	µg/L	40.030	0.409	100	70-130	1.33	20	
<b>Matrix Spike Dup (F811325-MSDC)</b>		<b>Source: 8J01083-07RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	43.37	0.101	1.52	µg/L	40.010	ND	108	70-130	4.16	20	
Iron	4735	28	253	µg/L	1250.0	66	374	70-130	116	20	QM-07, QR-08
Selenium	69.05	11.1	15.2	µg/L	49.990	22.60	92.9	70-130	2.30	20	
Antimony	41.58	0.228	0.506	µg/L	40.030	0.263	103	70-130	1.46	20	
<b>Matrix Spike Dup (F811325-MSDD)</b>		<b>Source: 8J01082-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Beryllium	52.13	0.101	1.51	µg/L	51.250	ND	102	70-130	0.445	20	AS
Iron	4921	28	252	µg/L	5125.0	62	94.8	70-130	2.26	20	AS
Selenium	1014	11.1	15.1	µg/L	1025.0	ND	98.9	70-130	0.860	20	AS
<b>Matrix Spike Dup (F811325-MSDE)</b>		<b>Source: 8J01082-10RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	52.24	0.101	1.51	µg/L	51.250	ND	102	70-130	1.51	20	AS
Iron	5144	28	252	µg/L	5125.0	274	95.0	70-130	0.963	20	AS
Selenium	1039	11.1	15.1	µg/L	1025.0	ND	101	70-130	0.861	20	AS
<b>Matrix Spike Dup (F811325-MSDF)</b>		<b>Source: 8J01083-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	55.85	0.101	1.51	µg/L	51.250	ND	109	70-130	0.545	20	AS
Iron	5154	28	252	µg/L	5125.0	213	96.4	70-130	1.56	20	AS
Selenium	1073	11.1	15.1	µg/L	1025.0	13.20	103	70-130	1.22	20	AS
Antimony	50.93	0.227	0.505	µg/L	51.250	0.409	98.6	70-130	1.10	20	AS
<b>Matrix Spike Dup (F811325-MSDG)</b>		<b>Source: 8J01083-07RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	53.78	0.101	1.51	µg/L	51.250	ND	105	70-130	2.62	20	AS
Iron	4975	28	252	µg/L	5125.0	66	95.8	70-130	1.58	20	AS
Selenium	1084	11.1	15.1	µg/L	1025.0	22.60	104	70-130	0.949	20	AS
Antimony	51.26	0.227	0.505	µg/L	51.250	0.263	99.5	70-130	2.33	20	AS

Eurofins Frontier Global Sciences, LLC

*Amy Goodall*

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Amy Goodall, Project Manager



Frontier Global Sciences

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811325-MSE)</b>		<b>Source: 8J01082-10RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	53.03	0.101	1.51	µg/L	51.250	ND	103	70-130			AS
Iron	5194	28	252	µg/L	5125.0	274	96.0	70-130			AS
Selenium	1030	11.1	15.1	µg/L	1025.0	ND	101	70-130			AS
<b>Matrix Spike (F811325-MSF)</b>		<b>Source: 8J01083-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	55.54	0.101	1.51	µg/L	51.250	ND	108	70-130			AS
Iron	5235	28	252	µg/L	5125.0	213	98.0	70-130			AS
Selenium	1086	11.1	15.1	µg/L	1025.0	13.20	105	70-130			AS
Antimony	50.38	0.227	0.505	µg/L	51.250	0.409	97.5	70-130			AS
<b>Matrix Spike (F811325-MSG)</b>		<b>Source: 8J01083-07RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	55.21	0.101	1.51	µg/L	51.250	ND	108	70-130			AS
Iron	5054	28	252	µg/L	5125.0	66	97.3	70-130			AS
Selenium	1094	11.1	15.1	µg/L	1025.0	22.60	105	70-130			AS
Antimony	50.08	0.227	0.505	µg/L	51.250	0.263	97.2	70-130			AS

Eurofins Frontier Global Sciences, LLC

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Amy Goodall, Project Manager

Page 40 of 52

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
02-Jan-19 15:03

### Notes and Definitions

- U Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
- QR-08 The RPD value for the MS/MSD was outside of acceptance limits. Batch QC acceptable based on matrix duplicate and/or LCS/LCSD RPD values within control limits.
- QM-07 The spike recovery was outside control limits for the MS and/or MSD. The batch was accepted based on LCS and LCSD recoveries within control limits and, when analysis permits, acceptable AS/ASD.
- QM-05 The spike recovery was outside acceptance limits for the MS/MSD and or AS/ASD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
- QB-08 The blank was preserved to 50% BrCl rather than 1%. The control limit for blanks preserved to greater than 1% BrCl is the preservation percentage multiplied by the MRL.
- J The result is an estimated concentration.
- AS This MS and/or MSD is an analytical spike and/or an analytical spike duplicate.
- AD This matrix duplicate is an analytical duplicate.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the method detection limit if reported to the MDL or above the reporting limit if reported to the MRL.
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference





**WORK ORDER NUMBER: 18-10-2295**

*The difference is service*



AIR | SOIL | WATER | MARINE CHEMISTRY

### Analytical Report For

**Client:** Eurofins Frontier Global Sciences, Inc.

**Client Project Name:** 8J01082

**Attention:** Amy Goodall  
11720 North Creek Parkway North  
Suite 4  
Bothell, WA 98011-8244

A black and white image of a handwritten signature, likely belonging to Carla Hollowell.

Approved for release on 11/07/2018 by:  
Carla Hollowell  
Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience (Calscience) certifies that the test results provided in this report meet all NELAC Institute requirements for parameters for which accreditation is required or available. Any exceptions to NELAC Institute requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

## Contents

Client Project Name: 8J01082  
Work Order Number: 18-10-2295

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## Work Order Narrative

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Work Order: 18-10-2295

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Page 1 of 1

**Condition Upon Receipt:**

Samples were received under Chain-of-Custody (COC) on 10/31/18. They were assigned to Work Order 18-10-2295.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

**Holding Times:**

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

**Quality Control:**

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

**Subcontractor Information:**

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

**Additional Comments:**

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

**DoD Projects:**

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

**Sample Summary**

---

Client: Eurofins Frontier Global Sciences, Inc.	Work Order: 18-10-2295
11720 North Creek Parkway North, Suite 4	Project Name: 8J01082
Bothell, WA 98011-8244	PO Number:
	Date/Time Received: 10/31/18 10:00
	Number of Containers: 2

---

Attn: Amy Goodall

---

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
NEW_02 NEW_01_TCn	18-10-2295-1	10/18/18 00:00	1	Aqueous
PEASE_02 PEASE_01_TCn	18-10-2295-2	10/18/18 00:00	1	Aqueous

## Analytical Report

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 10/31/18  
Work Order: 18-10-2295  
Preparation: N/A  
Method: SM 4500-CN E  
Units: mg/L

Project: 8J01082

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
<b>NEW_02 NEW_01_TCn</b>	<b>18-10-2295-1-A</b>	<b>10/18/18 00:00</b>	<b>Aqueous</b>	<b>UV 9</b>	<b>11/01/18</b>	<b>11/01/18 12:35</b>	<b>I1101CNL1</b>

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qualifiers</u>
Cyanide, Total	ND	0.020	1.00	

<b>PEASE_02 PEASE_01_TCn</b>	<b>18-10-2295-2-A</b>	<b>10/18/18 00:00</b>	<b>Aqueous</b>	<b>UV 9</b>	<b>11/01/18</b>	<b>11/01/18 12:35</b>	<b>I1101CNL1</b>
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<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qualifiers</u>
Cyanide, Total	ND	0.020	1.00	

<b>Method Blank</b>	<b>099-05-061-4307</b>	<b>N/A</b>	<b>Aqueous</b>	<b>UV 9</b>	<b>11/01/18</b>	<b>11/01/18 12:35</b>	<b>I1101CNL1</b>
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<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qualifiers</u>
Cyanide, Total	ND	0.020	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

## Quality Control - LCS/LCSD

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 10/31/18  
Work Order: 18-10-2295  
Preparation: N/A  
Method: SM 4500-CN E

Project: 8J01082

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-05-061-4307	LCS	Aqueous	UV 9	11/01/18	11/01/18 12:35	I1101CNL1			
099-05-061-4307	LCSD	Aqueous	UV 9	11/01/18	11/01/18 12:35	I1101CNL1			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Cyanide, Total	0.2000	0.1660	83	0.1688	84	80-120	2	0-20	

## Glossary of Terms and Qualifiers

Work Order: 18-10-2295

Page 1 of 1

<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDS or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

**SUBCONTRACT ORDER**  
**Eurofins Frontier Global Sciences, Inc.**

8J01082

**18-10-2295****SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
 11720 North Creek Parkway North, Suite 400  
 Bothell, WA 98011  
 Phone: (425) 686-1996  
 Fax: (425) 686-3096  
 Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
 7440 Lincoln Way  
 Garden Grove, CA 92841  
 Phone :7148955494  
 Fax: x

**Analysis****Comments**

Sample ID: NEW\_02 NEW\_01\_TCn

EFGS Lab ID: 8J01082-05 Matrix: Water

Sampled: 18-Oct-18 00:00 (GMT-05:00) Eastern Time (US &  
 Arrived on 10/26/18, temp 0.4C LEL 10/29/18

Due: 28-Nov-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:  
 250 mL PETG (A)

Sample ID: PEASE\_02 PEASE\_01\_TCn

EFGS Lab ID: 8J01082-14 Matrix: Water

Sampled: 18-Oct-18 00:00 (GMT-05:00) Eastern Time (US &  
 Arrived on 10/26/18, temp 0.4C LEL 10/29/18

Due: 28-Nov-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:  
 250 mL PETG (A)

Released By *[Signature]* Date 10-30-18  
 Released By *[Signature]* Date 10/30/18

Received By *[Signature]* Date 10/31/18 1000  
 Received By *[Signature]* Date 10/31/18 1000



5295

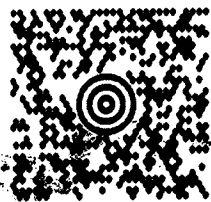
FRONT DESK  
 (425) 888-1996  
 FRONTIER GLOBAL SCIENCES  
 11720 N CREEK PKWY N  
 BOTHELL WA 98011-8244

29 LBS

1 OF 1

DWT: 16,12,16

SHIP TO:  
 SAMPLE RECEIVING  
 (714) 895-5494  
 EUROFINS CALSCIENCE, INC.  
 7440 LINCOLN WAY  
 GARDEN GROVE CA 92841



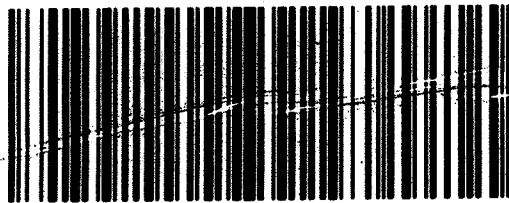
CA 927 9-09



UPS NEXT DAY AIR

1

TRACKING #: 1Z 86W 060 01 5174 4334



BILLING: P/P

Dept No.: OVERHEAD  
 REF 2:Subcontract

WS 21.0.23 Zebra ZP 450 06.0A 10/2018



SEE NOTICE ON REVERSE regarding UPS Terms, and notice of limitation of liability. Where allowed by law, shipper authorizes UPS to act as forwarding agent for export control and customs purposes. If exported from the US, shipper certifies that the commodities, technology or software were exported from the US in accordance with the Export Administration Regulations. Diversion contrary to law is prohibited. 9501 R2 0918

## SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1CLIENT: EFGSDATE: 10/31/2018

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: 0.0°C); Temperature (w/o CF): 3.6 °C (w/ CF): 3.6 °C; ☐ Blank ☒ Sample☐ Sample(s) outside temperature criteria (PM/APM contacted by: \_\_\_\_\_)☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling☐ Sample(s) received at ambient temperature; placed on ice for transport by courierAmbient Temperature: ☐ Air ☐ FilterChecked by: WJP

## CUSTODY SEAL:

Cooler ☐ Present and Intact ☐ Present but Not Intact ☒ Not Present ☐ N/AChecked by: WJPSample(s) ☐ Present and Intact ☐ Present but Not Intact ☒ Not Present ☐ N/AChecked by: WJP

## SAMPLE CONDITION:

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sampling date <input type="checkbox"/> Sampling time <input type="checkbox"/> Matrix <input type="checkbox"/> Number of containers			
<input type="checkbox"/> No analysis requested <input type="checkbox"/> Not relinquished <input type="checkbox"/> No relinquished date <input type="checkbox"/> No relinquished time			
Sampler's name indicated on COC .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample container label(s) consistent with COC .....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and in good condition .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers for analyses requested .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sufficient volume/mass for analyses requested .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples received within holding time .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aqueous samples for certain analyses received within 15-minute holding time			
<input type="checkbox"/> pH <input type="checkbox"/> Residual Chlorine <input type="checkbox"/> Dissolved Sulfide <input type="checkbox"/> Dissolved Oxygen .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation chemical(s) noted on COC and/or sample container .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unpreserved aqueous sample(s) received for certain analyses			
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Total Metals <input type="checkbox"/> Dissolved Metals			
Acid/base preserved samples - pH within acceptable range .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Container(s) for certain analysis free of headspace.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Dissolved Gases (RSK-175) <input type="checkbox"/> Dissolved Oxygen (SM 4500)			
<input type="checkbox"/> Carbon Dioxide (SM 4500) <input type="checkbox"/> Ferrous Iron (SM 3500) <input type="checkbox"/> Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## CONTAINER TYPE:

(Trip Blank Lot Number: \_\_\_\_\_)

Aqueous: ☐ VOA ☐ VOAh ☐ VOAna<sub>2</sub> ☐ 100PJ ☐ 100PJna<sub>2</sub> ☐ 125AGB ☐ 125AGBh ☐ 125AGBp ☐ 125PB ☐ 125PBznna (pH\_\_9)

☐ 250AGB ☐ 250CGB ☐ 250CGBs (pH\_\_2) ☐ 250PB ☐ 250PBn (pH\_\_2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJs (pH\_\_2) ☐ 500PB

☐ 1AGB ☐ 1AGBna<sub>2</sub> ☐ 1AGBs (pH\_\_2) ☐ 1AGBs (O&G) ☐ 1PB ☒ 1PBna (pH ≥ 12) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (\_\_\_\_) ☐ EnCores® (\_\_\_\_) ☐ TerraCores® (\_\_\_\_) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ \_\_\_\_\_ Other Matrix (\_\_\_\_): ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Container: A = Amber, B = Bottle, C = Clear, E = Envelope, G = Glass, J = Jar, P = Plastic, and Z = Ziploc/Resealable Bag

Preservative: b = buffered, f = filtered, h = HCl, n = HNO<sub>3</sub>, na = NaOH, na<sub>2</sub> = Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, p = H<sub>3</sub>PO<sub>4</sub>.Labeled/Checked by: WJPs = H<sub>2</sub>SO<sub>4</sub>, u = ultra-pure, x = Na<sub>2</sub>SO<sub>3</sub>+NaHSO<sub>4</sub>.H<sub>2</sub>O, znna = Zn (CH<sub>3</sub>COO)<sub>2</sub> + NaOHReviewed by: WJP

## SAMPLE ANOMALY REPORT

DATE: 10/3/12018

## SAMPLES, CONTAINERS, AND LABELS:

- ☐ Sample(s) NOT RECEIVED but listed on COC
- ☐ Sample(s) received but NOT LISTED on COC
- ☐ Holding time expired (list client or ECI sample ID and analysis)
- ☐ Insufficient sample amount for requested analysis (list analysis)
- ☐ Improper container(s) used (list analysis)
- ☐ Improper preservative used (list analysis)
- ☐ pH outside acceptable range (list analysis)
- ☐ No preservative noted on COC or label (list analysis and notify lab)
- ☐ Sample container(s) not labeled
- ☐ Client sample label(s) illegible (list container type and analysis)
- ☐ Client sample label(s) do not match COC (comment)
- ☐ Project information
- ☐ Client sample ID
- ☐ Sampling date and/or time
- ☐ Number of container(s)
- ☐ Requested analysis
- ☐ Sample container(s) compromised (comment)
- ☐ Broken
- ☐ Water present in sample container
- ☐ Air sample container(s) compromised (comment)
- ☐ Flat
- ☐ Very low in volume
- ☐ Leaking (not transferred; duplicate bag submitted)
- ☐ Leaking (transferred into ECI Tedlar™ bags\*)
- ☐ Leaking (transferred into client's Tedlar™ bags\*)

\* Transferred at client's request.

## MISCELLANEOUS: (Describe)

## HEADSPACE:

(Containers with bubble &gt; 6 mm or ¼ inch for volatile organic or dissolved gas analysis)

ECI Sample ID	ECI Container ID	Total Number**	ECI Sample ID	ECI Container ID	Total Number**

## Comments

\* (1-2) Received sample in 1 liter plastic container, 250 ml per COC.

## Comments

Comments:

\* Container type

\*\* Record the total number of containers (i.e., vials or bottles) for the affected sample.

Reported by: ufsoReviewed by: ugly

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2017-08-29 Revision





Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

15 January 2019

Tim Puls  
Underwood Engineers  
25 Vaughan Mall  
Portsmouth, NH 03801  
RE: Trace Metals In Wastewater

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Amy Goodall". The signature is written in a cursive, flowing style.

Amy Goodall  
Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
15-Jan-19 17:30

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
RIVER-02 RIV_01_TM	8J01083-01	Water	18-Oct-18 15:35	29-Oct-18 10:10
RIVER-02 RIV_02_TM	8J01083-02	Water	18-Oct-18 15:35	29-Oct-18 10:10
RIVER-02 RIV_EB_TM	8J01083-03	Water	18-Oct-18 15:35	29-Oct-18 10:10
RIVER-02 RIV_01_DM	8J01083-07	Water	18-Oct-18 15:45	29-Oct-18 10:10
RIVER-02 RIV_02_DM	8J01083-08	Water	18-Oct-18 15:45	29-Oct-18 10:10
RIVER-02 RIV_EB_DM	8J01083-09	Water	18-Oct-18 15:55	29-Oct-18 10:10
RIVER-02 RIV_01_DHg	8J01083-11	Water	18-Oct-18 15:55	29-Oct-18 10:10
RIVER-02 RIV_02_DHg	8J01083-12	Water	18-Oct-18 15:55	29-Oct-18 10:10
RIVER-02 RIV_EB_DHg	8J01083-13	Water	18-Oct-18 16:00	29-Oct-18 10:10
RIVER-02 RIV_MS_DHg	8J01083-14	Water	18-Oct-18 16:00	29-Oct-18 10:10

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager

Page 2 of 54



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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:30

#### SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 29-Oct-18 10:10. The samples were received intact, on-ice within a sealed cooler at

<u>Cooler</u>	<u>Temp C°</u>
Default Cooler	16.2

Samples were shipped to Eurofins Calscience in Garden Grove, CA for the EPA SM4500 Total CN analysis per the initial project setup.

The subcontract report is located after the notes and definitions section of the EFGS report.

#### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total mercury by flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631E.

Samples were prepared and analyzed for total recoverable metals by inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 200.8 (EFGS-054).

Samples were prepared and analyzed for total metals by preconcentration followed by analysis via inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 1640 Mod.

#### ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager



Frontier Global Sciences

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
15-Jan-19 17:30

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries. All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager

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## Sample Receipt Checklist

Client: Underwood Date & Time Received: 10/29/18 10:10 Date Labeled: 10-29-18 Labeled By: USE  
 Project: Anti-Deg WHITE River Samples Received By: [Signature] Label Verified By: [Signature]  
 # of Coolers Received: 1 <sup>YEL 5978</sup> Samples Arrived By: \_\_\_\_\_ Shipping Service \_\_\_\_\_ Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (Specify: \_\_\_\_\_)  
 Coolant: ☒ None/Ambient ☐ Loose Ice ☐ Gel Ice ☐ Dry Ice Coolant Required (Y) N Temp Blank Used (Y) N for Cooler(s): 1

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y/N

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>Y</u>	
Custody seals signed:	<u>[Signature]</u>	

TID: <u>240525</u> CF: <u>0.7</u> °C	Date/time: <u>10/29/18 10:10</u> By: <u>[Signature]</u>
Cooler 1: <u>15.7</u> °C w/ CF: <u>16.2</u> °C	Cooler 4: °C w/ CF: °C
Cooler 2: °C w/ CF: °C	Cooler 5: °C w/ CF: °C
Cooler 3: °C w/ CF: °C	Cooler 6: °C w/ CF: °C

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Preservation type:	<u>Y</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
Internal COC required:	<u>NA</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>Y</u>	

Anomalies/Non-conformances (attach additional pages if needed):

one sample listed on COC as 'No Sample', YEL 10-29-18

8J01083





Frontier Global Sciences

Chain of Custody Record & Laboratory Analysis Request:  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

Page 1 of 2

854083

Client: UNDERWOOD ENGINEERS, INC.		Contact: Tim Puls		Analyses Requested		EFGS PM:							
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Phone: (603) 436-6192 Fax:				Date:							
Project Name: RIVER SAMPLES		E-mail: tpuls@underwoodengineers.com				TAT (business days) 20 (si)							
Report To: Tim Puls		Contract/PO:				15 10 5 4 3 2 24 hr							
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Invoice To: Client				(For TAT < 10 days, contact P Surcharges apply for expedited TAT)							
Phone: (603) 436-6192 Fax:		Address:		Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N									
E-mail: tpuls@underwoodengineers.com		Phone: Fax:		(If yes, please contact PM)									
E-mail:		E-mail:		EDD <input type="checkbox"/> Y <input type="checkbox"/> N									
				QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High									
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Total Metals (TM)	Total Cn (TCn)	Dissolved Metals (DM)	Dissolved Mercury (DHg)	Comments
1	RIVER-02	RIV-01-TM	1	SB	10/18/18 1535	JEL	N	N	✓				Total Metals include: Sb, Be, Cr, Fe, Ti
2	RIVER-02	RIV-02-TM	1	SB					✓				Dissolved Metals include: As, Cd, Cu, Pb, Ni, Se, Ag, Zn  * X - No sample
3	RIVER-02	RIV-EB-TM	1	RW					✓				
4	RIVER-02	RIV-MS-TM	1	SB	1540			✓	✓				
5	RIVER-02	RIV-01-TCn	1	SB				N	✓				
6	RIVER-02	RIV-TB-TCn	1	RW	1545			"	✓				
7	RIVER-02	RIV-01-DM	1	SB				N			✓		
8	RIVER-02	RIV-02-DM	1	SB							✓		
9	RIVER-02	RIV-EB-DM	1	RW	1555						✓		
10	RIVER-02	RIV-MS-DM	1	SB							✓		
11	RIVER-02	RIV-01-DHg	1	SB							✓		
12	RIVER-02	RIV-02-DHg	1	SB							✓		
For Laboratory Use Only		Matrix Codes:		Relinquished By:		Received By:		Received By:					
COC Seal:	Comments:		FW: Fresh Water	Name: Steve Jones		Name:		Name:					
Cooler Temp:			WW: Waste Water	Organization: UNH		Organization:		Organization:					
Carrier:			SB: Sea and Brackish Water	Date & Time: 10/29/18 16:00		Date & Time:		Date & Time:					
VTSR:			SS: Soil and Sediment	Tracking number:									
# of Coolers:			TS: Plant and Animal Tissue										
			HC: Hydrocarbons										
			TR: Trap										
			OT: Other										
Sample Disposal:		CRW: Reagent Water		By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.		Customer Approval:		Date:					
<input type="checkbox"/> Return (shipping fees may apply)													
<input checked="" type="checkbox"/> Standard Disposal - 30 Days after report													
<input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)													



Frontier Global Sciences

Chain of Custody Record & Laboratory Analysis Request:  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

Page 2 of 2

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Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

Client: UNDERWOOD ENGINEERS, INC.						Contact: Tim Puls						Analyses Requested Total Metals (TM) Total Cu (TCu) Dissolved Metals (DM) Dissolved Mercury (DHg)				EFGS PM:	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Phone: (603) 436-6192 Fax:										Date:	
Project Name: RIVER SAMPLES						E-mail: tpuls@underwoodengineers.com										TAT (business days) <u>20</u> (std)	
Report To: Tim Puls						Contract/PO:										15 10 5 4 3 2 24 hrs.	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Invoice To: <i>Client</i>										(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)	
Phone: (603) 436-6192 Fax:						Address:						Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N					
E-mail: tpuls@underwoodengineers.com						E-mail:						(If yes, please contact PM)					
												EDD <input type="checkbox"/> Y <input type="checkbox"/> N					
												QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High					
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Total Metals (TM)	Total Cu (TCu)	Dissolved Metals (DM)	Dissolved Mercury (DHg)	Comments				
1	RIVER-02	RIV-EB-DHg	1	RW	10/12/18 16:00	JEL	N	N				✓	Total Metals include: Sb, Be, Cr, Fe, Ti  Dissolved Metals include: As, Cd, Cu, Pb, Ni, Se, Ag, Zn				
2	RIVER-02	RIV-MS-DHg	1	SB	11	✓	N	N				✓					
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	

For Laboratory Use Only		Matrix Codes:		Relinquished By:		Received By:		Received By:	
COC Seal:	Comments:	FW: Fresh Water	FW: Fresh Water WW: Waste Water SB: Sea and Brackish Water SS: Soil and Sediment TS: Plant and Animal Tissue HC: Hydrocarbons TR: Trap OT: Other	<i>[Signature]</i>		<i>[Signature]</i>			
Cooler Temp:		Name: <i>Steve Jones</i>		Name:		Name:			
Carrier:		Organization: <i>UNH</i>		Organization:		Organization:			
VTSR:		Date & Time: <i>10/23/18 16:00</i>		Date & Time:		Date & Time:			
# of Coolers:		Tracking number:							

Sample Disposal:  
☐ Return (shipping fees may apply)  
☒ Standard Disposal - 30 Days after report  
☐ Retain for \_\_\_ weeks after report (storage fees may apply)

*RW: Reagent Water*

By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.

Customer Approval: \_\_\_\_\_ Date: \_\_\_\_\_

**SUBCONTRACT ORDER**  
Eurofins Frontier Global Sciences, Inc.  
**8J01083**

**SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

**Analysis**

**Comments**

**Sample ID:** RIVER-02 RIV\_01\_TCn

**EFGS Lab ID:** 8J01083-05

**Matrix:** Water

**Sampled:** 18-Oct-18 15:40 (GMT-05:00) Eastern Time (US &  
**Arrived on** 10/26/18, temp 0.4C LEL 10/29/18

**Due:** 28-Nov-18 19:00

**Misc. Subcontract 1**

EPA SM4500 CN E

*Containers Supplied:*

250 mL PETG (A)

**Sample ID:** RIVER-02 RIV\_TB\_TCn

**EFGS Lab ID:** 8J01083-06

**Matrix:** Water

**Sampled:** 18-Oct-18 15:45 (GMT-05:00) Eastern Time (US &  
**Arrived on** 10/26/18, temp 0.4C LEL 10/29/18

**Due:** 28-Nov-18 19:00

**Misc. Subcontract 1**

EPA SM4500 CN E

*Containers Supplied:*

250 mL PETG (A)

17866-050 01 5174 4334

 10.30.18  
\_\_\_\_\_  
Date  
 10/30/18  
\_\_\_\_\_  
Date

Received By  
\_\_\_\_\_  
Date

Received By  
\_\_\_\_\_  
Date



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:30

**RIVER-02 RIV\_01\_TM**

**8J01083-01**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
---------	--------	-----------------	-----------------	-------	----------	-------	----------	----------	----------	--------	-------

**Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion**

<b>Antimony</b>	<b>0.624</b>	0.091	0.202	µg/L	10	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	R-05
Beryllium	ND	0.040	0.606	µg/L	10	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	U, R-05
<b>Chromium</b>	<b>0.43</b>	0.20	1.01	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	R-05, J
<b>Iron</b>	<b>189</b>	11	101	µg/L	10	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	R-05
Thallium	ND	0.061	0.202	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U, R-05

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
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**RIVER-02 RIV\_02\_TM**

**8J01083-02**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Antimony</b>	<b>0.240</b>	0.091	0.202	µg/L	10	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	R-05
Beryllium	ND	0.040	0.606	µg/L	10	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	U, R-05
<b>Chromium</b>	<b>0.47</b>	0.20	1.01	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	R-05, J
<b>Iron</b>	<b>173</b>	11	101	µg/L	10	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	R-05
Thallium	ND	0.061	0.202	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U, R-05

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**RIVER-02 RIV\_EB\_TM**  
**8J01083-03**

Analyte	Detection		Reporting	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
	Result	Limit	Limit								
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	ND	0.009	0.020	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	U
Beryllium	ND	0.004	0.061	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	U
Chromium	0.06	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	J
Iron	ND	1	10	µg/L	1	F811325	12-Nov-18	8K16011	15-Nov-18	EPA 200.8	U
Thallium	ND	0.006	0.020	µg/L	1	F811271	12-Nov-18	8K16013	15-Nov-18	EPA 200.8	U

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Project Manager: Tim Puls

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**RIVER-02 RIV\_01\_DM**  
**8J01083-07**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
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**Sample Preparation: EFGS SOP2820 Reductive Precipitation**

Arsenic	0.88	0.04	0.38	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	
Cadmium	0.038	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Chromium	0.13	0.01	0.25	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Copper	0.53	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	
Lead	0.024	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Nickel	0.41	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Selenium	ND	0.16	1.50	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640 Mod.	U
Silver	0.02	0.01	0.10	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Zinc	0.91	0.14	0.50	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	

**Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion**

Arsenic	3.47	1.01	3.03	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	R-05
Cadmium	ND	0.081	0.202	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U, R-05
Copper	0.55	0.20	1.01	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	R-05, J
Lead	ND	0.050	0.404	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U, R-05
Nickel	0.63	0.40	1.01	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	R-05, J
Selenium	14.3	4.44	6.06	µg/L	10	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	R-05
Silver	ND	0.020	0.202	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U, R-05
Zinc	2.43	1.62	5.05	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	R-05, J

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**RIVER-02 RIV\_02\_DM**  
**8J01083-08**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
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**Sample Preparation: EFGS SOP2820 Reductive Precipitation**

Arsenic	1.02	0.04	0.38	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	
Cadmium	0.042	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Chromium	0.17	0.01	0.25	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Copper	0.52	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	
Lead	0.028	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Nickel	0.41	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Selenium	ND	0.16	1.50	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640 Mod.	U
Silver	0.02	0.01	0.10	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Zinc	1.24	0.14	0.50	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	

**Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion**

Arsenic	3.45	1.01	3.03	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	R-05
Cadmium	ND	0.081	0.202	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U, R-05
Copper	0.56	0.20	1.01	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	R-05, J
Lead	ND	0.050	0.404	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U, R-05
Nickel	0.64	0.40	1.01	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	R-05, J
Selenium	16.9	4.44	6.06	µg/L	10	F811325	12-Nov-18	8K26022	21-Nov-18	EPA 200.8	R-05
Silver	ND	0.020	0.202	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U, R-05
Zinc	2.92	1.62	5.05	µg/L	10	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	R-05, J

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Project Manager: Tim Puls

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**RIVER-02 RIV\_EB\_DM**  
**8J01083-09**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
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**Sample Preparation: EFGS SOP2820 Reductive Precipitation**

Arsenic	ND	0.04	0.38	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	U
<b>Cadmium</b>	<b>0.026</b>	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
<b>Chromium</b>	<b>0.06</b>	0.01	0.25	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Copper	ND	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	U
Lead	ND	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	U
<b>Nickel</b>	<b>0.17</b>	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Selenium	ND	0.16	1.50	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640 Mod.	U
<b>Silver</b>	<b>0.03</b>	0.01	0.10	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
<b>Zinc</b>	<b>0.32</b>	0.14	0.50	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J

**Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion**

Arsenic	ND	0.10	0.30	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Cadmium	ND	0.008	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Copper	ND	0.02	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Lead	ND	0.005	0.040	µg/L	1	F811271	12-Nov-18	8K16013	16-Nov-18	EPA 200.8	U
Nickel	ND	0.04	0.10	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
Selenium	ND	0.44	0.61	µg/L	1	F811325	12-Nov-18	8K16011	16-Nov-18	EPA 200.8	U
Silver	ND	0.002	0.020	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	U
<b>Zinc</b>	<b>0.26</b>	0.16	0.50	µg/L	1	F811271	12-Nov-18	8K15007	14-Nov-18	EPA 200.8	J

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Project Manager: Tim Puls

**Reported:**  
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**RIVER-02 RIV\_01\_DHg**  
**8J01083-11**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	1.38	0.08	0.50	ng/L	1	F810476	29-Oct-18	8K01002	31-Oct-18	EPA 1631E	

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**RIVER-02 RIV\_02\_DHg**  
**8J01083-12**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	1.21	0.08	0.50	ng/L	1	F810476	29-Oct-18	8K01002	31-Oct-18	EPA 1631E	

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**RIVER-02 RIV\_EB\_DHg**  
**8J01083-13**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	ND	0.08	0.50	ng/L	1	F810476	29-Oct-18	8K01002	31-Oct-18	EPA 1631E	U

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Project Manager: Tim Puls

**Reported:**  
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**RIVER-02 RIV\_MS\_DHg**  
**8J01083-14**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	1.18	0.08	0.50	ng/L	1	F810476	29-Oct-18	8K01002	31-Oct-18	EPA 1631E	

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Project Manager: Tim Puls

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F810476 - EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Blank (F810476-BLK1)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810476-BLK2)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810476-BLK3)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F810476-BLK4)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	ND	1.65	9.90	ng/L							QB-08, U
<b>LCS (F810476-BS1)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	14.30	0.08	0.50	ng/L	14.688		97.4	80-120			
<b>LCS Dup (F810476-BSD1)</b>					Prepared & Analyzed: 31-Oct-18						
Mercury	14.37	0.08	0.50	ng/L	14.688		97.8	80-120	0.481	24	
<b>Duplicate (F810476-DUP1)</b>		<b>Source: 8J00788-06</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	7.83	0.08	0.50	ng/L		7.96			1.66	24	AD
<b>Matrix Spike (F810476-MS1)</b>		<b>Source: 8J01082-06</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	5.83	0.08	0.50	ng/L	5.0702	1.45	86.5	71-125			AS
<b>Matrix Spike (F810476-MS2)</b>		<b>Source: 8J01082-15</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	11.16	0.08	0.50	ng/L	10.140	2.16	88.7	71-125			AS
<b>Matrix Spike (F810476-MS3)</b>		<b>Source: 8J01083-11</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	5.99	0.08	0.50	ng/L	5.0702	1.38	90.9	71-125			AS

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F810476 - EFGS SOP2796 EPA 1631 Oxidation

<b>Matrix Spike Dup (F810476-MSD1)</b>		<b>Source: 8J01082-06</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	5.72	0.08	0.50	ng/L	5.0702	1.45	84.3	71-125	1.90	24	AS
<b>Matrix Spike Dup (F810476-MSD2)</b>		<b>Source: 8J01082-15</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	11.42	0.08	0.50	ng/L	10.140	2.16	91.3	71-125	2.33	24	AS
<b>Matrix Spike Dup (F810476-MSD3)</b>		<b>Source: 8J01083-11</b>			Prepared & Analyzed: 31-Oct-18						
Mercury	5.71	0.08	0.50	ng/L	5.0702	1.38	85.3	71-125	4.83	24	AS

#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Blank (F811271-BLK1)</b>		Prepared: 12-Nov-18 Analyzed: 14-Nov-18									
Silver	0.002	0.002	0.020	µg/L							J
<b>Blank (F811271-BLK2)</b>		Prepared: 12-Nov-18 Analyzed: 14-Nov-18									
Silver	ND	0.002	0.020	µg/L							U
<b>Blank (F811271-BLK3)</b>		Prepared: 12-Nov-18 Analyzed: 15-Nov-18									
Arsenic	ND	0.10	0.30	µg/L							U
Silver	ND	0.002	0.020	µg/L							U
<b>Blank (F811271-BLK4)</b>		Prepared: 12-Nov-18 Analyzed: 15-Nov-18									
Arsenic	ND	0.10	0.30	µg/L							U
Silver	ND	0.002	0.020	µg/L							U
<b>LCS (F811271-BS1)</b>		Prepared: 12-Nov-18 Analyzed: 14-Nov-18									
Silver	25.00	0.010	0.100	µg/L	25.000		100	85-115			

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Underwood Engineers  
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Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:30

**Quality Control Data**

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion**

<b>LCS (F811271-BS2)</b>					Prepared: 12-Nov-18 Analyzed: 15-Nov-18						
Arsenic	43.99	0.50	1.50	µg/L	50.000		88.0	85-115			
Silver	22.77	0.010	0.100	µg/L	25.000		91.1	85-115			
<b>LCS (F811271-BS3)</b>					Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	46.85	0.50	1.50	µg/L	50.000		93.7	85-115			
<b>LCS Dup (F811271-BSD1)</b>					Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	24.71	0.010	0.100	µg/L	25.000		98.8	85-115	1.18	20	
<b>LCS Dup (F811271-BSD2)</b>					Prepared: 12-Nov-18 Analyzed: 15-Nov-18						
Arsenic	42.68	0.50	1.50	µg/L	50.000		85.4	85-115	3.03	20	
Silver	21.80	0.010	0.100	µg/L	25.000		87.2	85-115	4.33	20	
<b>LCS Dup (F811271-BSD3)</b>					Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	47.99	0.50	1.50	µg/L	50.000		96.0	85-115	2.40	20	
<b>Matrix Spike (F811271-MS1)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	25.05	0.020	0.202	µg/L	25.000	0.267	99.1	70-130			
<b>Matrix Spike (F811271-MS2)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	23.85	0.020	0.202	µg/L	25.000	ND	95.4	70-130			
<b>Matrix Spike (F811271-MS3)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	58.20	1.01	3.04	µg/L	50.000	3.36	110	70-130			
Silver	21.78	0.020	0.202	µg/L	25.000	ND	87.1	70-130			
<b>Matrix Spike (F811271-MS4)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	59.38	1.01	3.04	µg/L	50.000	3.47	112	70-130			
Silver	21.63	0.020	0.202	µg/L	25.000	ND	86.5	70-130			

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811271-MS5)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	16.82	0.020	0.202	µg/L	20.500	0.267	80.7	70-130			AS
<b>Matrix Spike (F811271-MS6)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	14.78	0.020	0.202	µg/L	20.500	ND	72.1	70-130			AS
<b>Matrix Spike (F811271-MS7)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	371.4	1.01	3.03	µg/L	410.00	3.36	89.8	70-130			AS
Silver	15.09	0.020	0.202	µg/L	20.500	ND	73.6	70-130			AS
<b>Matrix Spike (F811271-MS8)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	363.2	1.01	3.03	µg/L	410.00	3.47	87.7	70-130			AS
Silver	14.85	0.020	0.202	µg/L	20.500	ND	72.4	70-130			AS
<b>Matrix Spike (F811271-MS9)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	47.34	1.01	3.04	µg/L	50.000	ND	94.7	70-130			
Silver	23.28	0.020	0.202	µg/L	25.000	0.267	92.1	70-130			
<b>Matrix Spike (F811271-MSA)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	53.92	1.01	3.04	µg/L	50.000	4.57	98.7	70-130			
Silver	23.56	0.020	0.202	µg/L	25.000	ND	94.2	70-130			
<b>Matrix Spike (F811271-MSB)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	402.8	1.01	3.03	µg/L	410.00	ND	98.2	70-130			AS
Silver	20.62	0.020	0.202	µg/L	20.500	0.267	99.3	70-130			AS
<b>Matrix Spike (F811271-MSC)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	419.0	1.01	3.03	µg/L	410.00	4.57	101	70-130			AS
Silver	20.11	0.020	0.202	µg/L	20.500	ND	98.1	70-130			AS

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<b>Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Matrix Spike (F811271-MSD)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	47.99	2.53	7.59	µg/L	50.000	ND	96.0	70-130			
<b>Matrix Spike Dup (F811271-MSD1)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	25.17	0.020	0.202	µg/L	25.000	0.267	99.6	70-130	0.485	20	
<b>Matrix Spike Dup (F811271-MSD2)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	24.91	0.020	0.202	µg/L	25.000	ND	99.6	70-130	4.33	20	
<b>Matrix Spike Dup (F811271-MSD3)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	57.97	1.01	3.04	µg/L	50.000	3.36	109	70-130	0.401	20	
Silver	21.73	0.020	0.202	µg/L	25.000	ND	86.9	70-130	0.206	20	
<b>Matrix Spike Dup (F811271-MSD4)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	58.98	1.01	3.04	µg/L	50.000	3.47	111	70-130	0.674	20	
Silver	22.47	0.020	0.202	µg/L	25.000	ND	89.9	70-130	3.80	20	
<b>Matrix Spike Dup (F811271-MSD5)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	16.03	0.020	0.202	µg/L	20.500	0.267	76.9	70-130	4.77	20	AS
<b>Matrix Spike Dup (F811271-MSD6)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Silver	15.97	0.020	0.202	µg/L	20.500	ND	77.9	70-130	7.76	20	AS
<b>Matrix Spike Dup (F811271-MSD7)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	340.7	1.01	3.03	µg/L	410.00	3.36	82.3	70-130	8.64	20	AS
Silver	13.99	0.020	0.202	µg/L	20.500	ND	68.2	70-130	7.60	20	AS, QM-05
<b>Matrix Spike Dup (F811271-MSD8)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Arsenic	368.5	1.01	3.03	µg/L	410.00	3.47	89.0	70-130	1.46	20	AS
Silver	14.91	0.020	0.202	µg/L	20.500	ND	72.7	70-130	0.386	20	AS

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<b>Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Matrix Spike Dup (F811271-MSD9)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	49.40	1.01	3.04	µg/L	50.000	ND	98.8	70-130	4.27	20	
Silver	24.61	0.020	0.202	µg/L	25.000	0.267	97.4	70-130	5.52	20	
<b>Matrix Spike Dup (F811271-MSDA)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	53.57	1.01	3.04	µg/L	50.000	4.57	98.0	70-130	0.649	20	
Silver	23.92	0.020	0.202	µg/L	25.000	ND	95.7	70-130	1.54	20	
<b>Matrix Spike Dup (F811271-MSDB)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	403.7	1.01	3.03	µg/L	410.00	ND	98.5	70-130	0.219	20	AS
Silver	20.79	0.020	0.202	µg/L	20.500	0.267	100	70-130	0.794	20	AS
<b>Matrix Spike Dup (F811271-MSDC)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Arsenic	421.7	1.01	3.03	µg/L	410.00	4.57	102	70-130	0.650	20	AS
Silver	20.20	0.020	0.202	µg/L	20.500	ND	98.6	70-130	0.470	20	AS
<b>Matrix Spike Dup (F811271-MSDD)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	47.81	2.53	7.59	µg/L	50.000	ND	95.6	70-130	0.386	20	
<b>Matrix Spike Dup (F811271-MSDE)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Arsenic	51.28	2.53	7.59	µg/L	50.000	4.57	93.4	70-130	1.98	20	
<b>Matrix Spike Dup (F811271-MSDF)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Arsenic	1003	2.52	7.57	µg/L	1025.0	ND	97.9	70-130	0.485	20	AS
<b>Matrix Spike Dup (F811271-MSDG)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Arsenic	1020	2.52	7.57	µg/L	1025.0	4.57	99.0	70-130	0.361	20	AS
<b>Matrix Spike (F811271-MSE)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Arsenic	52.30	2.53	7.59	µg/L	50.000	4.57	95.5	70-130			

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Matrix Spike (F811271-MSF)

Source: 8J01082-01

Prepared: 12-Nov-18 Analyzed: 20-Nov-18

Arsenic	1008	2.52	7.57	µg/L	1025.0	ND	98.3	70-130			AS
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##### Matrix Spike (F811271-MSG)

Source: 8J01082-10

Prepared: 12-Nov-18 Analyzed: 21-Nov-18

Arsenic	1016	2.52	7.57	µg/L	1025.0	4.57	98.7	70-130			AS
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#### Batch F812486 - EFGS SOP2820 Reductive Precipitation

##### Blank (F812486-BLK1)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Chromium	0.07	0.01	0.25	µg/L							J
Nickel	0.23	0.08	0.25	µg/L							J
Zinc	0.47	0.14	0.50	µg/L							J
Silver	0.02	0.01	0.10	µg/L							J
Cadmium	0.022	0.020	0.100	µg/L							J
Lead	ND	0.020	0.100	µg/L							U

##### Blank (F812486-BLK2)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Chromium	0.05	0.01	0.25	µg/L							J
Nickel	0.21	0.08	0.25	µg/L							J
Zinc	0.31	0.14	0.50	µg/L							J
Silver	0.02	0.01	0.10	µg/L							J
Cadmium	0.020	0.020	0.100	µg/L							J
Lead	ND	0.020	0.100	µg/L							U

##### Blank (F812486-BLK3)

Prepared: 02-Jan-19 Analyzed: 07-Jan-19

Copper	ND	0.08	0.25	µg/L							U
Arsenic	ND	0.04	0.38	µg/L							U
Selenium	ND	0.16	1.50	µg/L							U

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#### Batch F812486 - EFGS SOP2820 Reductive Precipitation

##### Blank (F812486-BLK4)

Prepared: 02-Jan-19 Analyzed: 07-Jan-19

Copper	ND	0.08	0.25	µg/L							U
Arsenic	ND	0.04	0.38	µg/L							U
Selenium	ND	0.16	1.50	µg/L							U

##### LCS (F812486-BS1)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Silver	4.68	0.05	0.50	µg/L	6.2500		74.9	30-151			
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##### LCS (F812486-BS2)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Chromium	10.47	0.01	0.25	µg/L	12.498		83.8	75-125			
Nickel	9.55	0.08	0.25	µg/L	12.502		76.4	71-130			
Lead	10.58	0.020	0.100	µg/L	12.502		84.6	62-129			

##### LCS (F812486-BS3)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Zinc	11.13	0.69	2.50	µg/L	12.502		89.0	75-95			
Cadmium	8.920	0.101	0.500	µg/L	10.002		89.2	73-105			

##### LCS (F812486-BS4)

Prepared: 02-Jan-19 Analyzed: 07-Jan-19

Copper	10.92	0.08	0.25	µg/L	12.500		87.4	77-109			
Arsenic	9.84	0.04	0.38	µg/L	12.500		78.8	58-110			
Selenium	11.11	0.16	1.50	µg/L	12.498		88.9	70-120			

##### LCS Dup (F812486-BSD1)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Silver	2.54	0.05	0.50	µg/L	6.2500		40.7	30-151	59.2	20	QR-06
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##### LCS Dup (F812486-BSD2)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Chromium	10.12	0.01	0.25	µg/L	12.498		80.9	75-125	3.43	20	
Nickel	9.17	0.08	0.25	µg/L	12.502		73.4	71-130	4.04	20	
Lead	10.26	0.020	0.100	µg/L	12.502		82.1	62-129	3.06	20	

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#### Batch F812486 - EFGS SOP2820 Reductive Precipitation

##### LCS Dup (F812486-BSD3)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Zinc	9.46	0.69	2.50	µg/L	12.502		75.7	75-95	16.2	20	
Cadmium	8.082	0.101	0.500	µg/L	10.002		80.8	73-105	9.86	20	

##### LCS Dup (F812486-BSD4)

Prepared: 02-Jan-19 Analyzed: 07-Jan-19

Copper	12.19	0.08	0.25	µg/L	12.500		97.5	77-109	11.0	20	
Arsenic	9.93	0.04	0.38	µg/L	12.500		79.4	58-110	0.825	20	
Selenium	11.07	0.16	1.50	µg/L	12.498		88.6	70-120	0.327	25	

##### Matrix Spike (F812486-MS1)

Source: 8J01083-07

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Silver	4.40	0.05	0.50	µg/L	6.2500	ND	70.4	30-151			
Cadmium	9.480	0.101	0.500	µg/L	10.002	ND	94.8	73-105			

##### Matrix Spike (F812486-MS2)

Source: 8K00762-08

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Silver	5.83	0.05	0.50	µg/L	6.2500	ND	93.2	30-151			
Cadmium	9.482	0.101	0.500	µg/L	10.002	ND	94.8	73-105			

##### Matrix Spike (F812486-MS3)

Source: 8J01083-07

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Chromium	11.63	0.01	0.25	µg/L	12.498	0.13	92.0	75-125			
Nickel	6.93	0.08	0.25	µg/L	12.502	0.41	52.2	71-130			QM-05
Zinc	12.02	0.14	0.50	µg/L	12.502	0.91	88.9	75-95			
Lead	11.71	0.020	0.100	µg/L	12.502	0.024	93.5	62-129			

##### Matrix Spike (F812486-MS4)

Source: 8K00762-08

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Chromium	12.04	0.01	0.25	µg/L	12.498	0.22	94.5	75-125			
Nickel	10.72	0.08	0.25	µg/L	12.502	0.68	80.3	71-130			
Zinc	13.54	0.14	0.50	µg/L	12.502	2.11	91.4	75-95			
Lead	11.97	0.020	0.100	µg/L	12.502	0.103	94.9	62-129			

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Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:30

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812486 - EFGS SOP2820 Reductive Precipitation

<b>Matrix Spike (F812486-MS5)</b>		<b>Source: 8J01083-07RE1</b>			Prepared: 02-Jan-19 Analyzed: 07-Jan-19						
Copper	13.48	0.08	0.25	µg/L	12.500	0.53	104	77-109			
Arsenic	11.88	0.04	0.38	µg/L	12.500	0.88	88.0	58-110			
Selenium	8.22	0.16	1.50	µg/L	12.498	ND	65.8	42-131			
<b>Matrix Spike (F812486-MS6)</b>		<b>Source: 8K00762-08RE1</b>			Prepared: 02-Jan-19 Analyzed: 07-Jan-19						
Copper	13.24	0.08	0.25	µg/L	12.500	0.58	101	77-109			
Arsenic	12.14	0.04	0.38	µg/L	12.500	0.76	91.0	58-110			
Selenium	11.75	0.16	1.50	µg/L	12.498	ND	94.0	42-131			
<b>Matrix Spike Dup (F812486-MSD1)</b>		<b>Source: 8J01083-07</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Silver	5.27	0.05	0.50	µg/L	6.2500	ND	84.3	30-151	17.9	20	
Cadmium	9.298	0.101	0.500	µg/L	10.002	ND	93.0	73-105	1.93	20	
<b>Matrix Spike Dup (F812486-MSD2)</b>		<b>Source: 8K00762-08</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Silver	5.48	0.05	0.50	µg/L	6.2500	ND	87.7	30-151	6.10	20	
Cadmium	8.670	0.101	0.500	µg/L	10.002	ND	86.7	73-105	8.94	20	
<b>Matrix Spike Dup (F812486-MSD3)</b>		<b>Source: 8J01083-07</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Chromium	12.13	0.01	0.25	µg/L	12.498	0.13	96.0	75-125	4.20	20	
Nickel	8.43	0.08	0.25	µg/L	12.502	0.41	64.2	71-130	19.5	20	QM-05
Zinc	12.08	0.14	0.50	µg/L	12.502	0.91	89.3	75-95	0.499	20	
Lead	12.27	0.020	0.100	µg/L	12.502	0.024	98.0	62-129	4.67	20	
<b>Matrix Spike Dup (F812486-MSD4)</b>		<b>Source: 8K00762-08</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Chromium	11.57	0.01	0.25	µg/L	12.498	0.22	90.8	75-125	3.99	20	
Nickel	10.56	0.08	0.25	µg/L	12.502	0.68	79.0	71-130	1.53	20	
Zinc	12.85	0.14	0.50	µg/L	12.502	2.11	85.9	75-95	5.21	20	
Lead	11.54	0.020	0.100	µg/L	12.502	0.103	91.5	62-129	3.61	20	

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#### Batch F812486 - EFGS SOP2820 Reductive Precipitation

<b>Matrix Spike Dup (F812486-MSD5)</b>		<b>Source: 8J01083-07RE1</b>				Prepared: 02-Jan-19 Analyzed: 07-Jan-19					
Copper	13.63	0.08	0.25	µg/L	12.500	0.53	105	77-109	1.10	20	
Arsenic	12.09	0.04	0.38	µg/L	12.500	0.88	89.6	58-110	1.71	20	
Selenium	8.23	0.16	1.50	µg/L	12.498	ND	65.8	42-131	0.0359	25	
<b>Matrix Spike Dup (F812486-MSD6)</b>		<b>Source: 8K00762-08RE1</b>				Prepared: 02-Jan-19 Analyzed: 07-Jan-19					
Copper	13.39	0.08	0.25	µg/L	12.500	0.58	102	77-109	1.14	20	
Arsenic	12.22	0.04	0.38	µg/L	12.500	0.76	91.7	58-110	0.696	20	
Selenium	11.41	0.16	1.50	µg/L	12.498	ND	91.3	42-131	2.92	25	

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F811271-BLK2)

Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Cadmium	ND	0.008	0.020	µg/L							U
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##### Blank (F811271-BLK3)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Chromium	ND	0.02	0.10	µg/L							U
Nickel	ND	0.04	0.10	µg/L							U
Copper	ND	0.02	0.10	µg/L							U
Zinc	0.16	0.16	0.50	µg/L							J
Cadmium	ND	0.008	0.020	µg/L							U
Thallium	ND	0.006	0.020	µg/L							U
Lead	ND	0.005	0.040	µg/L							U

##### Blank (F811271-BLK4)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Chromium	ND	0.02	0.10	µg/L							U
Nickel	ND	0.04	0.10	µg/L							U
Copper	ND	0.02	0.10	µg/L							U
Zinc	0.32	0.16	0.50	µg/L							J
Cadmium	ND	0.008	0.020	µg/L							U
Thallium	ND	0.006	0.020	µg/L							U
Lead	ND	0.005	0.040	µg/L							U

##### LCS (F811271-BS2)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Zinc	47.20	0.80	2.50	µg/L	50.010		94.4	85-115			
Cadmium	36.41	0.040	0.100	µg/L	40.010		91.0	85-115			
Thallium	35.20	0.030	0.100	µg/L	39.990		88.0	85-115			
Lead	46.08	0.025	0.200	µg/L	50.010		92.1	85-115			

##### LCS (F811271-BS3)

Prepared: 12-Nov-18 Analyzed: 20-Nov-18

Chromium	48.05	0.10	0.50	µg/L	49.990		96.1	85-115			
Nickel	49.10	0.20	0.50	µg/L	50.010		98.2	85-115			
Copper	48.43	0.10	0.50	µg/L	50.000		96.9	85-115			
Zinc	48.46	0.80	2.50	µg/L	50.010		96.9	85-115			

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### LCS Dup (F811271-BSD2)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Zinc	43.41	0.80	2.50	µg/L	50.010		86.8	85-115	8.36	20	
Cadmium	35.03	0.040	0.100	µg/L	40.010		87.6	85-115	3.86	20	
Thallium	36.16	0.030	0.100	µg/L	39.990		90.4	85-115	2.68	20	
Lead	46.71	0.025	0.200	µg/L	50.010		93.4	85-115	1.36	20	

##### LCS Dup (F811271-BSD3)

Prepared: 12-Nov-18 Analyzed: 20-Nov-18

Chromium	49.37	0.10	0.50	µg/L	49.990		98.8	85-115	2.70	20	
Nickel	50.87	0.20	0.50	µg/L	50.010		102	85-115	3.53	20	
Copper	50.70	0.10	0.50	µg/L	50.000		101	85-115	4.57	20	
Zinc	49.72	0.80	2.50	µg/L	50.010		99.4	85-115	2.56	20	

##### Matrix Spike (F811271-MS1)

Source: 8J01082-01

Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Thallium	38.04	0.061	0.202	µg/L	39.990	ND	95.1	70-130			
Lead	51.14	0.051	0.405	µg/L	50.010	2.002	98.2	70-130			

##### Matrix Spike (F811271-MS2)

Source: 8J01082-10

Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Thallium	39.59	0.061	0.202	µg/L	39.990	ND	99.0	70-130			
Lead	51.25	0.051	0.405	µg/L	50.010	0.224	102	70-130			

##### Matrix Spike (F811271-MS3)

Source: 8J01083-01

Prepared: 12-Nov-18 Analyzed: 14-Nov-18

Chromium	48.61	0.20	1.01	µg/L	49.990	0.43	96.4	70-130			
Nickel	44.70	0.40	1.01	µg/L	50.010	0.62	88.1	70-130			
Copper	44.41	0.20	1.01	µg/L	50.000	0.61	87.6	70-130			
Zinc	57.34	1.62	5.06	µg/L	50.010	2.90	109	70-130			
Cadmium	37.45	0.081	0.202	µg/L	40.010	ND	93.6	70-130			
Thallium	45.92	0.061	0.202	µg/L	39.990	ND	115	70-130			
Lead	55.39	0.051	0.405	µg/L	50.010	0.314	110	70-130			

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811271-MS4)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	48.26	0.20	1.01	µg/L	49.990	ND	96.5	70-130			
Nickel	44.11	0.40	1.01	µg/L	50.010	0.63	87.0	70-130			
Copper	43.40	0.20	1.01	µg/L	50.000	0.55	85.7	70-130			
Zinc	60.07	1.62	5.06	µg/L	50.010	2.43	115	70-130			
Cadmium	37.46	0.081	0.202	µg/L	40.010	ND	93.6	70-130			
Thallium	46.91	0.061	0.202	µg/L	39.990	ND	117	70-130			
Lead	55.92	0.051	0.405	µg/L	50.010	ND	112	70-130			
<b>Matrix Spike (F811271-MS5)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Cadmium	33.90	0.081	0.202	µg/L	41.000	ND	82.7	70-130			AS
Thallium	15.39	0.061	0.202	µg/L	20.500	ND	75.1	70-130			AS
Lead	80.71	0.050	0.404	µg/L	102.50	2.002	76.8	70-130			AS
<b>Matrix Spike (F811271-MS6)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Thallium	14.36	0.061	0.202	µg/L	20.500	ND	70.0	70-130			AS
Lead	73.06	0.050	0.404	µg/L	102.50	0.224	71.1	70-130			AS
<b>Matrix Spike (F811271-MS7)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	307.1	0.20	1.01	µg/L	410.00	0.43	74.8	70-130			AS
Nickel	353.2	0.40	1.01	µg/L	512.50	0.62	68.8	70-130			AS, QM-05
Copper	351.0	0.20	1.01	µg/L	512.50	0.61	68.4	70-130			AS, QM-05
Zinc	842.1	1.62	5.05	µg/L	1025.0	2.90	81.9	70-130			AS
Cadmium	31.02	0.081	0.202	µg/L	41.000	ND	75.7	70-130			AS
Thallium	19.00	0.061	0.202	µg/L	20.500	ND	92.7	70-130			AS
Lead	90.68	0.050	0.404	µg/L	102.50	0.314	88.2	70-130			AS
<b>Matrix Spike (F811271-MS8)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	301.3	0.20	1.01	µg/L	410.00	ND	73.5	70-130			AS
Nickel	348.5	0.40	1.01	µg/L	512.50	0.63	67.9	70-130			AS, QM-05
Copper	346.0	0.20	1.01	µg/L	512.50	0.55	67.4	70-130			AS, QM-05
Zinc	833.5	1.62	5.05	µg/L	1025.0	2.43	81.1	70-130			AS
Cadmium	30.12	0.081	0.202	µg/L	41.000	ND	73.5	70-130			AS
Thallium	18.75	0.061	0.202	µg/L	20.500	ND	91.5	70-130			AS
Lead	89.91	0.050	0.404	µg/L	102.50	ND	87.7	70-130			AS

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811271-MS9)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	126.5	1.62	5.06	µg/L	50.010	93.15	66.6	70-130			QM-07
Cadmium	37.58	0.081	0.202	µg/L	40.010	ND	93.9	70-130			
Thallium	39.55	0.061	0.202	µg/L	39.990	ND	98.9	70-130			
Lead	53.44	0.051	0.405	µg/L	50.010	2.002	103	70-130			
<b>Matrix Spike (F811271-MSA)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	129.0	1.62	5.06	µg/L	50.010	84.88	88.3	70-130			
Cadmium	40.99	0.081	0.202	µg/L	40.010	0.095	102	70-130			
Thallium	40.03	0.061	0.202	µg/L	39.990	ND	100	70-130			
Lead	51.59	0.051	0.405	µg/L	50.010	0.224	103	70-130			
<b>Matrix Spike (F811271-MSB)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	1073	1.62	5.05	µg/L	1025.0	93.15	95.6	70-130			AS
Cadmium	40.16	0.081	0.202	µg/L	41.000	ND	98.0	70-130			AS
Thallium	19.88	0.061	0.202	µg/L	20.500	ND	97.0	70-130			AS
Lead	104.1	0.050	0.404	µg/L	102.50	2.002	99.6	70-130			AS
<b>Matrix Spike (F811271-MSC)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	1091	1.62	5.05	µg/L	1025.0	84.88	98.1	70-130			AS
Cadmium	41.27	0.081	0.202	µg/L	41.000	0.095	100	70-130			AS
Thallium	20.16	0.061	0.202	µg/L	20.500	ND	98.4	70-130			AS
Lead	103.5	0.050	0.404	µg/L	102.50	0.224	101	70-130			AS
<b>Matrix Spike (F811271-MSD)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Chromium	49.48	0.51	2.53	µg/L	49.990	ND	99.0	70-130			
Nickel	51.31	1.01	2.53	µg/L	50.010	2.31	98.0	70-130			
Copper	51.23	0.51	2.53	µg/L	50.000	2.40	97.7	70-130			
Zinc	130.5	4.05	12.6	µg/L	50.010	93.15	74.6	70-130			

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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F811271-MSD1)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Thallium	38.24	0.061	0.202	µg/L	39.990	ND	95.6	70-130	0.530	20	
Lead	51.64	0.051	0.405	µg/L	50.010	2.002	99.3	70-130	0.985	20	
<b>Matrix Spike Dup (F811271-MSD2)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Thallium	39.04	0.061	0.202	µg/L	39.990	ND	97.6	70-130	1.41	20	
Lead	50.73	0.051	0.405	µg/L	50.010	0.224	101	70-130	1.02	20	
<b>Matrix Spike Dup (F811271-MSD3)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	47.60	0.20	1.01	µg/L	49.990	0.43	94.4	70-130	2.11	20	
Nickel	43.85	0.40	1.01	µg/L	50.010	0.62	86.5	70-130	1.91	20	
Copper	43.86	0.20	1.01	µg/L	50.000	0.61	86.5	70-130	1.25	20	
Zinc	53.91	1.62	5.06	µg/L	50.010	2.90	102	70-130	6.17	20	
Cadmium	37.70	0.081	0.202	µg/L	40.010	ND	94.2	70-130	0.660	20	
Thallium	45.45	0.061	0.202	µg/L	39.990	ND	114	70-130	1.02	20	
Lead	54.63	0.051	0.405	µg/L	50.010	0.314	109	70-130	1.38	20	
<b>Matrix Spike Dup (F811271-MSD4)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	48.85	0.20	1.01	µg/L	49.990	ND	97.7	70-130	1.21	20	
Nickel	44.40	0.40	1.01	µg/L	50.010	0.63	87.5	70-130	0.663	20	
Copper	44.52	0.20	1.01	µg/L	50.000	0.55	87.9	70-130	2.55	20	
Zinc	56.63	1.62	5.06	µg/L	50.010	2.43	108	70-130	5.89	20	
Cadmium	37.94	0.081	0.202	µg/L	40.010	ND	94.8	70-130	1.25	20	
Thallium	46.85	0.061	0.202	µg/L	39.990	ND	117	70-130	0.126	20	
Lead	56.12	0.051	0.405	µg/L	50.010	ND	112	70-130	0.354	20	
<b>Matrix Spike Dup (F811271-MSD5)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Cadmium	31.78	0.081	0.202	µg/L	41.000	ND	77.5	70-130	6.45	20	AS
Thallium	14.64	0.061	0.202	µg/L	20.500	ND	71.4	70-130	4.96	20	AS
Lead	76.99	0.050	0.404	µg/L	102.50	2.002	73.2	70-130	4.72	20	AS

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:30

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F811271-MSD6)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Thallium	15.24	0.061	0.202	µg/L	20.500	ND	74.4	70-130	6.01	20	AS
Lead	78.52	0.050	0.404	µg/L	102.50	0.224	76.4	70-130	7.21	20	AS
<b>Matrix Spike Dup (F811271-MSD7)</b>		<b>Source: 8J01083-01</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	282.3	0.20	1.01	µg/L	410.00	0.43	68.7	70-130	8.44	20	QM-05, AS
Nickel	326.0	0.40	1.01	µg/L	512.50	0.62	63.5	70-130	8.02	20	AS, QM-05
Copper	323.1	0.20	1.01	µg/L	512.50	0.61	62.9	70-130	8.30	20	AS, QM-05
Zinc	770.4	1.62	5.05	µg/L	1025.0	2.90	74.9	70-130	8.89	20	AS
Cadmium	27.78	0.081	0.202	µg/L	41.000	ND	67.8	70-130	11.0	20	AS, QM-05
Thallium	17.22	0.061	0.202	µg/L	20.500	ND	84.0	70-130	9.81	20	AS
Lead	83.23	0.050	0.404	µg/L	102.50	0.314	80.9	70-130	8.57	20	AS
<b>Matrix Spike Dup (F811271-MSD8)</b>		<b>Source: 8J01083-07</b>			Prepared: 12-Nov-18 Analyzed: 14-Nov-18						
Chromium	306.8	0.20	1.01	µg/L	410.00	ND	74.8	70-130	1.82	20	AS
Nickel	356.0	0.40	1.01	µg/L	512.50	0.63	69.3	70-130	2.14	20	AS, QM-05
Copper	349.5	0.20	1.01	µg/L	512.50	0.55	68.1	70-130	1.01	20	AS, QM-05
Zinc	839.5	1.62	5.05	µg/L	1025.0	2.43	81.7	70-130	0.716	20	AS
Cadmium	31.09	0.081	0.202	µg/L	41.000	ND	75.8	70-130	3.16	20	AS
Thallium	18.99	0.061	0.202	µg/L	20.500	ND	92.6	70-130	1.26	20	AS
Lead	91.16	0.050	0.404	µg/L	102.50	ND	88.9	70-130	1.39	20	AS
<b>Matrix Spike Dup (F811271-MSD9)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	131.8	1.62	5.06	µg/L	50.010	93.15	77.2	70-130	4.10	20	
Cadmium	40.24	0.081	0.202	µg/L	40.010	ND	101	70-130	6.85	20	
Thallium	39.37	0.061	0.202	µg/L	39.990	ND	98.5	70-130	0.452	20	
Lead	52.54	0.051	0.405	µg/L	50.010	2.002	101	70-130	1.71	20	
<b>Matrix Spike Dup (F811271-MSDA)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	127.5	1.62	5.06	µg/L	50.010	84.88	85.1	70-130	1.22	20	
Cadmium	40.31	0.081	0.202	µg/L	40.010	0.095	101	70-130	1.67	20	
Thallium	39.14	0.061	0.202	µg/L	39.990	ND	97.9	70-130	2.25	20	
Lead	50.67	0.051	0.405	µg/L	50.010	0.224	101	70-130	1.79	20	

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Project Manager: Tim Puls

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Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F811271-MSDB)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	1066	1.62	5.05	µg/L	1025.0	93.15	94.9	70-130	0.616	20	AS
Cadmium	40.21	0.081	0.202	µg/L	41.000	ND	98.1	70-130	0.114	20	AS
Thallium	20.00	0.061	0.202	µg/L	20.500	ND	97.6	70-130	0.618	20	AS
Lead	104.3	0.050	0.404	µg/L	102.50	2.002	99.8	70-130	0.215	20	AS

<b>Matrix Spike Dup (F811271-MSDC)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 16-Nov-18						
Zinc	1097	1.62	5.05	µg/L	1025.0	84.88	98.7	70-130	0.586	20	AS
Cadmium	41.36	0.081	0.202	µg/L	41.000	0.095	101	70-130	0.225	20	AS
Thallium	20.43	0.061	0.202	µg/L	20.500	ND	99.7	70-130	1.31	20	AS
Lead	104.6	0.050	0.404	µg/L	102.50	0.224	102	70-130	1.04	20	AS

<b>Matrix Spike Dup (F811271-MSDD)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Chromium	50.95	0.51	2.53	µg/L	49.990	ND	102	70-130	2.92	20	QM-05
Nickel	51.12	1.01	2.53	µg/L	50.010	2.31	97.6	70-130	0.371	20	
Copper	51.66	0.51	2.53	µg/L	50.000	2.40	98.5	70-130	0.826	20	
Zinc	125.6	4.05	12.6	µg/L	50.010	93.15	64.9	70-130	3.79	20	

<b>Matrix Spike Dup (F811271-MSDE)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Chromium	50.28	0.51	2.53	µg/L	49.990	ND	101	70-130	0.459	20	
Nickel	55.05	1.01	2.53	µg/L	50.010	4.61	101	70-130	0.976	20	
Copper	70.51	0.51	2.53	µg/L	50.000	19.84	101	70-130	1.15	20	
Zinc	123.6	4.05	12.6	µg/L	50.010	84.88	77.5	70-130	0.0994	20	

<b>Matrix Spike Dup (F811271-MSDF)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Chromium	1003	0.50	2.52	µg/L	1025.0	ND	97.8	70-130	2.36	20	AS
Nickel	1250	1.01	2.52	µg/L	1281.2	2.31	97.4	70-130	1.73	20	AS
Copper	1276	0.50	2.52	µg/L	1281.2	2.40	99.4	70-130	0.872	20	AS
Zinc	2587	4.04	12.6	µg/L	2562.5	93.15	97.3	70-130	1.28	20	AS

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Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F811271 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F811271-MSDG)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Chromium	1015	0.50	2.52	µg/L	1025.0	ND	99.0	70-130	0.647	20	AS
Nickel	1273	1.01	2.52	µg/L	1281.2	4.61	99.0	70-130	0.468	20	AS
Copper	1279	0.50	2.52	µg/L	1281.2	19.84	98.3	70-130	0.984	20	AS
Zinc	2597	4.04	12.6	µg/L	2562.5	84.88	98.0	70-130	1.18	20	AS

<b>Matrix Spike (F811271-MSE)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Chromium	50.51	0.51	2.53	µg/L	49.990	ND	101	70-130			
Nickel	54.52	1.01	2.53	µg/L	50.010	4.61	99.8	70-130			
Copper	71.32	0.51	2.53	µg/L	50.000	19.84	103	70-130			
Zinc	123.5	4.05	12.6	µg/L	50.010	84.88	77.2	70-130			

<b>Matrix Spike (F811271-MSF)</b>		<b>Source: 8J01082-01</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Chromium	1027	0.50	2.52	µg/L	1025.0	ND	100	70-130			AS
Nickel	1272	1.01	2.52	µg/L	1281.2	2.31	99.1	70-130			AS
Copper	1287	0.50	2.52	µg/L	1281.2	2.40	100	70-130			AS
Zinc	2620	4.04	12.6	µg/L	2562.5	93.15	98.6	70-130			AS

<b>Matrix Spike (F811271-MSG)</b>		<b>Source: 8J01082-10</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Chromium	1022	0.50	2.52	µg/L	1025.0	ND	99.7	70-130			AS
Nickel	1279	1.01	2.52	µg/L	1281.2	4.61	99.5	70-130			AS
Copper	1292	0.50	2.52	µg/L	1281.2	19.84	99.3	70-130			AS
Zinc	2628	4.04	12.6	µg/L	2562.5	84.88	99.2	70-130			AS

#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Blank (F811325-BLK1)</b>		Prepared: 12-Nov-18 Analyzed: 15-Nov-18									
Beryllium	ND	0.004	0.060	µg/L							U
Iron	ND	1	10	µg/L							U
Selenium	ND	0.44	0.60	µg/L							U
Antimony	0.013	0.009	0.020	µg/L							J

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#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F811325-BLK2)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Beryllium	ND	0.004	0.060	µg/L							U
Iron	ND	1	10	µg/L							U
Selenium	ND	0.44	0.60	µg/L							U
Antimony	ND	0.009	0.020	µg/L							U

##### LCS (F811325-BS1)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Antimony	38.26	0.045	0.100	µg/L	40.030		95.6	85-115			
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##### LCS (F811325-BS3)

Prepared: 12-Nov-18 Analyzed: 20-Nov-18

Beryllium	42.22	0.020	0.301	µg/L	40.010		106	85-115			
Iron	1166	6	50	µg/L	1250.0		93.3	85-115			
Selenium	49.14	2.20	3.01	µg/L	49.990		98.3	85-115			

##### LCS Dup (F811325-BSD1)

Prepared: 12-Nov-18 Analyzed: 15-Nov-18

Antimony	38.90	0.045	0.100	µg/L	40.030		97.2	85-115	1.68	20	
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##### LCS Dup (F811325-BSD3)

Prepared: 12-Nov-18 Analyzed: 20-Nov-18

Beryllium	42.41	0.020	0.301	µg/L	40.010		106	85-115	0.441	20	
Iron	1184	6	50	µg/L	1250.0		94.7	85-115	1.51	20	
Selenium	48.99	2.20	3.01	µg/L	49.990		98.0	85-115	0.306	20	

##### Matrix Spike (F811325-MS1)

Source: 8J01082-01RE1

Prepared: 12-Nov-18 Analyzed: 16-Nov-18

Antimony	42.47	0.091	0.202	µg/L	40.030	0.160	106	70-130			
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##### Matrix Spike (F811325-MS2)

Source: 8J01082-10RE1

Prepared: 12-Nov-18 Analyzed: 16-Nov-18

Antimony	40.01	0.091	0.202	µg/L	40.030	0.272	99.3	70-130			
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##### Matrix Spike (F811325-MS5)

Source: 8J01082-01RE1

Prepared: 12-Nov-18 Analyzed: 16-Nov-18

Antimony	19.46	0.091	0.202	µg/L	20.500	0.160	94.2	70-130			AS
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#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811325-MS6)</b>		<b>Source: 8J01082-10RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	19.42	0.091	0.202	µg/L	20.500	0.272	93.4	70-130			AS
<b>Matrix Spike (F811325-MS7)</b>		<b>Source: 8J01083-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	18.93	0.091	0.202	µg/L	20.500	0.409	90.3	70-130			AS
<b>Matrix Spike (F811325-MS8)</b>		<b>Source: 8J01083-07RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	19.04	0.091	0.202	µg/L	20.500	0.263	91.6	70-130			AS
<b>Matrix Spike (F811325-MS9)</b>		<b>Source: 8J01082-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 20-Nov-18							
Beryllium	42.94	0.101	1.52	µg/L	40.010	ND	107	70-130			
Iron	1241	28	253	µg/L	1250.0	62	94.4	70-130			
Selenium	50.13	11.1	15.2	µg/L	49.990	ND	100	70-130			
<b>Matrix Spike (F811325-MSA)</b>		<b>Source: 8J01082-10RE1</b>		Prepared: 12-Nov-18 Analyzed: 21-Nov-18							
Beryllium	40.52	0.101	1.52	µg/L	40.010	ND	101	70-130			
Iron	1461	28	253	µg/L	1250.0	274	94.9	70-130			
Selenium	51.93	11.1	15.2	µg/L	49.990	ND	104	70-130			
<b>Matrix Spike (F811325-MSB)</b>		<b>Source: 8J01083-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 21-Nov-18							
Beryllium	41.33	0.101	1.52	µg/L	40.010	ND	103	70-130			
Iron	1423	28	253	µg/L	1250.0	213	96.8	70-130			
Selenium	65.49	11.1	15.2	µg/L	49.990	13.20	105	70-130			
Antimony	40.96	0.228	0.506	µg/L	40.030	0.409	101	70-130			
<b>Matrix Spike (F811325-MSC)</b>		<b>Source: 8J01083-07RE1</b>		Prepared: 12-Nov-18 Analyzed: 21-Nov-18							
Beryllium	41.60	0.101	1.52	µg/L	40.010	ND	104	70-130			
Iron	1262	28	253	µg/L	1250.0	66	95.7	70-130			
Selenium	70.66	11.1	15.2	µg/L	49.990	22.60	96.1	70-130			
Antimony	40.98	0.228	0.506	µg/L	40.030	0.263	102	70-130			

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#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811325-MSD)</b>		<b>Source: 8J01082-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 20-Nov-18							
Beryllium	51.90	0.101	1.51	µg/L	51.250	ND	101	70-130			AS
Iron	5033	28	252	µg/L	5125.0	62	97.0	70-130			AS
Selenium	1023	11.1	15.1	µg/L	1025.0	ND	99.8	70-130			AS
<b>Matrix Spike Dup (F811325-MSD1)</b>		<b>Source: 8J01082-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	40.49	0.091	0.202	µg/L	40.030	0.160	101	70-130	4.77	20	
<b>Matrix Spike Dup (F811325-MSD2)</b>		<b>Source: 8J01082-10RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	39.90	0.091	0.202	µg/L	40.030	0.272	99.0	70-130	0.274	20	
<b>Matrix Spike Dup (F811325-MSD5)</b>		<b>Source: 8J01082-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	19.32	0.091	0.202	µg/L	20.500	0.160	93.5	70-130	0.732	20	AS
<b>Matrix Spike Dup (F811325-MSD6)</b>		<b>Source: 8J01082-10RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	19.76	0.091	0.202	µg/L	20.500	0.272	95.1	70-130	1.73	20	AS
<b>Matrix Spike Dup (F811325-MSD7)</b>		<b>Source: 8J01083-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	18.86	0.091	0.202	µg/L	20.500	0.409	90.0	70-130	0.380	20	AS
<b>Matrix Spike Dup (F811325-MSD8)</b>		<b>Source: 8J01083-07RE1</b>		Prepared: 12-Nov-18 Analyzed: 16-Nov-18							
Antimony	18.57	0.091	0.202	µg/L	20.500	0.263	89.3	70-130	2.47	20	AS
<b>Matrix Spike Dup (F811325-MSD9)</b>		<b>Source: 8J01082-01RE1</b>		Prepared: 12-Nov-18 Analyzed: 20-Nov-18							
Beryllium	44.18	0.101	1.52	µg/L	40.010	ND	110	70-130	2.85	20	
Iron	1252	28	253	µg/L	1250.0	62	95.3	70-130	0.883	20	
Selenium	49.17	11.1	15.2	µg/L	49.990	ND	98.4	70-130	1.94	20	
<b>Matrix Spike Dup (F811325-MSDA)</b>		<b>Source: 8J01082-10RE1</b>		Prepared: 12-Nov-18 Analyzed: 21-Nov-18							
Beryllium	39.78	0.101	1.52	µg/L	40.010	ND	99.4	70-130	1.82	20	
Iron	1427	28	253	µg/L	1250.0	274	92.2	70-130	2.34	20	
Selenium	49.34	11.1	15.2	µg/L	49.990	ND	98.7	70-130	5.13	20	

Eurofins Frontier Global Sciences, LLC

*Amy Goodall*

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amy Goodall, Project Manager

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Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:30

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F811325-MSDB)</b>		<b>Source: 8J01083-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	40.99	0.101	1.52	µg/L	40.010	ND	102	70-130	0.825	20	
Iron	1394	28	253	µg/L	1250.0	213	94.5	70-130	2.03	20	
Selenium	68.03	11.1	15.2	µg/L	49.990	13.20	110	70-130	3.81	20	
Antimony	40.42	0.228	0.506	µg/L	40.030	0.409	100	70-130	1.33	20	
<b>Matrix Spike Dup (F811325-MSDC)</b>		<b>Source: 8J01083-07RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	43.37	0.101	1.52	µg/L	40.010	ND	108	70-130	4.16	20	
Iron	4735	28	253	µg/L	1250.0	66	374	70-130	116	20	QM-07, QR-08
Selenium	69.05	11.1	15.2	µg/L	49.990	22.60	92.9	70-130	2.30	20	
Antimony	41.58	0.228	0.506	µg/L	40.030	0.263	103	70-130	1.46	20	
<b>Matrix Spike Dup (F811325-MSDD)</b>		<b>Source: 8J01082-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 20-Nov-18						
Beryllium	52.13	0.101	1.51	µg/L	51.250	ND	102	70-130	0.445	20	AS
Iron	4921	28	252	µg/L	5125.0	62	94.8	70-130	2.26	20	AS
Selenium	1014	11.1	15.1	µg/L	1025.0	ND	98.9	70-130	0.860	20	AS
<b>Matrix Spike Dup (F811325-MSDE)</b>		<b>Source: 8J01082-10RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	52.24	0.101	1.51	µg/L	51.250	ND	102	70-130	1.51	20	AS
Iron	5144	28	252	µg/L	5125.0	274	95.0	70-130	0.963	20	AS
Selenium	1039	11.1	15.1	µg/L	1025.0	ND	101	70-130	0.861	20	AS
<b>Matrix Spike Dup (F811325-MSDF)</b>		<b>Source: 8J01083-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	55.85	0.101	1.51	µg/L	51.250	ND	109	70-130	0.545	20	AS
Iron	5154	28	252	µg/L	5125.0	213	96.4	70-130	1.56	20	AS
Selenium	1073	11.1	15.1	µg/L	1025.0	13.20	103	70-130	1.22	20	AS
Antimony	50.93	0.227	0.505	µg/L	51.250	0.409	98.6	70-130	1.10	20	AS
<b>Matrix Spike Dup (F811325-MSDG)</b>		<b>Source: 8J01083-07RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	53.78	0.101	1.51	µg/L	51.250	ND	105	70-130	2.62	20	AS
Iron	4975	28	252	µg/L	5125.0	66	95.8	70-130	1.58	20	AS
Selenium	1084	11.1	15.1	µg/L	1025.0	22.60	104	70-130	0.949	20	AS
Antimony	51.26	0.227	0.505	µg/L	51.250	0.263	99.5	70-130	2.33	20	AS

Eurofins Frontier Global Sciences, LLC

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Amy Goodall, Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
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425.686.1996 Phone  
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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:30

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

#### Batch F811325 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F811325-MSE)</b>		<b>Source: 8J01082-10RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	53.03	0.101	1.51	µg/L	51.250	ND	103	70-130			AS
Iron	5194	28	252	µg/L	5125.0	274	96.0	70-130			AS
Selenium	1030	11.1	15.1	µg/L	1025.0	ND	101	70-130			AS
<b>Matrix Spike (F811325-MSF)</b>		<b>Source: 8J01083-01RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	55.54	0.101	1.51	µg/L	51.250	ND	108	70-130			AS
Iron	5235	28	252	µg/L	5125.0	213	98.0	70-130			AS
Selenium	1086	11.1	15.1	µg/L	1025.0	13.20	105	70-130			AS
Antimony	50.38	0.227	0.505	µg/L	51.250	0.409	97.5	70-130			AS
<b>Matrix Spike (F811325-MSG)</b>		<b>Source: 8J01083-07RE1</b>			Prepared: 12-Nov-18 Analyzed: 21-Nov-18						
Beryllium	55.21	0.101	1.51	µg/L	51.250	ND	108	70-130			AS
Iron	5054	28	252	µg/L	5125.0	66	97.3	70-130			AS
Selenium	1094	11.1	15.1	µg/L	1025.0	22.60	105	70-130			AS
Antimony	50.08	0.227	0.505	µg/L	51.250	0.263	97.2	70-130			AS

Eurofins Frontier Global Sciences, LLC

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Amy Goodall, Project Manager

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:30

### Notes and Definitions

- U Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
- R-05 The sample was diluted due to the presence of high levels of non-target analytes or particulates resulting in elevated reporting limits.
- QR-08 The RPD value for the MS/MSD was outside of acceptance limits. Batch QC acceptable based on matrix duplicate and/or LCS/LCSD RPD values within control limits.
- QR-06 The RPD value for the LCS/LCSD was outside of acceptance limits. Batch QC acceptable based on MS/MSD, and where applicable, matrix duplicate RPD value(s) within control limits.
- QM-07 The spike recovery was outside control limits for the MS and/or MSD. The batch was accepted based on LCS and LCSD recoveries within control limits and, when analysis permits, acceptable AS/ASD.
- QM-05 The spike recovery was outside acceptance limits for the MS/MSD and or AS/ASD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
- QB-08 The blank was preserved to 50% BrCl rather than 1%. The control limit for blanks preserved to greater than 1% BrCl is the preservation percentage multiplied by the MRL.
- J The result is an estimated concentration.
- AS This MS and/or MSD is an analytical spike and/or an analytical spike duplicate.
- AD This matrix duplicate is an analytical duplicate.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the method detection limit if reported to the MDL or above the reporting limit if reported to the MRL.
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference





**WORK ORDER NUMBER: 18-10-2296**

*The difference is service*



AIR | SOIL | WATER | MARINE CHEMISTRY

### Analytical Report For

**Client:** Eurofins Frontier Global Sciences, Inc.

**Client Project Name:** 8J01083

**Attention:** Amy Goodall  
11720 North Creek Parkway North  
Suite 4  
Bothell, WA 98011-8244

A black and white image of a handwritten signature, likely belonging to Carla Hollowell.

Approved for release on 11/07/2018 by:  
Carla Hollowell  
Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience (Calscience) certifies that the test results provided in this report meet all NELAC Institute requirements for parameters for which accreditation is required or available. Any exceptions to NELAC Institute requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.



## Contents

Client Project Name: 8J01083  
Work Order Number: 18-10-2296

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## Work Order Narrative

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Work Order: 18-10-2296Page 1 of 1

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**Condition Upon Receipt:**

Samples were received under Chain-of-Custody (COC) on 10/31/18. They were assigned to Work Order 18-10-2296.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

**Holding Times:**

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

**Quality Control:**

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

**Subcontractor Information:**

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

**Additional Comments:**

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

**DoD Projects:**

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

**Sample Summary**

---

Client:	Eurofins Frontier Global Sciences, Inc.	Work Order:	18-10-2296
	11720 North Creek Parkway North, Suite 4	Project Name:	8J01083
	Bothell, WA 98011-8244	PO Number:	
		Date/Time Received:	10/31/18 10:00
		Number of Containers:	2

---

Attn: Amy Goodall

---

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
RIVER-02 RIV_01_TcN	18-10-2296-1	10/18/18 15:40	1	Aqueous
RIVER-02 RIV_TB_TcN	18-10-2296-2	10/18/18 15:45	1	Aqueous

## Analytical Report

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 10/31/18  
Work Order: 18-10-2296  
Preparation: N/A  
Method: SM 4500-CN E  
Units: mg/L

Project: 8J01083

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
RIVER-02 RIV_01_TCn	18-10-2296-1-A	10/18/18 15:40	Aqueous	UV 9	11/01/18	11/01/18 12:35	I1101CNL1

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qualifiers</u>
Cyanide, Total	ND	0.020	1.00	

RIVER-02 RIV_TB_TCn	18-10-2296-2-A	10/18/18 15:45	Aqueous	UV 9	11/01/18	11/01/18 12:35	I1101CNL1
---------------------	----------------	----------------	---------	------	----------	----------------	-----------

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qualifiers</u>
Cyanide, Total	ND	0.020	1.00	

Method Blank	099-05-061-4307	N/A	Aqueous	UV 9	11/01/18	11/01/18 12:35	I1101CNL1
--------------	-----------------	-----	---------	------	----------	----------------	-----------

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qualifiers</u>
Cyanide, Total	ND	0.020	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

## Quality Control - LCS/LCSD

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 10/31/18  
Work Order: 18-10-2296  
Preparation: N/A  
Method: SM 4500-CN E

Project: 8J01083

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-05-061-4307	LCS	Aqueous	UV 9	11/01/18	11/01/18 12:35	I1101CNL1			
099-05-061-4307	LCSD	Aqueous	UV 9	11/01/18	11/01/18 12:35	I1101CNL1			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Cyanide, Total	0.2000	0.1660	83	0.1688	84	80-120	2	0-20	

## Glossary of Terms and Qualifiers

Work Order: 18-10-2296

Page 1 of 1

<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDS or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

**SUBCONTRACT ORDER**  
**Eurofins Frontier Global Sciences, Inc.**

8J01083

**18-10-2296****SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
 11720 North Creek Parkway North, Suite 400  
 Bothell, WA 98011  
 Phone: (425) 686-1996  
 Fax: (425) 686-3096  
 Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
 7440 Lincoln Way  
 Garden Grove, CA 92841  
 Phone :7148955494  
 Fax: x

**Analysis****Comments****Sample ID: RIVER-02 RIV\_01\_TCn****EFGS Lab ID: 8J01083-05      Matrix: Water**

**Sampled: 18-Oct-18 15:40 (GMT-05:00) Eastern Time (US &**  
**Arrived on 10/26/18, temp 0.4C LEL 10/29/18**

**Due: 28-Nov-18 19:00****Misc. Subcontract 1****EPA SM4500 CN E***Containers Supplied:*

250 mL PETG (A)

**Sample ID: RIVER-02 RIV\_TB\_TCn****EFGS Lab ID: 8J01083-06      Matrix: Water**

**Sampled: 18-Oct-18 15:45 (GMT-05:00) Eastern Time (US &**  
**Arrived on 10/26/18, temp 0.4C LEL 10/29/18**

**Due: 28-Nov-18 19:00****Misc. Subcontract 1****EPA SM4500 CN E***Containers Supplied:*

250 mL PETG (A)

*[Signature]* 10-30-18  
 Released By      Date

*[Signature]* 10/30/18  
 Released By      Date

Received By

Date

Received By

Date

*[Signature]* 10/31/18 1000  
 Received By      Date

2296

FRONT DESK  
425 888-1996  
FRONTIER GLOBAL SCIENCES  
11720 N CREEK PKWY N  
BOTHELL WA 98011-8244

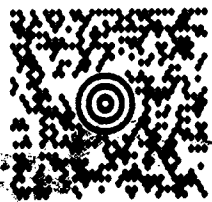
29 LBS

1 OF 1

DWT: 18,12,16

## SHIP TO:

SAMPLE RECEIVING  
(714) 895-5494  
EUROFINS CALSCIENCE, INC.  
7440 LINCOLN WAY  
GARDEN GROVE CA 92841



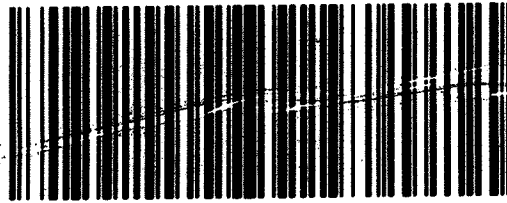
CA 927 9-09



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TRACKING #: 1Z 86W 050 01 5174 4334

1



BILLING: P/P

Dept No.: OVERHEAD  
REF 2:Subcontract

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R001072 0918



# SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: EFGS

DATE: 10/31/2018

**TEMPERATURE:** (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: 0.0°C); Temperature (w/o CF): 3.6 °C (w/ CF): 3.6 °C; ☐ Blank ☒ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: \_\_\_\_\_)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter

Checked by: VJBP

## CUSTODY SEAL:

Cooler ☐ Present and Intact ☐ Present but Not Intact ☒ Not Present ☐ N/A

Checked by: VJBP

Sample(s) ☐ Present and Intact ☐ Present but Not Intact ☒ Not Present ☐ N/A

Checked by: UCL

## SAMPLE CONDITION:

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sampling date <input type="checkbox"/> Sampling time <input type="checkbox"/> Matrix <input type="checkbox"/> Number of containers			
<input type="checkbox"/> No analysis requested <input type="checkbox"/> Not relinquished <input type="checkbox"/> No relinquished date <input type="checkbox"/> No relinquished time			
Sampler's name indicated on COC .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample container label(s) consistent with COC .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and in good condition .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers for analyses requested .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sufficient volume/mass for analyses requested .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples received within holding time .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aqueous samples for certain analyses received within 15-minute holding time			
<input type="checkbox"/> pH <input type="checkbox"/> Residual Chlorine <input type="checkbox"/> Dissolved Sulfide <input type="checkbox"/> Dissolved Oxygen .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation chemical(s) noted on COC and/or sample container .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unpreserved aqueous sample(s) received for certain analyses			
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Total Metals <input type="checkbox"/> Dissolved Metals			
Acid/base preserved samples - pH within acceptable range .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Container(s) for certain analysis free of headspace.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Dissolved Gases (RSK-175) <input type="checkbox"/> Dissolved Oxygen (SM 4500)			
<input type="checkbox"/> Carbon Dioxide (SM 4500) <input type="checkbox"/> Ferrous Iron (SM 3500) <input type="checkbox"/> Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## CONTAINER TYPE:

(Trip Blank Lot Number: \_\_\_\_\_)

**Aqueous:** ☐ VOA ☐ VOA<sub>h</sub> ☐ VOA<sub>na2</sub> ☐ 100PJ ☐ 100PJ<sub>na2</sub> ☐ 125AGB ☐ 125AGB<sub>h</sub> ☐ 125AGB<sub>p</sub> ☐ 125PB ☐ 125PB<sub>znna</sub> (pH\_\_9)

☐ 250AGB ☐ 250CGB ☐ 250CGB<sub>s</sub> (pH\_\_2) ☐ 250PB ☐ 250PB<sub>n</sub> (pH\_\_2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJ<sub>s</sub> (pH\_\_2) ☐ 500PB

☐ 1AGB ☐ 1AGB<sub>na2</sub> ☐ 1AGB<sub>s</sub> (pH\_\_2) ☐ 1AGB<sub>s</sub> (O&G) ☐ 1PB ☒ 1PB<sub>na</sub> (pH\_\_12) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

**Solid:** ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (\_\_\_\_) ☐ EnCores® (\_\_\_\_) ☐ TerraCores® (\_\_\_\_) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

**Air:** ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ \_\_\_\_\_ **Other Matrix** (\_\_\_\_): ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO<sub>3</sub>, **na** = NaOH, **na<sub>2</sub>** = Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, **p** = H<sub>3</sub>PO<sub>4</sub>, Labeled/Checked by: UCL

**s** = H<sub>2</sub>SO<sub>4</sub>, **u** = ultra-pure, **x** = Na<sub>2</sub>SO<sub>3</sub>+NaHSO<sub>4</sub>.H<sub>2</sub>O, **znna** = Zn (CH<sub>3</sub>CO<sub>2</sub>)<sub>2</sub> + NaOH

Reviewed by: UCL

# SAMPLE ANOMALY REPORT

DATE: **10/3/2018**

## SAMPLES, CONTAINERS, AND LABELS:

- ☐ Sample(s) NOT RECEIVED but listed on COC
- ☐ Sample(s) received but NOT LISTED on COC
- ☐ Holding time expired (list client or ECI sample ID and analysis)
- ☐ Insufficient sample amount for requested analysis (list analysis)
- ☐ Improper container(s) used (list analysis)
- ☐ Improper preservative used (list analysis)
- ☐ pH outside acceptable range (list analysis)
- ☐ No preservative noted on COC or label (list analysis and notify lab)
- ☐ Sample container(s) not labeled
- ☐ Client sample label(s) illegible (list container type and analysis)
- ☐ Client sample label(s) do not match COC (comment)
  - ☐ Project information
  - ☐ Client sample ID
  - ☐ Sampling date and/or time
  - ☐ Number of container(s)
  - ☐ Requested analysis
- ☐ Sample container(s) compromised (comment)
  - ☐ Broken
  - ☐ Water present in sample container
- ☐ Air sample container(s) compromised (comment)
  - ☐ Flat
  - ☐ Very low in volume
  - ☐ Leaking (not transferred; duplicate bag submitted)
  - ☐ Leaking (transferred into ECI Tedlar™ bags\*)
  - ☐ Leaking (transferred into client's Tedlar™ bags\*)

\* Transferred at client's request.

## Comments

*\*(1-2) Received sample in 1 liter plastic container, 250 ml per COC.*

## MISCELLANEOUS: (Describe)

## Comments

## HEADSPACE:

(Containers with bubble &gt; 6 mm or ¼ inch for volatile organic or dissolved gas analysis)

ECI Sample ID	ECI Container ID	Total Number**	ECI Sample ID	ECI Container ID	Total Number**

(Containers with bubble for other analysis)

ECI Sample ID	ECI Container ID	Total Number**	Requested Analysis

Comments: *\* Container type*

Reported by: *ufso*

Reviewed by: *ubcl*

\*\* Record the total number of containers (i.e., vials or bottles) for the affected sample.

## APPENDIX B

Laboratory Reports of Sample Results and Chain of Custody

Round 3 – November 14-15, 2018

EnviroSystems, Inc.  
One Lafayette Road  
P.O. Box 778  
Hampton, N.H. 03843-0778  
p 603 926 3345 • f 603 926 3521  
envirosystems.com

Steve Clifton  
Underwood Engineers, Inc.  
25 Vaughan Mall  
Portsmouth, NH 03801

PO Number: None  
Report Number: 31381  
Date Received: 11/15/18  
Date Reported: 12/20/18

Project: Piscataqua River

Attached please find results for analyses performed on samples received on 11/15/18 at 1400. Samples for total kjeldahl nitrogen, total phenol, and VOC analyses were subcontracted to Alpha Analytical of Westborough, MA. Data for subcontracted samples may be found in the report appendix.

Samples were received in acceptable condition, except where noted, and under chain of custody.

Instruments used in analysis were calibrated with the appropriate frequency and to the specifications of the referenced methods.

Analytes in blanks were below levels affecting sample results.

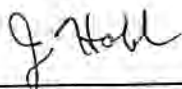
Matrix effects as monitored by matrix spike recovery or unusual physical properties were not apparent unless otherwise noted.

Accuracy and precision as monitored by laboratory control sample analyses were within acceptance limits unless otherwise noted.

Accreditations may be viewed at [www.envirosystems.com](http://www.envirosystems.com).

The results presented in this report relate only to the samples described on the chain(s) of custody and sample receipt log(s), and are intended to be used only by the submitter.

EnviroSystems, Incorporated



Jason Hobbs - Technical Manager of Analytical Chemistry  
Signature

Date 12/21/18

Attachment  
Report

Report No: 31381  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_003  
Matrix: Water  
Sampled: 11/15/18 0000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31381-004	15	4	mg/L	11/16/18 1500	11/19/18 1345	CA /SM 2540D
Total dissolved solids	31381-013	1600	5	mg/L	11/19/18 1645	11/20/18 1645	CA /SM 2540C
Biochemical Oxygen Demand	31381-001	6.2	5	mg/L	11/16/18	11/21/18	CA /SM 5210 B
Ammonia-N	31381-005	3.4	0.1	mg/L as N	11/16/18 1330	11/16/18 1330	JHW/SM 4500-NH3 G
Nitrate plus nitrite-N	31381-008	3.2	0.25	mg/L as N	11/19/18 1200	11/19/18 1213	JHW/SM 4500-NO3 F
Total Nitrogen	31381-008	8.6	0.25	mg/L as N	12/18/18	12/18/18	AM/Calculation
Total phosphorus	31381-011	30	0.8	mg/L	11/27/18 1145	11/28/18 1135	CA /SM 4500-P E

Notes:

ESI

Report No: 31381  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_003  
Matrix: Water  
Sampled: 11/15/18 0824

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31381-014	2.43	0.2	NTU	11/15/18 1300	11/15/18 1300	JLH/SM 2130 B
Oil and grease	31381-010	ND	5	mg/L	11/19/18 0900	11/27/18 0900	RkVEPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31381 SDG:  
 Project: Piscataqua River  
 Sample ID: PEASE\_003DUP  
 Matrix: Water  
 Sampled: 11/15/18 0000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31381-006	3.4	0.1	mg/L as N	11/16/18 1330	11/16/18 1330	JHW/SM 4500-NH3 G
Nitrate plus nitrite-N	31381-009	3	0.25	mg/L as N	11/19/18 1200	11/19/18 1213	JHW/SM 4500-NO3 F
Total Nitrogen	31381-009	8.5	0.25	mg/L as N	12/18/18	12/18/18	AM/Calculation
Total phosphorus	31381-012	31	0.8	mg/L	11/27/18 1145	11/28/18 1135	CA /SM 4500-P E

Notes:

ESI

Report No: 31381 SDG:  
 Project: Piscataqua River  
 Sample ID: NEW\_003  
 Matrix: Water  
 Sampled: 11/15/18 0000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31381-023	12	4	mg/L	11/16/18 1500	11/19/18 1345	CA /SM 2540D
Total dissolved solids	31381-032	630	5	mg/L	11/19/18 1645	11/20/18 1645	CA /SM 2540C
Biochemical Oxygen Demand	31381-020	31	5	mg/L	11/16/18	11/21/18	CA /SM 5210 B
Ammonia-N	31381-024	ND	0.1	mg/L as N	11/16/18 1330	11/16/18 1330	JHW/SM 4500-NH3 G
Nitrate plus nitrite-N	31381-027	0.6	0.05	mg/L as N	11/19/18 1200	11/19/18 1213	JHW/SM 4500-NO3 F
Total Nitrogen	31381-027	2.3	0.05	mg/L as N	12/18/18	12/18/18	AM/Calculation
Total phosphorus	31381-030	0.61	0.02	mg/L	12/03/18 1215	12/05/18 1146	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI



Report No: 31381  
Project: Piscataqua River

SDG:

Sample ID: NEW\_003  
Matrix: Water  
Sampled: 11/15/18 1016

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31381-033	7.38	0.2	NTU	11/15/18 1300	11/15/18 1300	JLH/SM 2130 B
Oil and grease	31381-029	ND	5	mg/L	11/19/18 0900	11/27/18 0900	RkVEPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31381 SDG:  
Project: Piscataqua River

Sample ID: NEW\_003DUP  
Matrix: Water  
Sampled: 11/15/18 0000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31381-025	ND	0.1	mg/L as N	11/16/18 1330	11/16/18 1330	JHW/SM 4500-NH3 G
Nitrate plus nitrite-N	31381-028	0.6	0.05	mg/L as N	11/19/18 1200	11/19/18 1213	JHW/SM 4500-NO3 F
Total Nitrogen	31381-028	2.4	0.05	mg/L as N	12/18/18	12/18/18	AM/Calculation
Total phosphorus	31381-031	0.6	0.02	mg/L	12/03/18 1215	12/05/18 1146	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31381 SDG:  
 Project: Piscataqua River  
 Sample ID: RIVER\_003  
 Matrix: Water  
 Sampled: 11/15/18

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31381-042	29	3	mg/L	11/16/18 1500	11/19/18 1345	CA /SM 2540D
Total dissolved solids	31381-050	12000	5	mg/L	11/19/18 1645	11/20/18 1645	CA /SM 2540C
Biochemical Oxygen Demand	31381-039	ND	5	mg/L	11/16/18	11/21/18	CA /SM 5210 B
Ammonia-N	31381-043	ND	0.1	mg/L as N	11/16/18 1330	11/16/18 1330	JHW/SM 4500-NH3 G
Nitrate plus nitrite-N	31381-045	0.09	0.05	mg/L as N	11/19/18 1200	11/19/18 1213	JHW/SM 4500-NO3 F
Total Nitrogen	31381-045	0.439	0.05	mg/L as N	12/18/18	12/18/18	AM/Calculation
Total phosphorus	31381-048	0.084	0.02	mg/L	12/03/18 1215	12/05/18 1146	CA /SM 4500-P E
Turbidity	31381-051	1.07	0.2	NTU	11/15/18 1300	11/15/18 1300	JLH/SM 2130 B
Oil and grease	31381-047	ND	5	mg/L	11/19/18 0900	11/27/18 0900	RkVEPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31381  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_003DUP  
Matrix: Water  
Sampled: 11/15/18

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31381-044	ND	0.1	mg/L as N	11/16/18 1330	11/16/18 1330	JHW/SM 4500-NH3 G
Nitrate plus nitrite-N	31381-046	0.09	0.05	mg/L as N	11/19/18 1200	11/19/18 1213	JHW/SM 4500-NO3 F
Total Nitrogen	31381-046	0.435	0.05	mg/L as N	12/18/18	12/18/18	AM/Calculation
Total phosphorus	31381-049	0.11	0.02	mg/L	12/03/18 1215	12/05/18 1146	CA /SM 4500-P E

Notes:

ND = Not Detected

ESI

Lab Number: 31381-018  
Sample Designation: PEASE\_003  
Date Sampled: 11/15/18  
Date Extracted: 11/20/18  
Date Analyzed: 12/07/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	5	acenaphthene	U, J5	3
phenol	U	3	2,4-dinitrophenol	U	11
2-chlorophenol	U	3	4-nitrophenol	U	11
bis(2-chloroethyl)ether	U	3	fluorene	U, J5	3
1,3-dichlorobenzene	U, J5	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	5	4,6-dinitro-2-methylphenol	U	11
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	5
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U, J5	3	4-bromophenyl-phenylether	U, J5	3
N-nitroso-di-n-propylamine	U	5	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U, J5	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	20,B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	43
2,4-dichlorophenol	U	3	pyrene	U, J5	3
1,2,4-trichlorobenzene	U, J2, J5	5	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U, J5	3
hexachloro-1,3-butadiene	U, J5	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	22
hexachlorocyclopentadiene	U, J5	5	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	5
2-chloronaphthalene	U, J2, J5	5	benzo(k)fluoranthene	U	5
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U, J5	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	38	25-175	nitrobenzene-d5	51	22-178
phenol-d5	33	24-176	2-fluorobiphenyl	47	38-162
2,4,6-tribromophenol	65	24-176	terphenyl-d14	64	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 9 ug/L.

J2 = LCS %R below limit. No sample remaining.

J5 = MS %R below limit.

Lab Number: 31381-037  
Sample Designation: NEW\_003  
Date Sampled: 11/15/18  
Date Extracted: 11/20/18  
Date Analyzed: 12/07/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	6	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	11
2-chlorophenol	U	3	4-nitrophenol	U	11
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	6	4,6-dinitro-2-methylphenol	U	11
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	6
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	6	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	12, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	45
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U,J2	6	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	22
hexachlorocyclopentadiene	U	6	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	6
2-chloronaphthalene	U,J2	6	benzo(k)fluoranthene	U	6
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits ( %)		Recovery (%)	Acceptance Limits ( %)
2-fluorophenol	35	25-175	nitrobenzene-d5	58	22-178
phenol-d5	32	24-176	2-fluorobiphenyl	57	38-162
2,4,6-tribromophenol	64	24-176	terphenyl-d14	67	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 9 ug/L.

J2 = LCS %R below limit. No sample remaining.

Lab Number: 31381-058  
Sample Designation: RIVER\_003  
Date Sampled: 11/15/18  
Date Extracted: 11/20/18  
Date Analyzed: 12/07/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	6	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	12
2-chlorophenol	U	3	4-nitrophenol	U	12
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	6	4,6-dinitro-2-methylphenol	U	12
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	6
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	6	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	29, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	49
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U, J2	6	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	24
hexachlorocyclopentadiene	U	6	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	6
2-chloronaphthalene	U, J2	6	benzo(k)fluoranthene	U	6
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	45	25-175	nitrobenzene-d5	60	22-178
phenol-d5	48	24-176	2-fluorobiphenyl	60	38-162
2,4,6-tribromophenol	60	24-176	terphenyl-d14	60	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 9 ug/L.

J2 = LCS %R below limit. No sample remaining.

Lab Number: 31381-059  
Sample Designation: RIVER\_003TB  
Date Sampled: 11/15/18  
Date Extracted: 11/20/18  
Date Analyzed: 12/07/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	5	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	11
2-chlorophenol	U	3	4-nitrophenol	U	11
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	5	4,6-dinitro-2-methylphenol	U	11
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	5
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	5	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	8, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	43
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U,J2	5	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	21
hexachlorocyclopentadiene	U	5	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	5
2-chloronaphthalene	U,J2	5	benzo(k)fluoranthene	U	5
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	50	25-175	nitrobenzene-d5	60	22-178
phenol-d5	44	24-176	2-fluorobiphenyl	59	38-162
2,4,6-tribromophenol	90	24-176	terphenyl-d14	80	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 9 ug/L.

J2 = LCS %R below limit. No sample remaining.



## BACTERIAL ANALYSIS REPORT

ESI STUDY No.: 31381  
 Client: Underwood Engineers  
 Sample Receipt: 11/15/18 1400

### Fecal Coliform

Method: SM 9222D

Sample Identification	Lab ID Number	Sample Collection		Sample Analysis		Result (CFU/100mL)	Analyst
		Date	Time	Date	Time		
PEASE_003	31381-003	11/15/18	0823	11/15/18	1526	<2	KC
NEW_003	31381-022	11/15/18	1015	11/15/18	1523	5	KC
RIVER_003	31381-041	11/15/18	1243	11/15/18	1523	107	KC

### Enterococcus

Method: EPA 1600

Sample Identification	Lab ID Number	Sample Collection		Sample Analysis		Result (CFU/100mL)	Analyst
		Date	Time	Date	Time		
PEASE_003	31381-002	11/15/18	0823	11/15/18	1548	2	KC
NEW_003	31381-021	11/15/18	1015	11/15/18	1546	<2	KC
RIVER_003	31381-040	11/15/18	1320	11/15/18	1546	143	KC

### Effluent Chemistry

Sample Number	Total Residual Chlorine (mg/L)
002	0.0
003	0.0
021	0.0
022	0.0
040	0.0
041	0.0

Analytical Methods: APHA. 2012. *Standard Methods for the Examination of Water and Wastewater*, 22<sup>nd</sup> Edition. Washington D.C.

U.S. Environmental Protection Agency Office of Water (4303T). 2003. *Method 1600: Membrane Filter Test for Enterococci in Water*. Washington D.C.

Report No: 31381  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_003  
Matrix: Water  
Sampled: 11/15/18 0000

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total Suspended Solids	PB	ND		ND	mg/L	11/16/18 1500	11/19/18 1345	SM 2540D
Total Suspended Solids	LCS	10.4	10.6	98%R	mg/L	11/16/18 1500	11/19/18 1345	SM 2540D
Total Suspended Solids	LCSD	11.7	11.2	104%R, 12%RPD	mg/L	11/16/18 1500	11/19/18 1345	SM 2540D
Total dissolved Solids	PB	ND		ND	mg/L	11/19/18 1645	11/20/18 1645	SM 2540C
Total dissolved Solids	LCS	563	500	113%R	mg/L	11/19/18 1645	11/20/18 1645	SM 2540C
Total dissolved Solids	LCSD	599	500	120%R, 6%RPD	mg/L	11/19/18 1645	11/20/18 1645	SM 2540C
Biochemical Oxygen Demand	PBA	ND	9	ND	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	PBB	ND	9	ND	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	LCS	179	198	90%R	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	LCSD	184	198	93%R	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	LCST	184	198	93%R, 1%RR	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Ammonia-N	PB	ND		ND	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R, 0%RPD	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Nitrate plus nitrite-N	PB	ND		ND	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	0.99	1.00	99%R	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	0.95	1.00	95%R, 4%RPD	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Total phosphorus	PB	0.00	0.00	ND	mg/L	12/05/18 1146	12/05/18 1146	SM 4500-P E
Total phosphorus	LCS	0.49	0.50	98%R	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	LCSD	0.48	0.50	97%R, 1%RPD	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	S1D	0.62		0%RPD	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E
Total phosphorus	S1S	1.01	0.50	80%R	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31381  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_003  
Matrix: Water  
Sampled: 11/15/18 0825

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	PB	ND			mg/L	11/19/18 0900	11/19/18 1600	EPA 1664A
Oil and grease	LCS	39	40	98%R	mg/L	11/19/18 0900	11/19/18 1600	EPA 1664A
Oil and grease	LCSD	36	40	89%R,9.6%RR	mg/L	11/19/18 0900	11/19/18 1600	EPA 1664A
Oil and grease	S1MS	41	40	102%R	mg/L	11/19/18 0900	11/27/18 0900	EPA 1664A

Notes:

ND = Not Detected

Report No: 31381  
 Project: Piscataqua River  
 Sample ID: PEASE\_003DUP  
 Matrix: Water  
 Sampled: 11/15/18 0000

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	PB	ND		ND	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R, 0%RPD	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Nitrate plus nitrite-N	PB	ND		ND	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	0.99	1.00	99%R	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	0.95	1.00	95%R, 4%RPD	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Total phosphorus	PB	0.00	0.00	ND	mg/L	12/05/18 1146	12/05/18 1146	SM 4500-P E
Total phosphorus	LCS	0.49	0.50	98%R	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	LCSD	0.48	0.50	97%R, 1%RPD	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	S1D	0.62		0%RPD	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E
Total phosphorus	S1S	1.01	0.50	80%R	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31381  
Project: Piscataqua River

SDG:

Sample ID: NEW\_003  
Matrix: Water  
Sampled: 11/15/18 0000

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total Suspended Solids	PB	ND		ND	mg/L	11/16/18 1500	11/19/18 1345	SM 2540D
Total Suspended Solids	LCS	10.4	10.6	98%R	mg/L	11/16/18 1500	11/19/18 1345	SM 2540D
Total Suspended Solids	LCSD	11.7	11.2	104%R, 12%RPD	mg/L	11/16/18 1500	11/19/18 1345	SM 2540D
Total dissolved Solids	PB	ND		ND	mg/L	11/19/18 1645	11/20/18 1645	SM 2540C
Total dissolved Solids	LCS	563	500	113%R	mg/L	11/19/18 1645	11/20/18 1645	SM 2540C
Total dissolved Solids	LCSD	599	500	120%R, 6%RPD	mg/L	11/19/18 1645	11/20/18 1645	SM 2540C
Biochemical Oxygen Demand	PBA	ND	9	ND	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	PBB	ND	9	ND	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	LCS	179	198	90%R	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	LCSD	184	198	93%R	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	LCST	184	198	93%R, 1%RR	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Ammonia-N	PB	ND		ND	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R, 0%RPD	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Nitrate plus nitrite-N	PB	ND		ND	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	0.99	1.00	99%R	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	0.95	1.00	95%R, 4%RPD	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Total phosphorus	PB	0.00	0.00	ND	mg/L	12/05/18 1146	12/05/18 1146	SM 4500-P E
Total phosphorus	LCS	0.49	0.50	98%R	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	LCSD	0.48	0.50	97%R, 1%RPD	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	S1D	0.62		0%RPD	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E
Total phosphorus	S1S	1.01	0.50	80%R	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31381  
Project: Piscataqua River

SDG:

Sample ID: NEW\_003  
Matrix: Water  
Sampled: 11/15/18 1015

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	PB	ND			mg/L	11/19/18 0900	11/19/18 1600	EPA 1664A
Oil and grease	LCS	39	40	98%R	mg/L	11/19/18 0900	11/19/18 1600	EPA 1664A
Oil and grease	LCSD	36	40	89%R,9.6%RR	mg/L	11/19/18 0900	11/19/18 1600	EPA 1664A
Oil and grease	S1MS	41	40	102%R	mg/L	11/19/18 0900	11/27/18 0900	EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31381  
 Project: Piscataqua River  
 Sample ID: NEW\_003DUP  
 Matrix: Water  
 Sampled: 11/15/18 0000

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	PB	ND		ND	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R, 0%RPD	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Nitrate plus nitrite-N	PB	ND		ND	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	0.99	1.00	99%R	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	0.95	1.00	95%R, 4%RPD	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Total phosphorus	PB	0.00	0.00	ND	mg/L	12/05/18 1146	12/05/18 1146	SM 4500-P E
Total phosphorus	LCS	0.49	0.50	98%R	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	LCSD	0.48	0.50	97%R, 1%RPD	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	S1D	0.62		0%RPD	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E
Total phosphorus	S1S	1.01	0.50	80%R	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31381  
 Project: Piscataqua River  
 Sample ID: RIVER\_003  
 Matrix: Water  
 Sampled: 11/15/18

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total Suspended Solids	PB	ND		ND	mg/L	11/16/18 1500	11/19/18 1345	SM 2540D
Total Suspended Solids	LCS	10.4	10.6	98%R	mg/L	11/16/18 1500	11/19/18 1345	SM 2540D
Total Suspended Solids	LCSD	11.7	11.2	104%R, 12%RPD	mg/L	11/16/18 1500	11/19/18 1345	SM 2540D
Total dissolved Solids	PB	ND		ND	mg/L	11/19/18 1645	11/20/18 1645	SM 2540C
Total dissolved Solids	LCS	563	500	113%R	mg/L	11/19/18 1645	11/20/18 1645	SM 2540C
Total dissolved Solids	LCSD	599	500	120%R, 6%RPD	mg/L	11/19/18 1645	11/20/18 1645	SM 2540C
Biochemical Oxygen Demand	PBA	ND	9	ND	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	PBB	ND	9	ND	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	LCS	179	198	90%R	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	LCSD	184	198	93%R	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Biochemical Oxygen Demand	LCST	184	198	93%R, 1%RR	mg/L DO depletion	11/16/18	11/21/18	SM 5210 B
Ammonia-N	PB	ND		ND	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R, 0%RPD	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Nitrate plus nitrite-N	PB	ND		ND	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	0.99	1.00	99%R	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	0.95	1.00	95%R, 4%RPD	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Total phosphorus	PB	0.00	0.00	ND	mg/L	12/05/18 1146	12/05/18 1146	SM 4500-P E
Total phosphorus	LCS	0.49	0.50	98%R	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	LCSD	0.48	0.50	97%R, 1%RPD	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	S1D	0.62		0%RPD	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E
Total phosphorus	S1S	1.01	0.50	80%R	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E
Oil and grease	PB	ND			mg/L	11/19/18 0900	11/19/18 1600	EPA 1664A
Oil and grease	LCS	39	40	98%R	mg/L	11/19/18 0900	11/19/18 1600	EPA 1664A
Oil and grease	LCSD	36	40	89%R, 9.6%RR	mg/L	11/19/18 0900	11/19/18 1600	EPA 1664A
Oil and grease	S1MS	41	40	102%R	mg/L	11/19/18 0900	11/27/18 0900	EPA 1664A

Notes:

ND = Not Detected



Report No: 31381  
 Project: Piscataqua River  
 Sample ID: RIVER\_003DUP  
 Matrix: Water  
 Sampled: 11/15/18

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	PB	ND		ND	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Ammonia-N	LCS	9.8	10.0	98%R, 0%RPD	mg/L as N	11/16/18 1330	11/16/18 1330	SM 4500-NH3 G
Nitrate plus nitrite-N	PB	ND		ND	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	0.99	1.00	99%R	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	0.95	1.00	95%R, 4%RPD	mg/L as N	11/19/18 1200	11/19/18 1213	SM 4500-NO3 F
Total phosphorus	PB	0.00	0.00	ND	mg/L	12/05/18 1146	12/05/18 1146	SM 4500-P E
Total phosphorus	LCS	0.49	0.50	98%R	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	LCSD	0.48	0.50	97%R, 1%RPD	mg/L	12/03/18 1215	12/05/18 1146	SM 4500-P E
Total phosphorus	S1D	0.62		0%RPD	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E
Total phosphorus	S1S	1.01	0.50	80%R	mg/L	12/03/18 1215	12/03/18 1215	SM 4500-P E

Notes:

ND = Not Detected

ESI

Lab Number: PB170W  
Sample Designation: Laboratory Blank  
Date Sampled: 11/20/18 0900  
Date Extracted: 11/20/18 0900  
Date Analyzed: 11/27/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Quantitation Limit (ug/L)		Concentration (ug/L)	Quantitation Limit (ug/L)
N-nitrosodimethylamine	U	5	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	10
2-chlorophenol	U	3	4-nitrophenol	U	10
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	5	4,6-dinitro-2-methylphenol	U	10
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	5
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	10	hexachlorobenzene	U	3
4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	9, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	40
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	5	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	20
hexachlorocyclopentadiene	U	10	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	5
2-chloronaphthalene	U	5	benzo(k)fluoranthene	U	5
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	43	25-175	nitrobenzene-d5	76	22-178
phenol-d5	39	24-176	2-fluorobiphenyl	67	38-162
2,4,6-tribromophenol	90	24-176	terphenyl-d14	90	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 9 ug/L.

Lab Number: LCS170W  
Sample Designation: Laboratory Control Sample  
Date Sampled: 11/20/18 1030  
Date Extracted: 11/20/18 1030  
Date Analyzed: 11/28/18  
Matrix: Water

# SEMIVOLATILE ORGANICS

Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)
N-nitrosodimethylamine	69	100	69	30-150	acenaphthene	64	100	64	47-145
phenol	34	100	34	5-120	2,4-dinitrophenol	43	100	43	1-191
2-chlorophenol	56	100	56	30-150	4-nitrophenol	41	100	41	1-132
bis(2-chloroethyl)ether	61	100	61	12-158	fluorene	69	100	69	59-121
1,3-dichlorobenzene	41	100	41	30-150	4-chlorophenyl-phenylether	74	100	74	25-158
1,4-dichlorobenzene	42	100	42	30-150	diethylphthalate	75	100	75	1-120
1,2-dichlorobenzene	43	100	43	30-150	4,6-dinitro-2-methylphenol	58	100	58	1-181
2-methylphenol (m-cresol)	NA	NA	NA	30-150	N-nitrosodiphenylamine	90	100	90	30-150
bis(2-chloroisopropyl)ether	61	100	61	38-166	1,2-diphenylhydrazine	NA	NA	NA	30-150
hexachloroethane	44	100	44	40-120	4-bromophenyl-phenylether	78	100	78	53-127
N-nitroso-di-n-propylamine	67	100	67	1-230	hexachlorobenzene	77	100	77	1-152
4-methylphenol (p-cresol)	NA	NA	NA	30-150	pentachlorophenol	65	100	65	14-176
nitrobenzene	60	100	60	35-180	phenanthrene	78	100	78	54-120
isophorone	75	100	75	21-196	anthracene	79	100	79	27-133
2-nitrophenol	58	100	58	29-182	di-n-butylphthalate	95	100	95	1-120
2,4-dimethylphenol	68	100	68	32-119	fluoranthene	87	100	87	26-137
bis(2-chloroethoxy)methane	70	100	70	33-184	benzidine	NA	NA	NA	30-150
2,4-dichlorophenol	61	100	61	32-135	pyrene	77	100	77	52-120
1,2,4-trichlorobenzene	44	100	44	44-142	butylbenzylphthalate	81	100	81	1-152
naphthalene	46	100	46	21-133	benzo(a)anthracene	89	100	89	33-143
hexachloro-1,3-butadiene	42	100	42	24-120	chrysene	87	100	87	17-168
4-chloro-3-methylphenol	64	100	64	22-147	3,3'-dichlorobenzidine	NA	NA	NA	1-262
hexachlorocyclopentadiene	64	100	64	30-150	bis(2-ethylhexyl)phthalate	51	100	51	8-158
2,4,6-trichlorophenol	62	100	62	37-144	di-n-octylphthalate	46	100	46	4-146
2-chloronaphthalene	56	100	56, J2	60-120	benzo(b)fluoranthene	85	100	85	24-159
acenaphthylene	61	100	61	33-145	benzo(k)fluoranthene	85	100	85	11-162
dimethylphthalate	71	100	71	1-112	benzo(a)pyrene	88	100	88	17-163
2,6-dinitrotoluene	77	100	77	50-158	indeno(1,2,3-cd)pyrene	85	100	85	1-171
2,4-dinitrotoluene	78	100	78	39-139	dibenzo(a,h)anthracene	78	100	78	1-227
					benzo(g,h,i)perylene	89	100	89	1-219

# SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	41	21-100	nitrobenzene-d5	73	35-114
phenol-d5	36	10-102	2-fluorobiphenyl	65	43-116
2,4,6-tribromophenol	85	10-123	terphenyl-d14	93	33-141

U = Below quantitation limit

NA = Not Added

J2 = LCS %R below limit.

Lab Number: LCSD170W  
Sample Designation: Laboratory Control Sample Duplicate  
Date Sampled: 11/20/18 1030  
Date Extracted: 11/20/18 1030  
Date Analyzed: 11/28/18  
Matrix: Water

# SEMIVOLATILE ORGANICS

Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)
N-nitrosodimethylamine	70	100	70	30-150	acenaphthene	57	100	57	47-145
phenol	41	100	41	5-120	2,4-dinitrophenol	53	100	53	1-191
2-chlorophenol	66	100	66	23-134	4-nitrophenol	52	100	52	1-132
bis(2-chloroethyl)ether	58	100	58	12-158	fluorene	60	100	60	59-121
1,3-dichlorobenzene	41	100	41	30-150	4-chlorophenyl-phenylether	64	100	64	25-158
1,4-dichlorobenzene	42	100	42	30-150	diethylphthalate	62	100	62	1-120
1,2-dichlorobenzene	43	100	43	30-150	4,6-dinitro-2-methylphenol	70	100	70	1-181
2-methylphenol (m-cresol)	NA	NA	NA	30-150	N-nitrosodiphenylamine	73	100	73	30-150
bis(2-chloroisopropyl)ether	59	100	59	36-166	1,2-diphenylhydrazine	NA	NA	NA	30-150
hexachloroethane	43	100	43	40-120	4-bromophenyl-phenylether	65	100	65	53-127
N-nitroso-di-n-propylamine	64	100	64	1-230	hexachlorobenzene	63	100	63	1-152
4-methylphenol (p-cresol)	NA	NA	NA	30-150	pentachlorophenol	78	100	78	14-176
nitrobenzene	58	100	58	35-180	phenanthrene	65	100	65	54-120
isophorone	73	100	73	21-196	anthracene	65	100	65	27-133
2-nitrophenol	67	100	67	29-182	di-n-butylphthalate	75	100	75	1-120
2,4-dimethylphenol	73	100	73	32-119	fluoranthene	71	100	71	26-137
bis(2-chloroethoxy)methane	67	100	67	33-184	benzidine	NA	NA	NA	30-150
2,4-dichlorophenol	73	100	73	39-135	pyrene	61	100	61	52-120
1,2,4-trichlorobenzene	43	100	43, J2	44-142	butylbenzylphthalate	63	100	63	1-152
naphthalene	45	100	45	21-133	benzo(a)anthracene	71	100	71	33-143
hexachloro-1,3-butadiene	41	100	41	24-120	chrysene	69	100	69	17-168
4-chloro-3-methylphenol	74	100	74	22-147	3,3'-dichlorobenzidine	NA	NA	NA	1-262
hexachlorocyclopentadiene	68	100	68	30-150	bis(2-ethylhexyl)phthalate	35	100	35	8-158
2,4,6-trichlorophenol	75	100	75	37-144	di-n-octylphthalate	32	100	32	4-146
2-chloronaphthalene	53	100	53, J2	60-120	benzo(b)fluoranthene	68	100	68	24-159
acenaphthylene	56	100	56	33-145	benzo(k)fluoranthene	70	100	70	11-162
dimethylphthalate	59	100	59	1-120	benzo(a)pyrene	70	100	70	17-163
2,6-dinitrotoluene	65	100	65	50-158	indeno(1,2,3-cd)pyrene	66	100	66	1-171
2,4-dinitrotoluene	65	100	65	39-139	dibenzo(a,h)anthracene	60	100	60	1-227
					benzo(g,h,i)perylene	67	100	67	1-219

## SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	48	21-100	nitrobenzene-d5	70	35-114
phenol-d5	42	10-102	2-fluorobiphenyl	59	43-116
2,4,6-tribromophenol	99	10-123	terphenyl-d14	70	33-141

U = Below quantitation limit

NA = Not Added

J2 = LCS %R below limit.

Lab Number: 31381-018MS  
Sample Designation: Matrix Spike  
Date Sampled: 11/20/18 1030  
Date Extracted: 11/20/18 1030  
Date Analyzed: 12/07/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)
N-nitrosodimethylamine	52	100	52	30-150	acenaphthene	33	100	33, J5	47-145
phenol	32	100	32	5-120	2,4-dinitrophenol	53	100	53	1-191
2-chlorophenol	56	100	56	23-134	4-nitrophenol	39	100	39	1-132
bis(2-chloroethyl)ether	39	100	39	12-158	fluorene	32	100	32, J5	59-121
1,3-dichlorobenzene	29	100	29, J5	30-150	4-chlorophenyl-phenylether	33	100	33	25-158
1,4-dichlorobenzene	30	100	30	30-150	diethylphthalate	40	100	40	1-120
1,2-dichlorobenzene	30	100	30	30-150	4,6-dinitro-2-methylphenol	62	100	62	1-181
2-methylphenol (m-cresol)	NA	NA	NA	30-150	N-nitrosodiphenylamine	41	100	41	30-150
bis(2-chloroisopropyl)ether	41	100	41	36-166	1,2-diphenylhydrazine	NA	NA	NA	30-150
hexachloroethane	31	100	31, J5	40-120	4-bromophenyl-phenylether	33	100	33, J5	53-127
N-nitroso-di-n-propylamine	46	100	46	1-230	hexachlorobenzene	30	100	30	1-152
4-methylphenol (p-cresol)	NA	NA	NA	30-150	pentachlorophenol	64	100	64	14-176
nitrobenzene	40	100	40	35-180	phenanthrene	32	100	32, J5	54-120
isophorone	48	100	48	21-196	anthracene	32	100	32	27-133
2-nitrophenol	58	100	58	29-182	di-n-butylphthalate	53	100	53	1-120
2,4-dimethylphenol	35	100	35	32-119	fluoranthene	33	100	33	26-137
bis(2-chloroethoxy)methane	44	100	44	33-184	benzidine	NA	NA	NA	30-150
2,4-dichlorophenol	59	100	59	39-135	pyrene	31	100	31, J5	52-120
1,2,4-trichlorobenzene	29	100	29, J5	44-142	butylbenzylphthalate	34	100	34	1-152
naphthalene	31	100	31	21-133	benzo(a)anthracene	32	100	32, J5	33-143
hexachloro-1,3-butadiene	22	100	22, J5	24-120	chrysene	31	100	31	17-168
4-chloro-3-methylphenol	61	100	61	22-147	3,3'-dichlorobenzidine	NA	NA	NA	1-262
hexachlorocyclopentadiene	29	100	29, J5	30-150	bis(2-ethylhexyl)phthalate	18	100	18	8-158
2,4,6-trichlorophenol	64	100	64	37-144	di-n-octylphthalate	16	100	16	4-146
2-chloronaphthalene	32	100	32, J5	60-120	benzo(b)fluoranthene	34	100	34	24-159
acenaphthylene	33	100	33	33-145	benzo(k)fluoranthene	34	100	34	11-162
dimethylphthalate	41	100	41	1-120	benzo(a)pyrene	32	100	32	17-163
2,6-dinitrotoluene	41	100	41, J5	50-158	indeno(1,2,3-cd)pyrene	37	100	37	1-171
2,4-dinitrotoluene	41	100	41	39-139	dibenzo(a,h)anthracene	29	100	29	1-227
					benzo(g,h,i)perylene	35	100	35	1-219

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	39	21-100	nitrobenzene-d5	45	35-114
phenol-d5	35	10-102	2-fluorobiphenyl	37	43-116
2,4,6-tribromophenol	73	10-123	terphenyl-d14	35	33-141

U = Below quantitation limit  
NA = Not Added  
J5 = MS %R below limit.

MICROBIOLOGICAL ASSAY DATA SHEET							
Client: Underwood Engineers			Date: 11/15/18		Initials: MW		
ESI #: 21381			Col.Dil.H <sub>2</sub> O: M-3339		M-FC: M-3332		
Date collected: 11/15/18			Pipette Used: A-5003		Positive lot #: EC B10311BA		
Sample ID	Time Sampled	Time Filtered	mls filtered per 100 mls total vol.	Media	CFU's	Total w/ background	Comments
Start Blank		1523	100	M-FC	0	0	
003	0823	1526	1	M-FC	0	0	< 7 CFUs / 100 mL
↓	↓	1530	10	M-FC	0	0	
↓	↓	1532	10d	M-FC	0	0	
↓	↓	1534	50	M-FC	0	0	
022	1015	1523	1	M-FC	0	0	$\frac{3}{100} \times 100 = 5 \text{ CFUs } / 100 \text{ mL}$
↓	↓	1526	10	M-FC	1	1	
↓	↓	1530	50	M-FC	2	2	
041	1245	1523	1	M-FC	0	0	$\frac{104}{100} \times 100 = 107 \text{ CFUs } / 100 \text{ mL}$
↓	↓	1526	10	M-FC	3	6	
↓	↓	1530	50	M-FC	61	63	
Positive		1536	100	M-FC	✓	✓	
End Blank		↓	100	M-FC	0	0	
				M-FC			
				M-FC			
				M-FC			
				M-FC			
				M-FC			
				M-FC			
				M-FC			
				M-FC			
				M-FC			
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				M-FC			
				M-FC			
				M-FC			
				M-FC			
				M-FC			
				M-FC			
				M-FC			
				M-FC			
				M-FC			
M-FC stored in Incubator #303		Temp: 44.5	1538	11/15/18	to	1600	11/16/18
Method 922D		Counted:			Counted By: V		



# MICROBIOLOGICAL ASSAY DATA SHEET

Client: Underwood Engineers	Date: 11/15/18	Initials: MW
ESI #: 31381	Col.Dil.H <sub>2</sub> O: M-3339	M-El: M-3337
Date collected: 11/15/18	Pipette Used: A-5003	Positive lot #: EFB103118A

[illegible]

M-EI stored in Incubator #309	Temp: 40.7	11000	11/15/18	to	1515	11/16/18
Method EPA 1600	Counted:			Counted By:	[Signature]	

## Sample Chlorine Check

Cl Strips A-5224 Date & Time 11/15/16 1520 Initial MW

Sample	Result
002	0.0 mg/L
021	0.0 mg/L
040	0.0 mg/L




## Sample Chlorine Check

Cl Strips A-5224 Date & Time 11/15/18 1515 Initial MW

Sample	Result
003	0.0 mg/L
022	0.0 mg/L
041	0.0 mg/L

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 1 of 3

STUDY NO: 31381  
SDG No:  
Project: Piscataqua River  
Delivered via:  
Date and Time Received: 11/15/18 1400 Date and Time Logged into Lab: 11/15/18 1600  
Received By: MG Logged into Lab by: CS   
Air bill / Way bill: No Air bill included in folder if received? NA  
Cooler on ice/packs: Yes Custody Seals present? NA  
Cooler Blank Temp (C) at arrival 2 Custody Seals intact? NA  
Number of COC Pages: 6  
COC Serial Number(s): A1016927  
COC Complete: Yes Does the info on the COC match the samples? Yes  
Sampled Date: Yes Were samples received within holding time? Yes  
Field ID complete: Yes Were all samples properly labeled? Yes  
Sampled Time: Yes Were proper sample containers used? Yes  
Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
Were all samples received? Yes Were VOC vials free of headspace? Yes  
Client notification/authorization: Not required pH Test strip ID number: A-5314


Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
PEASE_003	31381-001	W	BOD	500 P	4C	Yes
PEASE_003	31381-002	W	Enterococci	100 Sterile	4C	Yes
PEASE_003	31381-003	W	FC	100 Sterile	4C	Yes
PEASE_003	31381-004	W	TSS	1000 P	4C	Yes
PEASE_003	31381-005	W	NH3	125 P	H2SO4	Yes
PEASE_003DUP	31381-006	W	NH3	125 P	H2SO4	Yes
PEASE_003	31381-008	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
PEASE_003DUP	31381-009	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
PEASE_003	31381-010	W	OG	2x1000 G	H2SO4	Yes
PEASE_003	31381-011	W	TP	250 P	H2SO4	Yes
PEASE_003DUP	31381-012	W	TP	250 P	H2SO4	Yes
PEASE_003	31381-013	W	TDS	1000 P	4C	Yes
PEASE_003	31381-014	W	Turbidity	250 P	4C	Yes
PEASE_003	31381-015	W	TPhen	1000 G	H2SO4	Yes
PEASE_003	31381-016	W	VOC624	2x40 G	4C	Yes
PEASE_003	31381-017	W	HOLD VOC624	2x40 G	HCl	Yes
PEASE_003	31381-018	W	ABN625	2x1000 G	4C	Yes

Notes and qualifications:

See COC

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 2 of 3

STUDY NO: 31381  
SDG No:  
Project: Piscataqua River  
Delivered via:  
Date and Time Received: 11/15/18 1400 Date and Time Logged into Lab: 11/15/18 1600  
Received By: MG Logged into Lab by: CS   
Air bill / Way bill: No Air bill included in folder if received? NA  
Cooler on ice/packs: Yes Custody Seals present? NA  
Cooler Blank Temp (C) at arrival 2 Custody Seals intact? NA  
Number of COC Pages: 6  
COC Serial Number(s): A1016927  
COC Complete: Yes Does the info on the COC match the samples? Yes  
Sampled Date: Yes Were samples received within holding time? Yes  
Field ID complete: Yes Were all samples properly labeled? Yes  
Sampled Time: Yes Were proper sample containers used? Yes  
Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
Were all samples received? Yes Were VOC vials free of headspace? Yes  
Client notification/authorization: Not required pH Test strip ID number: A-5314


Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NEW_003	31381-020	W	BOD	500 P	4C	Yes
NEW_003	31381-021	W	Enterococci	100 Sterile	4C	Yes
NEW_003	31381-022	W	FC	100 Sterile	4C	Yes
NEW_003	31381-023	W	TSS	1000 P	4C	Yes
NEW_003	31381-024	W	NH3	125 P	H2SO4	Yes
NEW_003DUP	31381-025	W	NH3	125 P	H2SO4	Yes
NEW_003	31381-027	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
NEW_003DUP	31381-028	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
NEW_003	31381-029	W	OG	2x1000 G	H2SO4	Yes
NEW_003	31381-030	W	TP	250 P	H2SO4	Yes
NEW_003DUP	31381-031	W	TP	250 P	H2SO4	Yes
NEW_003	31381-032	W	TDS	1000 P	4C	Yes
NEW_003	31381-033	W	Turbidity	250 P	4C	Yes
NEW_003	31381-034	W	TPhen	1000 G	H2SO4	Yes
NEW_003	31381-035	W	VOC624	2x40 G	4C	Yes
NEW_003	31381-036	W	HOLD VOC624	2x40 G	HCl	Yes
NEW_003	31381-037	W	ABN625	2x1000 G	4C	Yes

Notes and qualifications:

See COC

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 3 of 3

STUDY NO: 31381  
SDG No:  
Project: Piscataqua River  
Delivered via:  
Date and Time Received: 11/15/18 1400 Date and Time Logged into Lab: 11/15/18 1600  
Received By: MG Logged into Lab by: CS   
Air bill / Way bill: No Air bill included in folder if received? NA  
Cooler on ice/packs: Yes Custody Seals present? NA  
Cooler Blank Temp (C) at arrival: 2 Custody Seals intact? NA  
Number of COC Pages: 6  
COC Serial Number(s): A1016927  
COC Complete: Yes Does the info on the COC match the samples? Yes  
Sampled Date: Yes Were samples received within holding time? Yes  
Field ID complete: Yes Were all samples properly labeled? Yes  
Sampled Time: Yes Were proper sample containers used? Yes  
Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
Were all samples received? Yes Were VOC vials free of headspace? No  
Client notification/authorization: Not required pH Test strip ID number: A-5314

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
RIVER_003	31381-039	W	BOD	500 P	4C	Yes
RIVER_003	31381-040	W	Enterococci	100 Sterile	4C	Yes
RIVER_003	31381-041	W	FC	100 Sterile	4C	Yes
RIVER_003	31381-042	W	TSS	1000 P	4C	Yes
RIVER_003	31381-043	W	NH3	125 P	H2SO4	Yes
RIVER_003DUP	31381-044	W	NH3	125 P	H2SO4	Yes
RIVER_003	31381-045	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
RIVER_003DUP	31381-046	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
RIVER_003	31381-047	W	OG	2x1000 G	H2SO4	Yes
RIVER_003	31381-048	W	TP	250 P	H2SO4	Yes
RIVER_003DUP	31381-049	W	TP	250 P	H2SO4	Yes
RIVER_003	31381-050	W	TDS	1000 P	4C	Yes
RIVER_003	31381-051	W	Turbidity	250 P	4C	Yes
RIVER_003	31381-052	W	TPhen	1000 G	H2SO4	Yes
RIVER_003TB	31381-053	W	TPhen	1000 G	H2SO4	Yes
RIVER_003	31381-054	W	VOC624	2x40 G	4C	Yes
RIVER_003TB	31381-055	W	VOC624	2x40 G	4C	Yes
RIVER_003	31381-056	W	HOLD VOC624	2x40 G	HCl	Yes
RIVER_003TB	31381-057	W	HOLD VOC624	2x40 G	HCl	Yes
RIVER_003	31381-058	W	ABN625	2x1000 G	4C	Yes
RIVER_003TB	31381-059	W	ABN625	2x1000 G	4C	Yes

Notes and qualifications:

See COC

## CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River								
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001								
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton								
Voice: 603-436-6192		Fax:		email:								
Protocol: NPDES												
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
001	PEASE 003	11/15/18	24h	UE/CO	C	1	500	P	4C	Water	N	BOD
002	PEASE 003		8:23A		G	1	100	le	4C	Water	N	Enterococci
003	PEASE 003		8:23A		G	1	100	le	4C	Water	N	FC
004	PEASE 003		24h		C	1	1000	P	4C	Water	N	TSS
005	PEASE 003		"		C	1	125	P	H2SO4	Water	N	NH3
006	PEASE 003DUP		"		C	1	125	P	H2SO4	Water	N	NH3
007	PEASE 003		8:25A		G	1	500	P	4C	Water	N	TRC
008	PEASE 003		24h		C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
009	PEASE 003DUP		"		C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
010	PEASE 003		8:24A		G	2	1000	G	H2SO4	Water	N	OG
011	PEASE 003		24h		C	1	250	P	H2SO4	Water	N	TP
012	PEASE 003DUP		"		C	1	250	P	H2SO4	Water	N	TP
Relinquished By: <i>Tim Doherty</i>		Date: 11/15/18		Time: 2 PM		Received By: <i>M. Corne</i>		Date: 11/15/18		Time: 2 PM		
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:		
Comments: #007 not in cooler												

## CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River								
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001								
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton								
Voice: 603-436-6192		Fax:		email:								
Protocol: NPDES												
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
013 PEASE 003		11/15/18	2:44	UC/100	C	1	1000	P	4C	Water	N	TDS
014 PEASE 003		8:24	2:44		G	1	250	P	4C	Water	N	Turbidity
015 PEASE 003			2:44		C	1	1000	G	H2SO4	Water	N	TPhen
016 PEASE 003			8:24		G	2	40 G	G	4C	Water	N	VOC624
017 PEASE 003			8:34		G	2	40 G	G	HCl	Water	N	HOLD VOC624
018 PEASE 003			2:44		C	2	1000	G	4C	Water	N	ABN625
* 019 PEASE 003			8:25		G	1	1000	P	4C	Water	N	DO, pH, Temperature, Conductivity
Relinquished By: <i>Tim Fisher</i> Date: 11/15/18 Time: 2PM Received By: <i>M. Gagne</i> Date: 11/15/18 Time: 2PM												
Relinquished By: _____ Date: _____ Time: _____ Received at Lab By: _____ Date: _____ Time: _____												
Comments: #019 not in cooler <i>(D)</i>												





EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No:

31381

# CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.	Contact: Steve Clifton	Project Name: Piscataqua River
Report to: Steve Clifton	Address: 25 Vaughan Mall	Project Number: P0771 Task: 0001
Invoice to: Steve Clifton	Address: Portsmouth, NH 03801	Project Manager: Steve Clifton
Voice: 603-436-6192	Fax:	email:

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (PIGT)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
020 NEW 003		11/15/18	24hr	UE/100	C	1	500	P	4C	Water	N	BOD
021 NEW 003			10:15A		G	1	100	le	4C	Water	N	Enterococci
022 NEW 003			10:15A		G	1	100	le	4C	Water	N	FC
023 NEW 003			24hr		C	1	1000	P	4C	Water	N	TSS
024 NEW 003			"		C	1	125	P	H2SO4	Water	N	NH3
025 NEW 003DUP			"		C	1	125	P	H2SO4	Water	N	NH3
026 NEW 003			10:18A		G	1	500	P	4C	Water	N	TRC
027 NEW 003			24hr		C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
028 NEW 003DUP			"		C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
029 NEW 003			10:15A		G	2	1000	G	H2SO4	Water	N	OG
030 NEW 003			24hr		C	1	250	P	H2SO4	Water	N	TP
031 NEW 003DUP			"		C	1	250	P	H2SO4	Water	N	TP

Relinquished By: <i>Tim Rab</i>	Date: 11/15/18	Time: 2PM	Received By: <i>M. Green</i>	Date: 11/15/18	Time: 2:00
Relinquished By:	Date:	Time:	Received at Lab By:	Date:	Time:

Comments: #026 not in cooler  
2°C

## CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.	Contact: Steve Clifton	Project Name: Piscataqua River
Report to: Steve Clifton	Address: 25 Vaughan Mall	Project Number: P0771 Task: 0001
Invoice to: Steve Clifton	Address: Portsmouth, NH 03801	Project Manager: Steve Clifton
Voice: 603-436-6192	Fax:	email:

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
032	NEW 003	11/15/18	24hr	UE/	C	1	1000	P	4C	Water	N	TDS
033	NEW 003	11/16/18	24hr		G	1	250	P	4C	Water	N	Turbidity
034	NEW 003	11/16/18	24hr		C	1	1000	G	H2SO4	Water	N	TPhen
035	NEW 003	11/18/18	24hr		G	2	40 G	G	4C	Water	N	VOC624
036	NEW 003	11/18/18	24hr		G	2	40 G	G	HCl	Water	N	HOLD VOC624
037	NEW 003	11/18/18	24hr		C	2	1000	G	4C	Water	N	ABN625
038	NEW 003	11/17/18	24hr		G	1	1000	P	4C	Water	N	Measured @ Dease DO, pH, Temperature, Conductivity

Relinquished By: <i>Tom Pab</i>	Date: 11/15/18	Time: 2:00
Relinquished By:	Date:	Time:

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COC Number: A1016927

Sample Delivery Group No: Nov 2018

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## CHAIN OF CUSTODY DOCUMENTATION

Client:	Underwood Engineers, Inc.	Contact:	Steve Clifton	Project Name:	Piscataqua River
Report to:	Steve Clifton	Address:	25 Vaughan Mall	Project Number:	P0771
Invoice to:	Steve Clifton	Address:	Portsmouth, NH 03801	Task:	0001
Voice:	603-436-6192	Fax:		Project Manager:	Steve Clifton
Protocol:	NPDES	email:			

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com- posite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preser- vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
039 RIVER_003		11/15/18	13:21	JEC	G	1	500	P	4C	Water	N	BOD
040 RIVER_003			13:20			1	100	le	4C	Water	N	Enterococci
041 RIVER_003			13:43			1	100	le	4C	Water	N	FC
042 RIVER_003			13:43			1	1000	P	4C	Water	N	TSS
043 RIVER_003			13:33			1	125	P	H2SO4	Water	N	NH3
044 RIVER_003DUP			13:33			1	125	P	H2SO4	Water	N	NH3
045 RIVER_003			13:34			1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
046 RIVER_003DUP			13:34			1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
047 RIVER_003			13:35			2	1000	G	H2SO4	Water	N	OG
048 RIVER_003			13:35			1	250	P	H2SO4	Water	N	TP
049 RIVER_003DUP			13:36			1	250	P	H2SO4	Water	N	TP
050 RIVER_003			13:40			1	1000	P	4C	Water	N	TDS

Relinquished By:	<i>Jim Doherty</i>	Date:	11/15/18	Time:	2 PM	Received By:	<i>M. Grezle</i>	Date:	11/15/18	Time:	2 PM
Relinquished By:		Date:		Time:		Received at Lab By:		Date:		Time:	
Comments:											

## CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton		Project Name: Piscataqua River							
Report to: Steve Clifton		Address: 25 Vaughan Mall		Project Number: P0771 Task: 0001							
Invoice to: Steve Clifton		Address: Portsmouth, NH 03801		Project Manager: Steve Clifton							
Voice: 603-436-6192		Fax:		email:							
Protocol: NPDES											
Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
051 RIVER_003	1213D	11/15/18		JEL G	1	250	P	4C	Water	N	Turbidity
052 RIVER_003			12:31		1	1000	G	H2SO4	Water	N	TPhen
053 RIVER_003TB			12:32		1	1000	G	H2SO4	Water	N	TPhen
054 RIVER_003			12:51		2	40 G	G	4C	Water	N	VOC624
055 RIVER_003TB			12:53		2	40 G	G	4C	Water	N	VOC624
056 RIVER_003			12:57		2	40 G	G	HCl	Water	N	HOLD VOC624
057 RIVER_003TB			12:57		2	40 G	G	HCl	Water	N	HOLD VOC624
058 RIVER_003			12:45		2	1000	G	4C	Water	N	ABN625
059 RIVER_003TB			12:45		2	1000	G	4C	Water	N	ABN625
060 RIVER_003			12:46		1	1000	P	4C	Water	N	DO, pH, Temperature, Conductivity <sup>②</sup>
Relinquished By: Tim Cook		Date: 11/15/18		Time: 2PM		Received By: M. Greene		Date: 11/15/18		Time: 2PM	

Relinquished By:

Date: 11/15/18

Time: 2PM

Received at Lab By:

Date: 11/15/18

Time: 2PM

Comments: 2°C. ② sample not received, analyzed 11/15/18

COC Number: A1016927

Sample Delivery Group No: Nov 2018

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## ANALYTICAL REPORT

Lab Number:	L1847214
Client:	Enthalpy Analytical 1 Lafayette Road PO Box 778 Hampton, NH 03843
ATTN:	Jason Hobbs
Phone:	(603) 926-3345
Project Name:	31381
Project Number:	Not Specified
Report Date:	11/29/18

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

---

Eight Walkup Drive, Westborough, MA 01581-1019

508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847214  
Report Date: 11/29/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1847214-01	31381-015	WATER	Not Specified	11/15/18 00:00	11/16/18
L1847214-02	31381-034	WATER	Not Specified	11/15/18 00:00	11/16/18
L1847214-03	31381-052	WATER	Not Specified	11/15/18 12:30	11/16/18
L1847214-04	31381-053	WATER	Not Specified	11/15/18 12:32	11/16/18
L1847214-05	31381-016	WATER	Not Specified	11/15/18 08:23	11/16/18
L1847214-06	31381-017	WATER	Not Specified	11/15/18 08:23	11/16/18
L1847214-07	31381-035	WATER	Not Specified	11/15/18 10:18	11/16/18
L1847214-08	31381-036	WATER	Not Specified	11/15/18 10:18	11/16/18
L1847214-09	31381-054	WATER	Not Specified	11/15/18 12:54	11/16/18
L1847214-10	31381-055	WATER	Not Specified	11/15/18 12:53	11/16/18
L1847214-11	31381-056	WATER	Not Specified	11/15/18 12:37	11/16/18
L1847214-12	31381-057	WATER	Not Specified	11/15/18 12:37	11/16/18

**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

#### HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

### Case Narrative (continued)

#### Report Submission

November 29, 2018: This final report includes the results of all requested analyses.

November 27, 2018: This is a preliminary report.

#### Sample Receipt

L1847214-09: Headspace was noted in the sample containers submitted for VOC 624 analysis. The analysis was cancelled at the client's request.

L1847214-11: Headspace was noted in the sample containers submitted for VOC 624 analysis. The analysis was performed at the client's request.

#### Volatile Organics

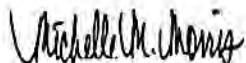
L1847214-11: Headspace was noted in the sample container utilized for analysis. The analysis was performed at the client's request.

L1847214-11: The analysis of Volatile Organics was performed with the method required holding time exceeded for Acrolein.

L1847214-11: The pH of the sample was less than two. It should be noted that 2-chloroethylvinyl ether breaks down under acidic conditions.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Michelle M. Morris

Title: Technical Director/Representative

Date: 11/29/18

# ORGANICS

# **VOLATILES**



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

**SAMPLE RESULTS**

**Lab ID:** L1847214-05  
**Client ID:** 31381-016  
**Sample Location:** Not Specified

**Date Collected:** 11/15/18 08:23  
**Date Received:** 11/16/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 11/17/18 15:25  
**Analyst:** NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by GC/MS - Westborough Lab</b>						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	74		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	10		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	28		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

**SAMPLE RESULTS**

**Lab ID:** L1847214-05  
**Client ID:** 31381-016  
**Sample Location:** Not Specified

**Date Collected:** 11/15/18 08:23  
**Date Received:** 11/16/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by GC/MS - Westborough Lab</b>						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	120		60-140
Fluorobenzene	108		60-140
4-Bromofluorobenzene	104		60-140

**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

**SAMPLE RESULTS**

**Lab ID:** L1847214-07  
**Client ID:** 31381-035  
**Sample Location:** Not Specified

**Date Collected:** 11/15/18 10:18  
**Date Received:** 11/16/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 11/17/18 15:58  
**Analyst:** NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	53		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	17		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	30		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	1.6		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

**SAMPLE RESULTS**

**Lab ID:** L1847214-07  
**Client ID:** 31381-035  
**Sample Location:** Not Specified

**Date Collected:** 11/15/18 10:18  
**Date Received:** 11/16/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	120		60-140
Fluorobenzene	108		60-140
4-Bromofluorobenzene	106		60-140

**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

**SAMPLE RESULTS**

**Lab ID:** L1847214-10  
**Client ID:** 31381-055  
**Sample Location:** Not Specified

**Date Collected:** 11/15/18 12:53  
**Date Received:** 11/16/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water  
**Analytical Method:** 128,624.1  
**Analytical Date:** 11/17/18 16:31  
**Analyst:** NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

**SAMPLE RESULTS**

**Lab ID:** L1847214-10  
**Client ID:** 31381-055  
**Sample Location:** Not Specified

**Date Collected:** 11/15/18 12:53  
**Date Received:** 11/16/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	117		60-140
Fluorobenzene	102		60-140
4-Bromofluorobenzene	107		60-140

Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847214  
Report Date: 11/29/18

**SAMPLE RESULTS**

Lab ID: L1847214-11  
Client ID: 31381-056  
Sample Location: Not Specified

Date Collected: 11/15/18 12:37  
Date Received: 11/16/18  
Field Prep: Not Specified

Sample Depth:  
Matrix: Water  
Analytical Method: 128,624.1  
Analytical Date: 11/28/18 13:59  
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	3.5	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	3.5	--	1
Trichlorofluoromethane	ND		ug/l	5.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	--	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	--	1
Bromoform	ND		ug/l	1.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	5.0	--	1
Bromomethane	ND		ug/l	5.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

**SAMPLE RESULTS**

**Lab ID:** L1847214-11  
**Client ID:** 31381-056  
**Sample Location:** Not Specified

**Date Collected:** 11/15/18 12:37  
**Date Received:** 11/16/18  
**Field Prep:** Not Specified

**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Styrene	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	10	--	1
Vinyl acetate	ND		ug/l	10	--	1
4-Methyl-2-pentanone	ND		ug/l	10	--	1
2-Hexanone	ND		ug/l	10	--	1
Acrolein	ND		ug/l	8.0	--	1
Acrylonitrile	ND		ug/l	10	--	1
Dibromomethane	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	98		60-140
Fluorobenzene	96		60-140
4-Bromofluorobenzene	97		60-140





Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847214  
Report Date: 11/29/18

### Method Blank Analysis Batch Quality Control

Analytical Method: 128,624.1  
Analytical Date: 11/17/18 10:25  
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05,07,10 Batch: WG1181010-8					
Methylene chloride	ND		ug/l	1.0	--
1,1-Dichloroethane	ND		ug/l	1.5	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	3.5	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.5	--
2-Chloroethylvinyl ether	ND		ug/l	10	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	3.5	--
Trichlorofluoromethane	ND		ug/l	5.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	2.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	1.5	--
cis-1,3-Dichloropropene	ND		ug/l	1.5	--
Bromoform	ND		ug/l	1.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Benzene	ND		ug/l	1.0	--
Toluene	ND		ug/l	1.0	--
Ethylbenzene	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	5.0	--
Bromomethane	ND		ug/l	5.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.5	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--



Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847214  
Report Date: 11/29/18

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 128,624.1  
Analytical Date: 11/17/18 10:25  
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05,07,10 Batch: WG1181010-8					
1,2-Dichlorobenzene	ND		ug/l	5.0	--
1,3-Dichlorobenzene	ND		ug/l	5.0	--
1,4-Dichlorobenzene	ND		ug/l	5.0	--
p/m-Xylene	ND		ug/l	2.0	--
o-xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
Styrene	ND		ug/l	1.0	--
Acetone	ND		ug/l	10	--
Carbon disulfide	ND		ug/l	5.0	--
2-Butanone	ND		ug/l	10	--
Vinyl acetate	ND		ug/l	10	--
4-Methyl-2-pentanone	ND		ug/l	10	--
2-Hexanone	ND		ug/l	10	--
Acrolein	ND		ug/l	8.0	--
Acrylonitrile	ND		ug/l	10	--
n-Hexane <sup>1</sup>	ND		ug/l	20	--
Methyl tert butyl ether	ND		ug/l	10	--
Dibromomethane	ND		ug/l	1.0	--
1,4-Dioxane <sup>1</sup>	ND		ug/l	2000	--
Tert-Butyl Alcohol	ND		ug/l	100	--
Tertiary-Amyl Methyl Ether	ND		ug/l	20	--
Dichlorodifluoromethane <sup>1</sup>	ND		ug/l	1.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	121		60-140
Fluorobenzene	110		60-140
4-Bromofluorobenzene	101		60-140



Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847214  
Report Date: 11/29/18

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 128,624.1  
Analytical Date: 11/28/18 11:42  
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 11 Batch: WG1183083-8					
Methylene chloride	ND		ug/l	1.0	--
1,1-Dichloroethane	ND		ug/l	1.5	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	3.5	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.5	--
2-Chloroethylvinyl ether	ND		ug/l	10	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	3.5	--
Trichlorofluoromethane	ND		ug/l	5.0	--
1,2-Dichloroethane	ND		ug/l	1.5	--
1,1,1-Trichloroethane	ND		ug/l	2.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	1.5	--
cis-1,3-Dichloropropene	ND		ug/l	1.5	--
Bromoform	ND		ug/l	1.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Benzene	ND		ug/l	1.0	--
Toluene	ND		ug/l	1.0	--
Ethylbenzene	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	5.0	--
Bromomethane	ND		ug/l	5.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.5	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--



Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847214  
Report Date: 11/29/18

### Method Blank Analysis Batch Quality Control

Analytical Method: 128,624.1  
Analytical Date: 11/28/18 11:42  
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 11 Batch: WG1183083-8					
1,2-Dichlorobenzene	ND		ug/l	5.0	--
1,3-Dichlorobenzene	ND		ug/l	5.0	--
1,4-Dichlorobenzene	ND		ug/l	5.0	--
p/m-Xylene	ND		ug/l	2.0	--
o-xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
Styrene	ND		ug/l	1.0	--
Acetone	ND		ug/l	10	--
Carbon disulfide	ND		ug/l	5.0	--
2-Butanone	ND		ug/l	10	--
Vinyl acetate	ND		ug/l	10	--
4-Methyl-2-pentanone	ND		ug/l	10	--
2-Hexanone	ND		ug/l	10	--
Acrolein	ND		ug/l	8.0	--
Acrylonitrile	ND		ug/l	10	--
n-Hexane <sup>1</sup>	ND		ug/l	20	--
Methyl tert butyl ether	ND		ug/l	10	--
Dibromomethane	ND		ug/l	1.0	--
Tert-Butyl Alcohol	ND		ug/l	100	--
Tertiary-Amyl Methyl Ether	ND		ug/l	20	--
Dichlorodifluoromethane <sup>1</sup>	ND		ug/l	1.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	99		60-140
Fluorobenzene	97		60-140
4-Bromofluorobenzene	100		60-140



# Lab Control Sample Analysis

Batch Quality Control

Lab Number: L1847214  
Report Date: 11/29/18

Project Name: 31381  
Project Number: Not Specified

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05,07,10 Batch: WG1181010-7								
Methylene chloride	120		-		60-140	-		28
1,1-Dichloroethane	100		-		50-150	-		49
Chloroform	115		-		70-135	-		54
Carbon tetrachloride	115		-		70-130	-		41
1,2-Dichloropropane	110		-		35-165	-		55
Dibromochloromethane	100		-		70-135	-		50
1,1,2-Trichloroethane	100		-		70-130	-		45
2-Chloroethylvinyl ether	55		-		1-225	-		71
Tetrachloroethene	105		-		70-130	-		39
Chlorobenzene	90		-		65-135	-		53
Trichlorofluoromethane	130		-		50-150	-		84
1,2-Dichloroethane	115		-		70-130	-		49
1,1,1-Trichloroethane	115		-		70-130	-		36
Bromodichloromethane	100		-		65-135	-		56
trans-1,3-Dichloropropene	80		-		50-150	-		86
cis-1,3-Dichloropropene	90		-		25-175	-		58
Bromoform	95		-		70-130	-		42
1,1,2,2-Tetrachloroethane	90		-		60-140	-		61
Benzene	115		-		65-135	-		61
Toluene	100		-		70-130	-		41
Ethylbenzene	100		-		60-140	-		63
Chloromethane	95		-		1-205	-		60
Bromomethane	85		-		15-185	-		61

# Lab Control Sample Analysis

Batch Quality Control

Lab Number: L1847214  
Report Date: 11/29/18

Project Name: 31381  
Project Number: Not Specified

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05,07,10 Batch: WG1181010-7

Vinyl chloride	120	-	-	-	5-195	-	-	66
Chloroethane	105	-	-	-	40-160	-	-	78
1,1-Dichloroethene	120	-	-	-	50-150	-	-	32
trans-1,2-Dichloroethene	130	-	-	-	70-130	-	-	45
cis-1,2-Dichloroethene	100	-	-	-	60-140	-	-	30
Trichloroethene	125	-	-	-	65-135	-	-	48
1,2-Dichlorobenzene	100	-	-	-	65-135	-	-	57
1,3-Dichlorobenzene	90	-	-	-	70-130	-	-	43
1,4-Dichlorobenzene	100	-	-	-	65-135	-	-	57
p/m-Xylene	92	-	-	-	60-140	-	-	30
o-xylene	90	-	-	-	60-140	-	-	30
Styrene	85	-	-	-	60-140	-	-	30
Acetone	104	-	-	-	40-160	-	-	30
Carbon disulfide	100	-	-	-	60-140	-	-	30
2-Butanone	116	-	-	-	60-140	-	-	30
Vinyl acetate	112	-	-	-	60-140	-	-	30
4-Methyl-2-pentanone	96	-	-	-	60-140	-	-	30
2-Hexanone	90	-	-	-	60-140	-	-	30
Acrolein	100	-	-	-	60-140	-	-	30
Acrylonitrile	105	-	-	-	60-140	-	-	60
Methyl tert butyl ether	105	-	-	-	60-140	-	-	30
Dibromomethane	115	-	-	-	70-130	-	-	30
1,4-Dioxane <sup>1</sup>	115	-	-	-	60-140	-	-	30

# Lab Control Sample Analysis Batch Quality Control

Project Name: 31381

Lab Number: L1847214

Project Number: Not Specified

Report Date: 11/29/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05,07,10 Batch: WG1181010-7								
Tert-Butyl Alcohol	110		-		60-140	-		30
Tertiary-Amyl Methyl Ether	100		-		60-140	-		30
Dichlorodifluoromethane'	100		-		70-130	-		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	121				60-140
Fluorobenzene	108				60-140
4-Bromofluorobenzene	104				60-140

# Lab Control Sample Analysis Batch Quality Control

Project Name: 31381

Lab Number: L1847214

Project Number: Not Specified

Report Date: 11/29/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 11 Batch: WG1183083-7								
Methylene chloride	95		-		60-140	-		28
1,1-Dichloroethane	95		-		50-150	-		49
Chloroform	100		-		70-135	-		54
Carbon tetrachloride	100		-		70-130	-		41
1,2-Dichloropropane	95		-		35-165	-		55
Dibromochloromethane	95		-		70-135	-		50
1,1,2-Trichloroethane	95		-		70-130	-		45
2-Chloroethylvinyl ether	115		-		1-225	-		71
Tetrachloroethene	100		-		70-130	-		39
Chlorobenzene	95		-		65-135	-		53
Trichlorofluoromethane	110		-		50-150	-		84
1,2-Dichloroethane	95		-		70-130	-		49
1,1,1-Trichloroethane	100		-		70-130	-		36
Bromodichloromethane	105		-		65-135	-		56
trans-1,3-Dichloropropene	85		-		50-150	-		86
cis-1,3-Dichloropropene	90		-		25-175	-		58
Bromoform	95		-		70-130	-		42
1,1,2,2-Tetrachloroethane	90		-		60-140	-		61
Benzene	100		-		65-135	-		61
Toluene	100		-		70-130	-		41
Ethylbenzene	100		-		60-140	-		63
Chloromethane	95		-		1-205	-		60
Bromomethane	125		-		15-185	-		61



# Lab Control Sample Analysis Batch Quality Control

Project Name: 31381

Lab Number: L1847214

Project Number: Not Specified

Report Date: 11/29/18

Parameter	LCS		LCSD		%Recovery		RPD	
	%Recovery	Qual	%Recovery	Qual	Limits		Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 11 Batch: WG1183083-7								
Vinyl chloride	130		-		5-195	-		66
Chloroethane	100		-		40-160	-		78
1,1-Dichloroethene	100		-		50-150	-		32
trans-1,2-Dichloroethene	100		-		70-130	-		45
cis-1,2-Dichloroethene	85		-		60-140	-		30
Trichloroethene	100		-		65-135	-		48
1,2-Dichlorobenzene	100		-		65-135	-		57
1,3-Dichlorobenzene	95		-		70-130	-		43
1,4-Dichlorobenzene	100		-		65-135	-		57
p/m-Xylene	90		-		60-140	-		30
o-xylene	90		-		60-140	-		30
Styrene	80		-		60-140	-		30
Acetone	100		-		40-160	-		30
Carbon disulfide	90		-		60-140	-		30
2-Butanone	96		-		60-140	-		30
Vinyl acetate	98		-		60-140	-		30
4-Methyl-2-pentanone	96		-		60-140	-		30
2-Hexanone	96		-		60-140	-		30
Acrolein	95		-		60-140	-		30
Acrylonitrile	90		-		60-140	-		60
Methyl tert butyl ether	90		-		60-140	-		30
Dibromomethane	90		-		70-130	-		30
Tert-Butyl Alcohol	97		-		60-140	-		30

# Lab Control Sample Analysis

Batch Quality Control

Lab Number: L1847214  
Report Date: 11/29/18

Project Name: 31381  
Project Number: Not Specified

Parameter	LCS		LCSD		%Recovery		RPD	
	%Recovery	Qual	%Recovery	Qual	Limits		Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 11 Batch: WG1183083-7								
Tertiary-Amyl Methyl Ether	95		-		60-140	-		30
Dichlorodifluoromethane <sup>1</sup>	100		-		70-130	-		30

Surrogate	LCS		LCSD		Acceptance	
	%Recovery	Qual	%Recovery	Qual	Criteria	
Pentafluorobenzene	101				60-140	
Fluorobenzene	97				60-140	
4-Bromofluorobenzene	100				60-140	

# **INORGANICS & MISCELLANEOUS**

**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

**SAMPLE RESULTS**

**Lab ID:** L1847214-01  
**Client ID:** 31381-015  
**Sample Location:** Not Specified

**Date Collected:** 11/15/18 00:00  
**Date Received:** 11/16/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	11/20/18 04:20	11/20/18 06:55	4,420.1	GD



Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847214  
Report Date: 11/29/18

**SAMPLE RESULTS**

Lab ID: L1847214-02  
Client ID: 31381-034  
Sample Location: Not Specified

Date Collected: 11/15/18 00:00  
Date Received: 11/16/18  
Field Prep: Not Specified

Sample Depth:  
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	11/20/18 04:20	11/20/18 06:58	4,420.1	GD



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

**SAMPLE RESULTS**

**Lab ID:** L1847214-03  
**Client ID:** 31381-052  
**Sample Location:** Not Specified

**Date Collected:** 11/15/18 12:30  
**Date Received:** 11/16/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	11/20/18 04:20	11/20/18 07:01	4,420.1	GD



Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847214  
Report Date: 11/29/18

## SAMPLE RESULTS

Lab ID: L1847214-04  
Client ID: 31381-053  
Sample Location: Not Specified

Date Collected: 11/15/18 12:32  
Date Received: 11/16/18  
Field Prep: Not Specified

Sample Depth:  
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	--	1	11/20/18 04:20	11/20/18 07:02	4,420.1	GD



Project Name: 31381

Lab Number: L1847214

Project Number: Not Specified

Report Date: 11/29/18

**Method Blank Analysis**  
**Batch Quality Control**

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-04 Batch: WG1181237-1									
Phenolics, Total	ND	mg/l	0.030	--	1	11/20/18 04:20	11/20/18 06:53	4,420.1	GD





Lab Control Sample Analysis

Batch Quality Control

Project Name: 31381

Project Number: Not Specified

Lab Number: L1847214

Report Date: 11/29/18

Parameter	LCS		LCSD		%Recovery		RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual	%Recovery	Limits			
General Chemistry - Westborough Lab Associated sample(s): 01-04 Batch: WG1181237-2									
Phenolics, Total	96		-		-	70-130	-		



### Matrix Spike Analysis Batch Quality Control

Project Name: 31381

Lab Number: L1847214

Project Number: Not Specified

Report Date: 11/29/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1181237-4 QC Sample: L1847214-01 Client ID: 31381-015									
Phenolics, Total	ND	0.4	0.38	96	-	-	70-130	-	20

**Lab Duplicate Analysis**  
*Batch Quality Control*

Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847214  
Report Date: 11/29/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1181237-3 QC Sample: L1847214-01 Client ID: 31381-015						
Phenolics, Total	ND	ND	mg/l	NC		20

Serial\_No:11291814:38  
 Lab Number: L1847214  
 Report Date: 11/29/18

Project Name: 31381  
 Project Number: Not Specified

### Sample Receipt and Container Information

Were project specific reporting limits specified? YES

**Cooler Information**  
 Cooler A Custody Seal Absent

Container Information			Initial		Final		Temp		Frozen		Analysis(*)
Container ID	Container Type	Cooler	pH	pH	deg C	Pres	Seal	Date/Time			
L1847214-01A	Glass 1000ml H2SO4 preserved	A	<2	<2	4.2	Y	Absent			TPHENOL-420(28)	
L1847214-02A	Glass 1000ml H2SO4 preserved	A	<2	<2	4.2	Y	Absent			TPHENOL-420(28)	
L1847214-03A	Glass 1000ml H2SO4 preserved	A	<2	<2	4.2	Y	Absent			TPHENOL-420(28)	
L1847214-04A	Glass 1000ml H2SO4 preserved	A	<2	<2	4.2	Y	Absent			TPHENOL-420(28)	
L1847214-05A	Vial unpreserved	A	NA		4.2	Y	Absent			624.1(3)	
L1847214-05B	Vial unpreserved	A	NA		4.2	Y	Absent			624.1(3)	
L1847214-06A	Vial HCl preserved	A	NA		4.2	Y	Absent			HOLD-624(14)	
L1847214-06B	Vial HCl preserved	A	NA		4.2	Y	Absent			HOLD-624(14)	
L1847214-07A	Vial unpreserved	A	NA		4.2	Y	Absent			624.1(3)	
L1847214-07B	Vial unpreserved	A	NA		4.2	Y	Absent			624.1(3)	
L1847214-08A	Vial HCl preserved	A	NA		4.2	Y	Absent			HOLD-624(14)	
L1847214-08B	Vial HCl preserved	A	NA		4.2	Y	Absent			HOLD-624(14)	
L1847214-09A	Vial unpreserved	A	NA		4.2	N	Absent			HOLD-624(7)	
L1847214-09B	Vial unpreserved	A	NA		4.2	N	Absent			HOLD-624(7)	
L1847214-10A	Vial unpreserved	A	NA		4.2	Y	Absent			624.1(3)	
L1847214-10B	Vial unpreserved	A	NA		4.2	Y	Absent			624.1(3)	
L1847214-11A	Vial HCl preserved	A	NA		4.2	N	Absent			624.1(14)	
L1847214-11B	Vial HCl preserved	A	NA		4.2	N	Absent			624.1(14)	
L1847214-12A	Vial HCl preserved	A	NA		4.2	N	Absent			HOLD-624(14)	
L1847214-12B	Vial HCl preserved	A	NA		4.2	Y	Absent			HOLD-624(14)	

**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

## GLOSSARY

### Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCS D	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

**Report Format:** Data Usability Report



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

#### Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847214  
**Report Date:** 11/29/18

## REFERENCES

- 4 Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983.
- 128 Method 624.1: Purgeables by GC/MS, EPA 821-R-16-008, December 2016.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.  
 Facility: Company-wide  
 Department: Quality Assurance  
 Title: Certificate/Approval Program Summary

ID No.:17873  
 Revision 12  
 Published Date: 10/9/2018 4:58:19 PM  
 Page 1 of 1

## Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

### Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene  
 EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.  
 EPA 8270D: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

SM 2540D: TSS  
 EPA 8082A: NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.  
 EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.  
 Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

### Westborough Facility:

#### Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; EPA 353.2: Nitrate-N, Nitrite-N; SM4500NO<sub>3</sub>-F: Nitrate-N, Nitrite-N; SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B  
 EPA 332: Perchlorate; EPA 524.2: THMs and VOCs; EPA 504.1: EDB, DBCP.  
 Microbiology: SM9215B; SM9223-P/A, SM9223B-Collert-QT, SM9222D.

#### Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH<sub>3</sub>-BH: Ammonia-N and Kjeldahl-N, EPA 350.1: Ammonia-N, LACHAT 10-107-06-1-B: Ammonia-N, EPA 351.1, SM4500NO<sub>3</sub>-F, EPA 353.2: Nitrate-N, SM4500P-E, SM4500P-B, E, SM4500SO<sub>4</sub>-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.  
 EPA 624.1: Volatile Halocarbons & Aromatics,  
 EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs  
 EPA 625.1: SVOC (Acid/Base/Neutral Extractables), EPA 600/4-81-045: PCB-Oil.  
 Microbiology: SM9223B-Collert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.

### Mansfield Facility:

#### Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. EPA 200.8: Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. EPA 245.1 Hg. EPA 522.

#### Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.  
 EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.  
 EPA 245.1 Hg.  
 SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



## CHAIN OF CUSTODY RECORD 11/12/18 11847214

## ENVIROSYSTEMS, INCORPORATED

P.O. Box 778, Hampton, New Hampshire 03842

ESI Study Number: 31381

Customer Services: Phone # (603) 926-3345 Fax # (603) 926-3521		PAGE 1 OF 1
PROJECT NAME: 31381	P.O. #	P01027780
CONTACT: Jason Hobbs Email: jason.hobbs@enthalpy.com CC: catherine.sasso@enthalpy.com	PHONE:	Ext. 208
ADDRESS: P.O. Box 778	SAMPLED BY:	CS
ADDRESS: Hampton, NH 03843		

Program Requirements: ☐ NPDES ☐ RCRA ☐ USACE ☐ EPA ☐ OTHER

SAMPLE #	YOUR FIELD IDENTIFICATION (MUST AGREE WITH CONTAINER)	DATE SAMPLED	TIME SAMPLED	COMPOSITE /GRAB	EFFLUENT D-DILUENT O-OTHER	CONTAINER #/VOLUME	FIELD PRESERVED	ANALYSIS REQUESTED (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
4724-01	31381-015	11/15/18	0000	C		1X1000ML G	H2SO4	TPhen (EPA 420.1)
02	31381-034	11/15/18	0000	C		1X1000ML G	H2SO4	TPhen (EPA 420.1)
03	31381-052	11/15/18	1230	G		1X1000ML G	H2SO4	TPhen (EPA 420.1)
04	31381-053	11/15/18	1232	G		1X1000ML G	H2SO4	TPhen (EPA 420.1)
05	31381-016	11/15/18	0823	G		2X40ML G	HCl	VOC 624 + ACRYLONITRILE
06	31381-017	11/15/18	0823	G		2X40ML G	HCl	HOLD VOC 624
07	31381-035	11/15/18	1018	G		2X40ML G	HCl	VOC 624 + ACRYLONITRILE
08	31381-036	11/15/18	1018	G		2X40ML G	HCl	HOLD VOC 624
09	31381-054	11/15/18	1254	G		2X40ML G	HCl	VOC 624 + ACRYLONITRILE
10	31381-055	11/15/18	1253	G		2X40ML G	HCl	VOC 624 + ACRYLONITRILE
11	31381-056	11/15/18	1237	G		2X40ML G	HCl	HOLD VOC 624
12	31381-057	11/15/18	1237	G		2X40ML G	HCl	HOLD VOC 624

RELINQUISHED BY: *[Signature]* DATE: 11/16/18 TIME: 1345  
 RECEIVED BY: *[Signature]* DATE: 11/16/18 TIME: 1745

FOR VICS: PLEASE LABEL SAMPLES REI LABELED INS HOLD IF WITHIN HOLD TIME. IF OUTSIDE HOLD TIME, PLEASE ONLY RUN SAMPLES  
 Page 39 of 39



## ANALYTICAL REPORT

Lab Number:	L1847584
Client:	Enthalpy Analytical 1 Lafayette Road PO Box 778 Hampton, NH 03843
ATTN:	Alexandra Mackinnon
Phone:	(603) 926-3345
Project Name:	31381
Project Number:	Not Specified
Report Date:	11/29/18

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03871), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847584  
Report Date: 11/29/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1847584-01	31381-008	WATER	Not Specified	11/15/18 00:00	11/20/18
L1847584-02	31381-009	WATER	Not Specified	11/15/18 00:00	11/20/18
L1847584-03	31381-027	WATER	Not Specified	11/15/18 00:00	11/20/18
L1847584-04	31381-028	WATER	Not Specified	11/15/18 00:00	11/20/18
L1847584-05	31381-046	WATER	Not Specified	11/15/18 00:00	11/20/18
L1847584-06	31381-045	WATER	Not Specified	11/15/18 00:00	11/20/18

**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847584  
**Report Date:** 11/29/18

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

#### HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847584  
**Report Date:** 11/29/18

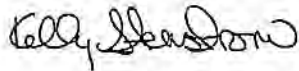
**Case Narrative (continued)**

**Sample Receipt**

L1847584-06: The sample identified as "31381-047" on the chain of custody was identified as "31381-045" on the container label. At the client's request, the sample is reported as "31381-045".

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Kelly Stenstrom

Title: Technical Director/Representative

Date: 11/29/18

# **INORGANICS & MISCELLANEOUS**

Project Name: 31381  
 Project Number: Not Specified

Lab Number: L1847584  
 Report Date: 11/29/18

**SAMPLE RESULTS**

Lab ID: L1847584-01  
 Client ID: 31381-008  
 Sample Location: Not Specified

Date Collected: 11/15/18 00:00  
 Date Received: 11/20/18  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Total Kjeldahl	5.35		mg/l	0.300	—	1	11/25/18 09:20	11/28/18 20:08	121,4500NH3-H	AT



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847584  
**Report Date:** 11/29/18

**SAMPLE RESULTS**

**Lab ID:** L1847584-02  
**Client ID:** 31381-009  
**Sample Location:** Not Specified

**Date Collected:** 11/15/18 00:00  
**Date Received:** 11/20/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Total Kjeldahl	5.46		mg/l	0.300	—	1	11/25/18 09:20	11/28/18 20:09	121,4500NH3-H	AT





Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847584  
Report Date: 11/29/18

## SAMPLE RESULTS

Lab ID: L1847584-03  
Client ID: 31381-027  
Sample Location: Not Specified

Date Collected: 11/15/18 00:00  
Date Received: 11/20/18  
Field Prep: Not Specified

Sample Depth:  
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Total Kjeldahl	1.72		mg/l	0.300	--	1	11/25/18 09:20	11/28/18 20:13	121,4500NH3-H	AT



Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847584  
Report Date: 11/29/18

## SAMPLE RESULTS

Lab ID: L1847584-04  
Client ID: 31381-028  
Sample Location: Not Specified

Date Collected: 11/15/18 00:00  
Date Received: 11/20/18  
Field Prep: Not Specified

Sample Depth:  
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Total Kjeldahl	1.84		mg/l	0.300	—	1	11/25/18 09:20	11/28/18 20:14	121,4500NH3-H	AT



Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847584  
Report Date: 11/29/18

## SAMPLE RESULTS

Lab ID: L1847584-05  
Client ID: 31381-046  
Sample Location: Not Specified

Date Collected: 11/15/18 00:00  
Date Received: 11/20/18  
Field Prep: Not Specified

Sample Depth:  
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Total Kjeldahl	0.349		mg/l	0.300	--	1	11/25/18 09:20	11/28/18 20:14	121.4500NH3-H	AT



Project Name: 31381  
 Project Number: Not Specified

Lab Number: L1847584  
 Report Date: 11/29/18

**SAMPLE RESULTS**

Lab ID: L1847584-06  
 Client ID: 31381-045  
 Sample Location: Not Specified

Date Collected: 11/15/18 00:00  
 Date Received: 11/20/18  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Total Kjeldahl	0.345		mg/l	0.300	--	1	11/25/18 09:20	11/28/18 20:15	121.4500NH3-H	AT



Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847584  
Report Date: 11/29/18

**Method Blank Analysis**  
**Batch Quality Control**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-06 Batch: WG1182279-1										
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	11/25/18 09:20	11/28/18 20:00	121,4500NH3-H	AT



# Lab Control Sample Analysis

Batch Quality Control

Lab Number: L1847584

Report Date: 11/29/18

Project Name: 31381

Project Number: Not Specified

Parameter	LCS		LCSD		%Recovery		RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual	%Recovery	Limits			
General Chemistry - Westborough Lab Associated sample(s): 01-06 Batch: WG1182279-2									
Nitrogen, Total Kjeldahl	102	-	-	-	78-122	-	-	-	-

**Matrix Spike Analysis**

Batch Quality Control

Project Name: 31381

Project Number: Not Specified

Lab Number: L1847584

Report Date: 11/29/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG1182279-4 QC Sample: L1847584-06 Client ID: 31381-045									
Nitrogen, Total Kjeldahl	0.345	8	8.00	96	-	-	77-111	-	24

### Lab Duplicate Analysis

*Batch Quality Control*

Project Name: 31381  
Project Number: Not Specified

Lab Number: L1847584  
Report Date: 11/29/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG1182279-3 QC Sample: L1847584-06 Client ID: 31381-045						
Nitrogen, Total Kjeldahl	0.345	0.424	mg/l	21		24



Serial\_No:11291811:56  
 Lab Number: L1847584  
 Report Date: 11/29/18

Project Name: 31381  
 Project Number: Not Specified

### Sample Receipt and Container Information

Were project specific reporting limits specified? YES

**Cooler Information**  
 Cooler A Custody Seal Absent

Container Information		Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
Container ID	Container Type								
L1847584-01A	Plastic 500ml H2SO4 preserved	A	<2	<2	5.4	Y	Absent		TKN-4500(28)
L1847584-02A	Plastic 500ml H2SO4 preserved	A	<2	<2	5.4	Y	Absent		TKN-4500(28)
L1847584-03A	Plastic 500ml H2SO4 preserved	A	<2	<2	5.4	Y	Absent		TKN-4500(28)
L1847584-04A	Plastic 500ml H2SO4 preserved	A	<2	<2	5.4	Y	Absent		TKN-4500(28)
L1847584-05A	Plastic 500ml H2SO4 preserved	A	<2	<2	5.4	Y	Absent		TKN-4500(28)
L1847584-06A	Plastic 500ml H2SO4 preserved	A	<2	<2	5.4	Y	Absent		TKN-4500(28)

**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847584  
**Report Date:** 11/29/18

## GLOSSARY

### Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

**Report Format:** Data Usability Report



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847584  
**Report Date:** 11/29/18

#### Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report



**Project Name:** 31381  
**Project Number:** Not Specified

**Lab Number:** L1847584  
**Report Date:** 11/29/18

## REFERENCES

- 121 Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WEF, Standard Methods Online.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



## Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

### Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene  
 EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.  
 EPA 8270D: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

#### SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.  
 Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

### Westborough Facility:

#### Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; EPA 353.2: Nitrate-N, Nitrite-N; SM4500NO<sub>3</sub>-F: Nitrate-N, Nitrite-N; SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B  
 EPA 332: Perchlorate; EPA 524.2: THMs and VOCs; EPA 504.1: EDB, DBCP.  
 Microbiology: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.

#### Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH<sub>3</sub>-BH: Ammonia-N and Kjeldahl-N, EPA 350.1: Ammonia-N, LACHAT 10-107-06-1-B: Ammonia-N, EPA 351.1, SM4500NO<sub>3</sub>-F, EPA 353.2: Nitrate-N, SM4500P-E, SM4500P-B, E, SM4500SO<sub>4</sub>-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.  
 EPA 624.1: Volatile Halocarbons & Aromatics,  
 EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs  
 EPA 625.1: SVOC (Acid/Base/Neutral Extractables), EPA 600/4-81-045: PCB-Oil.  
 Microbiology: SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.

### Mansfield Facility:

#### Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. EPA 200.8: Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. EPA 245.1 Hg. EPA 522.

#### Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.  
 EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.  
 EPA 245.1 Hg.  
 SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY DOCUMENTATION

[illegible]

Comments:

COC Number: A1016959

Sample Delivery Group No: November 2018 Page of



## Analytical Report Review Checklist

DATE IN: 11/15/18  
 DATE DUE: \_\_\_\_\_  
 \_\_\_\_\_

STUDY #: 31381  
 CLIENT: UNDERWOOD  
 PROJECT: PISCATAQUA RIVER

EDD Required Yes No

QC Report Pages Required: Yes No

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	11/15/18	CS	
Sample Receipt Complete	↓	↓	
QC Reports Generated			
EDD Generated			
Analytical Components Complete	12/19/18	AM	
Data Acceptability Review	↓	↓	
Analytical Reports Generated	↓	↓	

Technical Report Review	Date	Initials	Comments
All Elements of QC Reports Incorporated, MDL, etc.			
EDD Checked and Results Saved			
Data Appendix Compiled			
Analytical Report Reviewed	12/20/18	AS	
QA Audit / Review Complete			
Final Report Reviewed and Authorized	12/21/18	ALB	
Final Reports Printed - PDF	12/21/18	AM	
Hard Copy Sent or E-Mailed To Client	↓	↓	
Report Logged Out / Invoice Sent	↓	↓	
Report Scanned to Archive	↓	↓	







Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

21 January 2019

Tim Puls  
Underwood Engineers  
25 Vaughan Mall  
Portsmouth, NH 03801  
RE: Trace Metals In Wastewater

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in blue ink that reads "Maricris dela Rosa".

Maricris dela Rosa  
Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B182042 NEW_01_TM	8K00745-01	Water	15-Nov-18 00:00	21-Nov-18 10:30
B182043 NEW_02_TM	8K00745-02	Water	15-Nov-18 00:00	21-Nov-18 10:30
B182044 NEW_EB_TM	8K00745-03	Water	14-Nov-18 09:15	21-Nov-18 10:30
B182046 NEW_MS_TM	8K00745-04	Water	15-Nov-18 00:00	21-Nov-18 10:30
B181937 NEW_01_THg	8K00745-06	Water	15-Nov-18 00:00	21-Nov-18 10:30
B181959 NEW_02_THg	8K00745-07	Water	15-Nov-18 00:00	21-Nov-18 10:30
B181960 NEW_EB_THg	8K00745-08	Water	14-Nov-18 09:17	21-Nov-18 10:30
B181961 NEW_MS_THg	8K00745-09	Water	15-Nov-18 00:00	21-Nov-18 10:30
B181962 PEASE_01_TM	8K00745-10	Water	15-Nov-18 00:00	21-Nov-18 10:30
B181965 PEASE_02_TM	8K00745-11	Water	15-Nov-18 00:00	21-Nov-18 10:30
B181967 PEASE_EB_TM	8K00745-12	Water	14-Nov-18 08:27	21-Nov-18 10:30
B181969 PEASE_MS_TM	8K00745-13	Water	15-Nov-18 00:00	21-Nov-18 10:30
B181970 PEASE_01_THg	8K00745-15	Water	15-Nov-18 00:00	21-Nov-18 10:30
B181971 PEASE_02_THg	8K00745-16	Water	15-Nov-18 00:00	21-Nov-18 10:30
B181972 PEASE_EB_THg	8K00745-17	Water	14-Nov-18 08:29	21-Nov-18 10:30
B181973 PEASE_MS_THg	8K00745-18	Water	15-Nov-18 00:00	21-Nov-18 10:30

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

*Maricris dela Rosa*

Maricris dela Rosa, Project Manager

Page 2 of 43



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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

#### SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 21-Nov-18 10:30. The samples were received intact, on-ice within a sealed cooler at

<u>Cooler</u>	<u>Temp C°</u>
Cooler #1	3.3
Cooler #2	11.5

Samples were shipped to Eurofins Calscience in Garden Grove, CA for the EPA SM4500 Total CN analysis per the initial project setup.

The subcontract report is located after the notes and definitions section of the EFGS report.

#### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total mercury by flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631E.

Samples were prepared and analyzed for total recoverable metals by inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 200.8 (EFGS-054).

#### ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC

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*Maricris dela Rosa*

Maricris dela Rosa, Project Manager



Frontier Global Sciences

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries. All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC

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Maricris dela Rosa, Project Manager

## Sample Receipt Checklist

Client: Underwood Date & Time Received: 11/21/18 1030 Date Labeled: 11/21/18 Labeled By: BD

Project: \_\_\_\_\_ Received By: Bea Label Verified By: LEC 11-21-18

# of Coolers Received: 1 Samples Arrived By: ✓ Shipping Service \_\_\_\_\_ Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (Specify: \_\_\_\_\_)

Coolant: ☐ None/Ambient ☐ Loose Ice ☒ Gel Ice ☐ Dry Ice Coolant Required: Y Temp Blank Used: Y for Cooler(s): \_\_\_\_\_

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y/N

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>N</u>	
Custody seals signed:	<u>N</u>	

TID: <u>9780</u>	CF: <u>+0.3 °C</u>	Date/time: <u>11/21/18</u>	By: <u>AC</u>
Cooler 1: <u>3.0 °C</u>	w/ CF: <u>3.3 °C</u>	Cooler 4: _____ °C	w/ CF: _____ °C
Cooler 2: <u>11.0 °C</u>	w/ CF: <u>11.5 °C</u>	Cooler 5: _____ °C	w/ CF: _____ °C
Cooler 3: _____ °C	w/ CF: _____ °C	Cooler 6: _____ °C	w/ CF: _____ °C

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Preservation type:	<u>Y</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
Internal COC required:	<u>NA</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>Y</u>	

Anomalies/Non-conformances (attach additional pages if needed):

\* used Thermo 39804 +0.5

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8K00745



4°C

8100745



Frontier Global Sciences

Chain of Custody Record & Laboratory Analysis Request:  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

Page 1 of 2

Client: UNDERWOOD ENGINEERS, INC.				Contact: Tim Puls		Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Analyses Requested			EFGS PM:	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801				Phone: (603) 436-6192 Fax:								Date:	
Project Name: Anti-Degradation - WWTF				E-mail: tpuls@underwoodengineers.com								TAT (business days): <u>20</u> (std)	
Report To: Tim Puls				Contract/PO:								15 10 5 4 3 2 24 hrs.	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801				Invoice To: Client								(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)	
Phone: (603) 436-6192 Fax:				Address:					Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N				
E-mail: tpuls@underwoodengineers.com				Phone: Fax:					(If yes, please contact PM)				
E-mail: tpuls@underwoodengineers.com				E-mail:					EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N				
									QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High				
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time				Total Metals (TM)	Total Cn (TCn)	Total Mercury (THg)	Comments	
1	B182042	NEW_01_TM	1	WW	11/15/18 24hr	↑	N	-	X			Total Metals include: Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Ni, Se, Ag, Ti, Zn  RW = Reagent Water	
2	B182043	NEW_02_TM	1	WW	11/15/18 "	↑	N	-	X				
3	B182044	NEW_EB_TM	1	RW	11/14/18 9:15AM UE/60	↓	N	-	X				
4	B182046	NEW_MS_TM	1	WW	11/15/18 24hr	↓	N	-	X				
5	002256	NEW_01_TCn	1	WW	" "	↓	N	NaOH		X			
6	B181937	NEW_01_THg	1	WW	" "	↓	N	-			X		
7	B181959	NEW_02_THg	1	WW	" "	↓	N	-			X		
8	B181960	NEW_EB_THg	1	RW	11/14/18 9:17AM UE/60	↓	N	-			X		
9	B181961	NEW_MS_THg	1	WW	11/15/18 24hr	↓	N	-			X		
10	B181962	PEASE_01_TM	1	WW	" 24hr	↓	N	-	X				
11	B181965	PEASE_02_TM	1	WW	" 24hr	↓	N	-	X				
12	B181967	PEASE_EB_TM	1	RW	11/14/18 8:37A	↓	N	-	X				High level
For Laboratory Use Only				Matrix Codes:		Relinquished By:		Received By:		Received By:			
COC Seal: NA		Comments:		FW: Fresh Water WW: Waste Water SB: Sea and Brackish Water SS: Soil and Sediment TS: Plant and Animal Tissue HC: Hydrocarbons TR: Trap OT: Other		Name: Tim Puls		Name: Steve Jones		Name: Steve Jones			
Cooler Temp: 3-3						Organization: UE		Organization: UNH		Organization: UNH			
Carrier: UPS						Date & Time: 11/15/18		Date & Time: 11/15/18		Date & Time: 11/15/18			
VTSR: 1030						Tracking number: 5452 496 8221							
# of Coolers:													
Sample Disposal:						By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.							
<input type="checkbox"/> Return (shipping fees may apply)						Customer Approval: <u>Tim Puls</u> Date: <u>11/15/18</u>							
<input checked="" type="checkbox"/> Standard Disposal - 30 Days after report													
<input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)													

Brian M. Updegraff  
EFGS  
11/21/18 1030



Frontier Global Sciences

Chain of Custody Record & Laboratory Analysis Request:  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

Page 2 of 2

Client: UNDERWOOD ENGINEERS, INC.		Contact: Tim Puls		Analyses Requested		EFGS PM:									
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Phone: (603) 436-6192 Fax:				Date:									
Project Name: Anti-Degradation - WWTF		E-mail: tpuls@underwoodengineers.com				TAT (business days) <u>20</u> (std)									
Report To: Tim Puls		Contract/PO:				15 10 5 4 3 2 24 hrs.									
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Invoice To: Client				(For TAT < 10 days, contact PM.)									
Phone: (603) 436-6192 Fax:		Address:		Surcharges apply for expedited TAT)		Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N									
E-mail: tpuls@underwoodengineers.com		Phone: Fax:		Total Metals (TM)		(If yes, please contact PM)									
E-mail:		E-mail:		Total Cn (TCn)		EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N									
				Total Mercury (THg)		QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High									
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)							Comments
1	B181969	PEASE_MS_TM	1	WW	11/15/18 24hr	UE/60	N	-	X						Total Metals include: Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Ni, Se, Ag, Ti, Zn
2	002268	PEASE_01_TCN	1	WW	11/15/18 24hr		N	NaOH		X					RW=Reagent Water
3	B181970	PEASE_01_THg	1	WW	11/15/18 24hr		N	-			X				
4	B181971	PEASE_02_THg	1	WW	11/15/18 24hr		N	-			X				
5	B181972	PEASE_EB_THg	1	RW	11/14/18 8:29A		N	-			X				
6	B181973	PEASE_MS_THg	1	WW	11/15/18 24hr		N	-			X				
7															
8															
9															
10															
11															
12															
For Laboratory Use Only			Matrix Codes:			Relinquished By:		Received By:		Received By:					
COC Seal:			Comments:			Name: Tim Puls		Name: Steve Jenkins		Name: Steve Jenkins					
Cooler Temp:			FW: Fresh Water			Organization: U/E		Organization: UNH		Organization: UNH					
Carrier:			WW: Waste Water			Date & Time: 11/15/18		Date & Time: 11/15/18		Date & Time: 11/15/18					
VTSR:			SB: Sea and Brackish Water			Tracking number:									
# of Coolers:			SS: Soil and Sediment												
			TS: Plant and Animal Tissue												
			HC: Hydrocarbons												
			TR: Trap												
			OT: Other												
Sample Disposal:						By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.									
<input type="checkbox"/> Return (shipping fees may apply)						Customer Approval: <u>Tim Puls</u> Date: <u>11/15/18</u>									
<input checked="" type="checkbox"/> Standard Disposal - 30 Days after report															
<input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)															

**SUBCONTRACT ORDER**  
Eurofins Frontier Global Sciences, Inc.  
**8K00745**

**SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

**Analysis**

**Comments**

Sample ID: 002256 NEW\_01\_TCn

EFGS Lab ID: 8K00745-05

Matrix: Water

Sampled: 15-Nov-18 00:00 (GMT-05:00) Eastern Time (US &

Due: 21-Dec-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

*Containers Supplied:*

57\_ 1000 mL PETG (A)

Sample ID: 002268 PEASE\_01\_TCn

EFGS Lab ID: 8K00745-14

Matrix: Water

Sampled: 15-Nov-18 00:00 (GMT-05:00) Eastern Time (US &

Due: 21-Dec-18 19:00

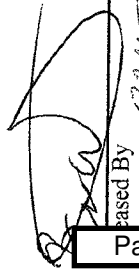

Misc. Subcontract 1

EPA SM4500 CN E

*Containers Supplied:*

57\_ 1000 mL PETG (A)

17 86605001 5075 7948

 11/26/18  
Released By \_\_\_\_\_ Date \_\_\_\_\_  
Received By \_\_\_\_\_ Date \_\_\_\_\_  
 11-26-18  
Released By \_\_\_\_\_ Date \_\_\_\_\_  
Received By \_\_\_\_\_ Date \_\_\_\_\_





Frontier Global Sciences

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

**B182042 NEW\_01\_TM**

**8K00745-01**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
---------	--------	-----------------	-----------------	-------	----------	-------	----------	----------	----------	--------	-------

**Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion**

Antimony	0.114	0.018	0.040	µg/L	2	F812177	03-Dec-18	8L10010	10-Dec-18	EPA 200.8	
Arsenic	1.00	0.10	0.30	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Beryllium	ND	0.004	0.061	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Cadmium	0.050	0.008	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Chromium	0.29	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Copper	6.03	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Iron	142	1	10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Lead	1.30	0.005	0.040	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Selenium	1.59	0.44	0.61	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Silver	0.953	0.002	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Zinc	85.5	0.16	0.50	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	

Eurofins Frontier Global Sciences, LLC

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*Maricris dela Rosa*

Maricris dela Rosa, Project Manager

Page 9 of 43



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Underwood Engineers  
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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

B182043 NEW\_02\_TM

8K00745-02

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	0.124	0.018	0.040	µg/L	2	F812177	03-Dec-18	8L10010	10-Dec-18	EPA 200.8	
Arsenic	1.02	0.10	0.30	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Beryllium	ND	0.004	0.061	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Cadmium	0.046	0.008	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Chromium	0.28	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Copper	5.91	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Iron	139	1	10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Lead	1.30	0.005	0.040	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Selenium	1.58	0.44	0.61	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Silver	0.844	0.002	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Zinc	85.0	0.16	0.50	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	

Eurofins Frontier Global Sciences, LLC

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*Maricris dela Rosa*

Maricris dela Rosa, Project Manager

Page 10 of 43



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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

**B182044 NEW\_EB\_TM**  
**8K00745-03**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	ND	0.009	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Arsenic	ND	0.10	0.30	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Beryllium	ND	0.004	0.061	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Cadmium	ND	0.008	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Chromium	ND	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
<b>Copper</b>	<b>0.05</b>	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	J
Iron	ND	1	10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Lead	ND	0.005	0.040	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Selenium	ND	0.44	0.61	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Silver	ND	0.002	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Thallium	ND	0.006	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
<b>Zinc</b>	<b>5.51</b>	0.16	0.50	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

**B182046 NEW\_MS\_TM**  
**8K00745-04**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	0.114	0.009	0.020	µg/L	1	F812177	03-Dec-18	8L08005	07-Dec-18	EPA 200.8	
Arsenic	1.04	0.10	0.30	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Beryllium	ND	0.004	0.061	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Cadmium	0.054	0.008	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Chromium	0.28	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Copper	5.91	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Iron	139	1	10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Lead	1.39	0.005	0.040	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Selenium	1.54	0.44	0.61	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Silver	0.889	0.002	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Zinc	86.2	0.16	0.50	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	

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Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

**B181937 NEW\_01\_THg**  
**8K00745-06**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	12.6	0.08	0.50	ng/L	1	F812271	06-Dec-18	8L08004	07-Dec-18	EPA 1631E	

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Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

**B181959 NEW\_02\_THg**  
**8K00745-07**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	8.55	0.08	0.50	ng/L	1	F812271	06-Dec-18	8L08004	07-Dec-18	EPA 1631E	

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Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

**B181960 NEW\_EB\_THg**  
**8K00745-08**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	ND	0.08	0.50	ng/L	1	F812271	06-Dec-18	8L08004	07-Dec-18	EPA 1631E	U

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Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

**B181961 NEW\_MS\_THg**  
**8K00745-09**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	8.59	0.08	0.50	ng/L	1	F812271	06-Dec-18	8L08004	07-Dec-18	EPA 1631E	

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Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

**B181962 PEASE\_01\_TM**  
**8K00745-10**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	0.197	0.018	0.040	µg/L	2	F812177	03-Dec-18	8L10010	10-Dec-18	EPA 200.8	
Arsenic	4.63	0.10	0.30	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Beryllium	ND	0.004	0.061	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Cadmium	0.118	0.008	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Chromium	0.59	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Copper	17.5	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Iron	271	1	10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Lead	0.304	0.005	0.040	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Selenium	2.23	0.44	0.61	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Silver	0.030	0.002	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Zinc	117	0.16	0.50	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	

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Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

**B181965 PEASE\_02\_TM**  
**8K00745-11**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	0.206	0.018	0.040	µg/L	2	F812177	03-Dec-18	8L10010	10-Dec-18	EPA 200.8	
Arsenic	4.64	0.10	0.30	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Beryllium	ND	0.004	0.061	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Cadmium	0.110	0.008	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Chromium	0.57	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Copper	17.4	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Iron	272	1	10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Lead	0.320	0.005	0.040	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Selenium	2.58	0.44	0.61	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Silver	0.020	0.002	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Zinc	117	0.16	0.50	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

**B181967 PEASE\_EB\_TM**  
**8K00745-12**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	ND	0.009	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Arsenic	ND	0.10	0.30	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Beryllium	ND	0.004	0.061	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Cadmium	ND	0.008	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Chromium	ND	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
<b>Copper</b>	<b>0.04</b>	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	J
Iron	ND	1	10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Lead	ND	0.005	0.040	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Selenium	ND	0.44	0.61	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Silver	ND	0.002	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Thallium	ND	0.006	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
<b>Zinc</b>	<b>31.3</b>	0.16	0.50	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

**B181969 PEASE\_MS\_TM**  
**8K00745-13**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	0.214	0.018	0.040	µg/L	2	F812177	03-Dec-18	8L10010	10-Dec-18	EPA 200.8	
Arsenic	4.52	0.10	0.30	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Beryllium	ND	0.004	0.061	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Cadmium	0.109	0.008	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Chromium	0.56	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Copper	17.1	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Iron	261	1	10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Lead	0.305	0.005	0.040	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Selenium	1.99	0.44	0.61	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Silver	0.032	0.002	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Zinc	115	0.16	0.50	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	

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Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

**B181970 PEASE\_01\_THg**  
**8K00745-15**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	5.15	0.08	0.50	ng/L	1	F812271	06-Dec-18	8L08004	07-Dec-18	EPA 1631E	

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Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

**B181971 PEASE\_02\_THg**  
**8K00745-16**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	4.83	0.08	0.50	ng/L	1	F812271	06-Dec-18	8L08004	07-Dec-18	EPA 1631E	

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Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

**B181972 PEASE\_EB\_THg**  
**8K00745-17**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	ND	0.08	0.50	ng/L	1	F812271	06-Dec-18	8L08004	07-Dec-18	EPA 1631E	U

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Project: Trace Metals In Wastewater  
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Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

**B181973 PEASE\_MS\_THg**  
**8K00745-18**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	5.10	0.08	0.50	ng/L	1	F812271	06-Dec-18	8L08004	07-Dec-18	EPA 1631E	

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Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812177 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Blank (F812177-BLK1)</b>					Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Arsenic	ND	0.10	0.30	µg/L							U
Silver	0.012	0.002	0.020	µg/L							J
<b>Blank (F812177-BLK2)</b>					Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Silver	0.007	0.002	0.020	µg/L							J
<b>Blank (F812177-BLK3)</b>					Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Arsenic	ND	0.10	0.30	µg/L							U
<b>LCS (F812177-BS1)</b>					Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Arsenic	50.41	0.50	1.50	µg/L	50.000		101	85-115			
Silver	24.76	0.010	0.100	µg/L	25.000		99.0	85-115			
<b>LCS Dup (F812177-BSD1)</b>					Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Arsenic	50.50	0.50	1.50	µg/L	50.000		101	85-115	0.187	20	
Silver	24.88	0.010	0.100	µg/L	25.000		99.5	85-115	0.475	20	
<b>Matrix Spike (F812177-MS1)</b>					<b>Source: 8K00745-04</b>		Prepared: 03-Dec-18 Analyzed: 05-Dec-18				
Arsenic	53.52	0.51	1.52	µg/L	50.000	1.04	105	70-130			
Silver	25.54	0.010	0.101	µg/L	25.000	0.889	98.6	70-130			
<b>Matrix Spike (F812177-MS2)</b>					<b>Source: 8K00745-13</b>		Prepared: 03-Dec-18 Analyzed: 05-Dec-18				
Arsenic	58.54	0.51	1.52	µg/L	50.000	4.52	108	70-130			
Silver	24.22	0.010	0.101	µg/L	25.000	0.032	96.7	70-130			
<b>Matrix Spike (F812177-MS3)</b>					<b>Source: 8K00745-04</b>		Prepared: 03-Dec-18 Analyzed: 05-Dec-18				
Arsenic	219.8	0.50	1.51	µg/L	205.00	1.04	107	70-130			AS
Silver	11.14	0.010	0.101	µg/L	10.250	0.889	100	70-130			AS

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
21-Jan-19 11:44

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812177 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F812177-MS4)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Arsenic	226.0	0.50	1.51	µg/L	205.00	4.52	108	70-130			AS
Silver	10.09	0.010	0.101	µg/L	10.250	0.032	98.1	70-130			AS
<b>Matrix Spike Dup (F812177-MSD1)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Arsenic	56.14	0.51	1.52	µg/L	50.000	1.04	110	70-130	4.78	20	
Silver	25.93	0.010	0.101	µg/L	25.000	0.889	100	70-130	1.52	20	
<b>Matrix Spike Dup (F812177-MSD2)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Arsenic	58.88	0.51	1.52	µg/L	50.000	4.52	109	70-130	0.568	20	
Silver	24.39	0.010	0.101	µg/L	25.000	0.032	97.4	70-130	0.701	20	
<b>Matrix Spike Dup (F812177-MSD3)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Arsenic	219.2	0.50	1.51	µg/L	205.00	1.04	106	70-130	0.289	20	AS
Silver	11.35	0.010	0.101	µg/L	10.250	0.889	102	70-130	1.89	20	AS
<b>Matrix Spike Dup (F812177-MSD4)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Arsenic	227.6	0.50	1.51	µg/L	205.00	4.52	109	70-130	0.713	20	AS
Silver	10.10	0.010	0.101	µg/L	10.250	0.032	98.3	70-130	0.131	20	AS

#### Batch F812271 - EFGS SOP2796 EPA 1631 Oxidation

<b>Blank (F812271-BLK1)</b>		Prepared: 06-Dec-18 Analyzed: 07-Dec-18									
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812271-BLK2)</b>		Prepared: 06-Dec-18 Analyzed: 07-Dec-18									
Mercury	ND	0.08	0.50	ng/L							U

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F812271 - EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Blank (F812271-BLK3)</b>					Prepared: 06-Dec-18 Analyzed: 07-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812271-BLK4)</b>					Prepared: 06-Dec-18 Analyzed: 07-Dec-18						
Mercury	ND	0.09	0.52	ng/L							QB-06, U
<b>LCS (F812271-BS1)</b>					Prepared: 06-Dec-18 Analyzed: 07-Dec-18						
Mercury	15.41	0.08	0.50	ng/L	14.688		105	80-120			
<b>LCS Dup (F812271-BSD1)</b>					Prepared: 06-Dec-18 Analyzed: 07-Dec-18						
Mercury	15.48	0.08	0.50	ng/L	14.688		105	80-120	0.428	24	
<b>Duplicate (F812271-DUP1)</b>					Source: 8K00745-06 Prepared: 06-Dec-18 Analyzed: 07-Dec-18						
Mercury	12.48	0.08	0.50	ng/L		12.62			1.08	24	AD
<b>Matrix Spike (F812271-MS1)</b>					Source: 8K00745-09 Prepared: 06-Dec-18 Analyzed: 07-Dec-18						
Mercury	27.11	0.08	0.50	ng/L	20.281	8.59	91.3	71-125			AS
<b>Matrix Spike (F812271-MS2)</b>					Source: 8K00745-18 Prepared: 06-Dec-18 Analyzed: 07-Dec-18						
Mercury	24.25	0.08	0.50	ng/L	20.281	5.10	94.4	71-125			AS
<b>Matrix Spike Dup (F812271-MSD1)</b>					Source: 8K00745-09 Prepared: 06-Dec-18 Analyzed: 07-Dec-18						
Mercury	27.79	0.08	0.50	ng/L	20.281	8.59	94.7	71-125	2.49	24	AS
<b>Matrix Spike Dup (F812271-MSD2)</b>					Source: 8K00745-18 Prepared: 06-Dec-18 Analyzed: 07-Dec-18						
Mercury	24.59	0.08	0.50	ng/L	20.281	5.10	96.1	71-125	1.40	24	AS

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#### Batch F812177 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F812177-BLK1)

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	ND	0.004	0.060	µg/L							U
Chromium	ND	0.02	0.10	µg/L							U
Iron	ND	1	10	µg/L							U
Copper	ND	0.02	0.10	µg/L							U
Zinc	ND	0.16	0.50	µg/L							U
Selenium	ND	0.44	0.60	µg/L							U
Cadmium	ND	0.008	0.020	µg/L							U
Antimony	0.011	0.009	0.020	µg/L							J
Thallium	ND	0.006	0.020	µg/L							U
Lead	ND	0.005	0.040	µg/L							U

##### Blank (F812177-BLK2)

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	ND	0.004	0.060	µg/L							U
Chromium	ND	0.02	0.10	µg/L							U
Iron	ND	1	10	µg/L							U
Copper	ND	0.02	0.10	µg/L							U
Zinc	0.19	0.16	0.50	µg/L							J
Antimony	ND	0.009	0.020	µg/L							U
Thallium	ND	0.006	0.020	µg/L							U
Lead	ND	0.005	0.040	µg/L							U

##### Blank (F812177-BLK3)

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Selenium	ND	0.44	0.60	µg/L							U
Cadmium	ND	0.008	0.020	µg/L							U

##### LCS (F812177-BS1)

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	42.21	0.020	0.301	µg/L	40.010	105	85-115
Chromium	46.78	0.10	0.50	µg/L	49.990	93.6	85-115
Iron	1178	6	50	µg/L	1250.0	94.2	85-115
Copper	53.36	0.10	0.50	µg/L	50.000	107	85-115
Zinc	52.44	0.80	2.50	µg/L	50.010	105	85-115
Selenium	52.64	2.20	3.01	µg/L	49.990	105	85-115
Cadmium	39.05	0.040	0.100	µg/L	40.010	97.6	85-115
Antimony	42.72	0.045	0.100	µg/L	40.030	107	85-115

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#### Batch F812177 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### LCS (F812177-BS1)

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Thallium	39.17	0.030	0.100	µg/L	39.990		97.9	85-115			
Lead	50.12	0.025	0.200	µg/L	50.010		100	85-115			

##### LCS Dup (F812177-BSD1)

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	42.53	0.020	0.301	µg/L	40.010		106	85-115	0.756	20	
Chromium	47.02	0.10	0.50	µg/L	49.990		94.0	85-115	0.502	20	
Iron	1180	6	50	µg/L	1250.0		94.4	85-115	0.178	20	
Copper	53.57	0.10	0.50	µg/L	50.000		107	85-115	0.384	20	
Zinc	52.43	0.80	2.50	µg/L	50.010		105	85-115	0.0113	20	
Selenium	52.92	2.20	3.01	µg/L	49.990		106	85-115	0.525	20	
Cadmium	38.56	0.040	0.100	µg/L	40.010		96.4	85-115	1.26	20	
Antimony	42.77	0.045	0.100	µg/L	40.030		107	85-115	0.126	20	
Thallium	39.61	0.030	0.100	µg/L	39.990		99.0	85-115	1.12	20	
Lead	50.89	0.025	0.200	µg/L	50.010		102	85-115	1.53	20	

##### Matrix Spike (F812177-MS1)

Source: 8K00745-04

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	42.88	0.020	0.304	µg/L	40.010	ND	107	70-130			
Chromium	47.84	0.10	0.51	µg/L	49.990	0.28	95.1	70-130			
Iron	1246	6	51	µg/L	1250.0	139	88.6	70-130			
Copper	58.34	0.10	0.51	µg/L	50.000	5.91	105	70-130			
Zinc	128.1	0.81	2.53	µg/L	50.010	86.18	83.8	70-130			
Selenium	56.52	2.23	3.04	µg/L	49.990	ND	113	70-130			
Cadmium	40.09	0.040	0.101	µg/L	40.010	0.054	100	70-130			
Thallium	38.29	0.030	0.101	µg/L	39.990	ND	95.8	70-130			
Lead	50.54	0.025	0.202	µg/L	50.010	1.391	98.3	70-130			

##### Matrix Spike (F812177-MS2)

Source: 8K00745-13

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	41.54	0.020	0.304	µg/L	40.010	ND	104	70-130			
Chromium	47.11	0.10	0.51	µg/L	49.990	0.56	93.1	70-130			
Iron	1344	6	51	µg/L	1250.0	261	86.7	70-130			
Copper	67.91	0.10	0.51	µg/L	50.000	17.12	102	70-130			
Zinc	158.2	0.81	2.53	µg/L	50.010	115.0	86.6	70-130			
Selenium	58.16	2.23	3.04	µg/L	49.990	ND	116	70-130			
Cadmium	39.64	0.040	0.101	µg/L	40.010	0.109	98.8	70-130			

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812177 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F812177-MS2)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Thallium	37.24	0.030	0.101	µg/L	39.990	ND	93.1	70-130			
Lead	48.06	0.025	0.202	µg/L	50.010	0.305	95.5	70-130			
<b>Matrix Spike (F812177-MS3)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	10.83	0.020	0.303	µg/L	10.250	ND	106	70-130			AS
Chromium	192.8	0.10	0.50	µg/L	205.00	0.28	93.9	70-130			AS
Iron	1115	6	50	µg/L	1025.0	139	95.2	70-130			AS
Copper	269.9	0.10	0.50	µg/L	256.25	5.91	103	70-130			AS
Zinc	620.7	0.81	2.52	µg/L	512.50	86.18	104	70-130			AS
Selenium	220.6	2.22	3.03	µg/L	205.00	ND	108	70-130			AS
Cadmium	20.42	0.040	0.101	µg/L	20.500	0.054	99.3	70-130			AS
Thallium	9.824	0.030	0.101	µg/L	10.250	ND	95.8	70-130			AS
Lead	51.86	0.025	0.202	µg/L	51.250	1.391	98.5	70-130			AS
<b>Matrix Spike (F812177-MS4)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	10.21	0.020	0.303	µg/L	10.250	ND	99.6	70-130			AS
Chromium	224.5	0.10	0.50	µg/L	205.00	0.56	109	70-130			AS
Iron	1331	6	50	µg/L	1025.0	261	104	70-130			AS
Copper	275.2	0.10	0.50	µg/L	256.25	17.12	101	70-130			AS
Zinc	680.2	0.81	2.52	µg/L	512.50	115.0	110	70-130			AS
Selenium	223.7	2.22	3.03	µg/L	205.00	ND	109	70-130			AS
Cadmium	20.04	0.040	0.101	µg/L	20.500	0.109	97.2	70-130			AS
Thallium	9.262	0.030	0.101	µg/L	10.250	ND	90.4	70-130			AS
Lead	48.09	0.025	0.202	µg/L	51.250	0.305	93.2	70-130			AS
<b>Matrix Spike (F812177-MS9)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	41.43	0.046	0.101	µg/L	40.030	0.124	103	70-130			

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#### Batch F812177 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F812177-MSA)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	40.14	0.046	0.101	µg/L	40.030	0.229	99.7	70-130			
<b>Matrix Spike (F812177-MSB)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	10.05	0.045	0.101	µg/L	10.250	0.124	96.9	70-130			AS
<b>Matrix Spike Dup (F812177-MSD1)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	43.21	0.020	0.304	µg/L	40.010	ND	108	70-130	0.780	20	
Chromium	49.02	0.10	0.51	µg/L	49.990	0.28	97.5	70-130	2.44	20	
Iron	1255	6	51	µg/L	1250.0	139	89.3	70-130	0.741	20	
Copper	59.45	0.10	0.51	µg/L	50.000	5.91	107	70-130	1.89	20	
Zinc	131.9	0.81	2.53	µg/L	50.010	86.18	91.3	70-130	2.89	20	
Selenium	57.19	2.23	3.04	µg/L	49.990	ND	114	70-130	1.19	20	
Cadmium	40.91	0.040	0.101	µg/L	40.010	0.054	102	70-130	2.02	20	
Thallium	39.00	0.030	0.101	µg/L	39.990	ND	97.5	70-130	1.83	20	
Lead	51.41	0.025	0.202	µg/L	50.010	1.391	100	70-130	1.71	20	
<b>Matrix Spike Dup (F812177-MSD2)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	40.87	0.020	0.304	µg/L	40.010	ND	102	70-130	1.62	20	
Chromium	48.69	0.10	0.51	µg/L	49.990	0.56	96.3	70-130	3.29	20	
Iron	1373	6	51	µg/L	1250.0	261	89.0	70-130	2.12	20	
Copper	69.47	0.10	0.51	µg/L	50.000	17.12	105	70-130	2.26	20	
Zinc	162.1	0.81	2.53	µg/L	50.010	115.0	94.3	70-130	2.41	20	
Selenium	58.59	2.23	3.04	µg/L	49.990	ND	117	70-130	0.734	20	
Cadmium	40.69	0.040	0.101	µg/L	40.010	0.109	101	70-130	2.61	20	
Thallium	36.50	0.030	0.101	µg/L	39.990	ND	91.3	70-130	1.98	20	
Lead	47.19	0.025	0.202	µg/L	50.010	0.305	93.8	70-130	1.83	20	
<b>Matrix Spike Dup (F812177-MSD3)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	10.69	0.020	0.303	µg/L	10.250	ND	104	70-130	1.29	20	AS
Chromium	191.4	0.10	0.50	µg/L	205.00	0.28	93.2	70-130	0.730	20	AS
Iron	1120	6	50	µg/L	1025.0	139	95.7	70-130	0.404	20	AS
Copper	269.0	0.10	0.50	µg/L	256.25	5.91	103	70-130	0.335	20	AS
Zinc	623.3	0.81	2.52	µg/L	512.50	86.18	105	70-130	0.424	20	AS
Selenium	220.0	2.22	3.03	µg/L	205.00	ND	107	70-130	0.264	20	AS
Cadmium	20.10	0.040	0.101	µg/L	20.500	0.054	97.8	70-130	1.58	20	AS

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#### Batch F812177 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F812177-MSD3)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Thallium	9.603	0.030	0.101	µg/L	10.250	ND	93.7	70-130	2.27	20	AS
Lead	50.47	0.025	0.202	µg/L	51.250	1.391	95.8	70-130	2.72	20	AS
<b>Matrix Spike Dup (F812177-MSD4)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	10.32	0.020	0.303	µg/L	10.250	ND	101	70-130	1.10	20	AS
Chromium	192.5	0.10	0.50	µg/L	205.00	0.56	93.6	70-130	15.4	20	AS
Iron	1227	6	50	µg/L	1025.0	261	94.2	70-130	8.13	20	AS
Copper	274.1	0.10	0.50	µg/L	256.25	17.12	100	70-130	0.402	20	AS
Zinc	646.4	0.81	2.52	µg/L	512.50	115.0	104	70-130	5.09	20	AS
Selenium	227.9	2.22	3.03	µg/L	205.00	ND	111	70-130	1.87	20	AS
Cadmium	20.33	0.040	0.101	µg/L	20.500	0.109	98.6	70-130	1.39	20	AS
Thallium	9.383	0.030	0.101	µg/L	10.250	ND	91.5	70-130	1.29	20	AS
Lead	48.28	0.025	0.202	µg/L	51.250	0.305	93.6	70-130	0.405	20	AS
<b>Matrix Spike Dup (F812177-MSD9)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	38.63	0.046	0.101	µg/L	40.030	0.124	96.2	70-130	6.99	20	
<b>Matrix Spike Dup (F812177-MSDA)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	42.92	0.046	0.101	µg/L	40.030	0.229	107	70-130	6.70	20	
<b>Matrix Spike Dup (F812177-MSDB)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	10.56	0.045	0.101	µg/L	10.250	0.124	102	70-130	4.92	20	AS

Eurofins Frontier Global Sciences, LLC

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

*Maricris dela Rosa*

Maricris dela Rosa, Project Manager

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Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
21-Jan-19 11:44

### Notes and Definitions

- U Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
- QB-06 The blank was preserved to 5% BrCl rather than 1%. The control limit for blanks preserved to greater than 1% BrCl is the preservation percentage multiplied by the MRL.
- J The result is an estimated concentration.
- AS This MS and/or MSD is an analytical spike and/or an analytical spike duplicate.
- AD This matrix duplicate is an analytical duplicate.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the method detection limit if reported to the MDL or above the reporting limit if reported to the MRL.
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

*Maricris dela Rosa*

Maricris dela Rosa, Project Manager

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**WORK ORDER NUMBER: 18-11-1947**

*The difference is service*



AIR | SOIL | WATER | MARINE CHEMISTRY

### Analytical Report For

**Client:** Eurofins Frontier Global Sciences, Inc.

**Client Project Name:** 8K00745

**Attention:** Amy Goodall  
11720 North Creek Parkway North  
Suite 4  
Bothell, WA 98011-8244

A handwritten signature in black ink, appearing to read "Carla Hollowell".

Approved for release on 12/05/2018 by:  
Carla Hollowell  
Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience (Calscience) certifies that the test results provided in this report meet all NELAC Institute requirements for parameters for which accreditation is required or available. Any exceptions to NELAC Institute requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

# Contents

Client Project Name: 8K00745  
Work Order Number: 18-11-1947

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## Work Order Narrative

---

Work Order: 18-11-1947

---

Page 1 of 1

**Condition Upon Receipt:**

Samples were received under Chain-of-Custody (COC) on 11/27/18. They were assigned to Work Order 18-11-1947.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

**Holding Times:**

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

**Quality Control:**

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

**Subcontractor Information:**

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

**Additional Comments:**

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

**DoD Projects:**

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

**Sample Summary**

---

Client:	Eurofins Frontier Global Sciences, Inc.	Work Order:	18-11-1947
	11720 North Creek Parkway North, Suite 4	Project Name:	8K00745
	Bothell, WA 98011-8244	PO Number:	
		Date/Time Received:	11/27/18 10:15
		Number of Containers:	2

---

Attn: Amy Goodall

---

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
002256 NEW_01_TCn	18-11-1947-1	11/15/18 00:00	1	Aqueous
002268 PEASE_01_TCn	18-11-1947-2	11/15/18 00:00	1	Aqueous

## Analytical Report

Eurofins Frontier Global Sciences, Inc.  
 11720 North Creek Parkway North, Suite 4  
 Bothell, WA 98011-8244

Date Received: 11/27/18  
 Work Order: 18-11-1947  
 Preparation: N/A  
 Method: SM 4500-CN E  
 Units: mg/L

Project: 8K00745

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
002256 NEW_01_TCn	18-11-1947-1-A	11/15/18 00:00	Aqueous	UV 9	11/29/18	11/29/18 14:28	I1129CNL1

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qualifiers</u>
Cyanide, Total	ND	0.020	1.00	

002268 PEASE_01_TCn	18-11-1947-2-A	11/15/18 00:00	Aqueous	UV 9	11/29/18	11/29/18 14:28	I1129CNL1
---------------------	----------------	----------------	---------	------	----------	----------------	-----------

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qualifiers</u>
Cyanide, Total	ND	0.020	1.00	

Method Blank	099-05-061-4315	N/A	Aqueous	UV 9	11/29/18	11/29/18 14:28	I1129CNL1
--------------	-----------------	-----	---------	------	----------	----------------	-----------

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qualifiers</u>
Cyanide, Total	ND	0.020	1.00	


  
 Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

## Quality Control - LCS/LCSD

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 11/27/18  
Work Order: 18-11-1947  
Preparation: N/A  
Method: SM 4500-CN E

Project: 8K00745

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-05-061-4315	LCS	Aqueous	UV 9	11/29/18	11/29/18 14:28	I1129CNL1
099-05-061-4315	LCSD	Aqueous	UV 9	11/29/18	11/29/18 14:28	I1129CNL1

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Cyanide, Total	0.2000	0.1705	85	0.1662	83	80-120	3	0-20	

## Glossary of Terms and Qualifiers

Work Order: 18-11-1947

Page 1 of 1

<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDS or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.



SUBCONTRACT ORDER  
Eurofins Frontier Global Sciences, Inc.

Page 8 of 10

8K00745

18-11-1947

SENDING LABORATORY:

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

RECEIVING LABORATORY:

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

Analysis

Comments

Sample ID: 002256 NEW\_01\_TCn

①

EFGS Lab ID: 8K00745-05

Matrix: Water

Sampled: 15-Nov-18 00:00 (GMT-05:00) Eastern Time (US &

Due: 21-Dec-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:

57\_1000 mL PETG (A)

Sample ID: 002268 PEASE\_01\_TCn

②

EFGS Lab ID: 8K00745-14

Matrix: Water

Sampled: 15-Nov-18 00:00 (GMT-05:00) Eastern Time (US &

Due: 21-Dec-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:

57\_1000 mL PETG (A)

Released By

Date

Received By

Date

Released By

Date

Received By

Date

1945

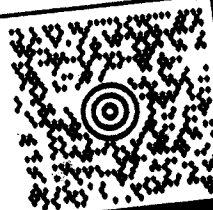
FRONT DESK  
(425) 686-1996  
FRONTIER GLOBAL SCIENCES  
11720 N CREEK PKWY N  
BOTHELL WA 98011-8244

**25 LBS**

1 OF 1

DWT: 19,14,14

SHIP TO:  
SAMPLE RECEIVING  
(714) 895-5494  
EUROFINS CALSCIENCE, INC.  
7440 LINCOLN WAY  
GARDEN GROVE CA 92841



CA 927 9-09



**UPS NEXT DAY AIR**

UPS NEXT DAY AIR  
TRACKING #: 1Z 86W 060 01 5076 7948



**BILLING: P/P**

Dept No.: OVERHEAD  
REF 2: Subcontract

W6 21.0.23 Zebra ZP 450 08.0A 10/2018



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# SAMPLE RECEIPT CHECKLIST

COOLER / OF /

CLIENT: EFGS

DATE: 11/27/2018

**TEMPERATURE:** (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: 0.0°C); Temperature (w/o CF): 3.7 °C (w/ CF): 3.7 °C; ☐ Blank ☒ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: \_\_\_\_\_)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter

Checked by: UFS

**CUSTODY SEAL:**

Cooler ☒ Present and Intact ☐ Present but Not Intact ☐ Not Present ☐ N/A

Sample(s) ☐ Present and Intact ☐ Present but Not Intact ☒ Not Present ☐ N/A

Checked by: UFS

**SAMPLE CONDITION:**

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sampling date <input type="checkbox"/> Sampling time <input type="checkbox"/> Matrix <input type="checkbox"/> Number of containers			
<input type="checkbox"/> No analysis requested <input type="checkbox"/> Not relinquished <input type="checkbox"/> No relinquished date <input type="checkbox"/> No relinquished time			
Sampler's name indicated on COC	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample container label(s) consistent with COC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and in good condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers for analyses requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sufficient volume/mass for analyses requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples received within holding time	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aqueous samples for certain analyses received within 15-minute holding time			
<input type="checkbox"/> pH <input type="checkbox"/> Residual Chlorine <input type="checkbox"/> Dissolved Sulfide <input type="checkbox"/> Dissolved Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation chemical(s) noted on COC and/or sample container	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unpreserved aqueous sample(s) received for certain analyses			
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Total Metals <input type="checkbox"/> Dissolved Metals			
Acid/base preserved samples - pH within acceptable range	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Container(s) for certain analysis free of headspace	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Dissolved Gases (RSK-175) <input type="checkbox"/> Dissolved Oxygen (SM 4500)			
<input type="checkbox"/> Carbon Dioxide (SM 4500) <input type="checkbox"/> Ferrous Iron (SM 3500) <input type="checkbox"/> Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**CONTAINER TYPE:** (Trip Blank Lot Number: \_\_\_\_\_)

**Aqueous:** ☐ VOA ☐ VOAh ☐ VOAna<sub>2</sub> ☐ 100PJ ☐ 100PJna<sub>2</sub> ☐ 125AGB ☐ 125AGBh ☐ 125AGBp ☐ 125PB ☐ 125PBznna (pH\_\_9)

☐ 250AGB ☐ 250CGB ☐ 250CGBs (pH\_\_2) ☐ 250PB ☐ 250PBn (pH\_\_2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJs (pH\_\_2) ☐ 500PB

☐ 1AGB ☐ 1AGBna<sub>2</sub> ☐ 1AGBs (pH\_\_2) ☐ 1AGBs (O&G) ☐ 1PB ☒ 1PBna (pH\_\_12) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

**Solid:** ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (\_\_\_\_) ☐ EnCores® (\_\_\_\_) ☐ TerraCores® (\_\_\_\_) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

**Air:** ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ \_\_\_\_\_ **Other Matrix** (\_\_\_\_): ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Container: A = Amber, B = Bottle, C = Clear, E = Envelope, G = Glass, J = Jar, P = Plastic, and Z = Ziploc/Resealable Bag

Preservative: b = buffered, f = filtered, h = HCl, n = HNO<sub>3</sub>, na = NaOH, na<sub>2</sub> = Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, p = H<sub>3</sub>PO<sub>4</sub>, Labeled/Checked by: UFS

s = H<sub>2</sub>SO<sub>4</sub>, u = ultra-pure, x = Na<sub>2</sub>SO<sub>3</sub>+NaHSO<sub>4</sub>.H<sub>2</sub>O, znna = Zn (CH<sub>3</sub>CO<sub>2</sub>)<sub>2</sub> + NaOH Reviewed by: UFS





Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

15 January 2019

Tim Puls  
Underwood Engineers  
25 Vaughan Mall  
Portsmouth, NH 03801  
RE: Trace Metals In Wastewater

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Amy Goodall". The signature is written in a cursive, flowing style.

Amy Goodall  
Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
15-Jan-19 17:37

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B182032 RIVER_02_TM	8K00762-02	Water	15-Nov-18 13:02	21-Nov-18 10:30
B182033 RIVER_EB_TM	8K00762-03	Water	15-Nov-18 12:37	21-Nov-18 10:30
B182034 RIVER_MS_TM	8K00762-04	Water	15-Nov-18 13:07	21-Nov-18 10:30
D2852 RIVER_01_DM Dissolved	8K00762-05	Water	15-Nov-18 12:48	21-Nov-18 10:30
D2854 RIVER_02_DM Dissolved	8K00762-06	Water	15-Nov-18 12:51	21-Nov-18 10:30
D2856 RIVER_EB_DM Dissolved	8K00762-07	Water	15-Nov-18 12:35	21-Nov-18 10:30
D2858 RIVER_MS_DM Dissolved	8K00762-08	Water	15-Nov-18 12:55	21-Nov-18 10:30
B182035 RIVER_01_DHg Dissolved	8K00762-09	Water	15-Nov-18 13:09	21-Nov-18 10:30
B182037 RIVER_02_DHg Dissolved	8K00762-10	Water	15-Nov-18 13:11	21-Nov-18 10:30
B182038 RIVER_EB_DHg Dissolved	8K00762-11	Water	15-Nov-18 12:39	21-Nov-18 10:30
B182039 RIVER_MS_DHg Dissolved	8K00762-12	Water	15-Nov-18 13:13	21-Nov-18 10:30

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager

Page 2 of 39



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

#### SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 21-Nov-18 10:30. The samples were received intact, on-ice within two sealed coolers at

Cooler	Temp C°
Cooler #1	3.3
Cooler #2	11.5

Samples were shipped to Eurofins Calscience in Garden Grove, CA for the EPA SM4500 Total CN analysis per the initial project setup.

The subcontract report is located after the notes and definitions section of the EFGS report.

#### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total mercury by flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631E.

Samples were prepared and analyzed for total recoverable metals by inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 200.8 (EFGS-054).

Samples were prepared and analyzed for total metals by preconcentration followed by analysis via inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 1640 Mod.

Client was contacted during the analysis of the 1st sample, 8K00762-01, as the results did not match 8K00762-02 or the MS/MSD sample. Client requested that we cancel the analysis of this sample and only report the EB and the field duplicate.

#### ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager



Frontier Global Sciences

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
15-Jan-19 17:37

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries. All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

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Amy Goodall, Project Manager

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## Sample Receipt Checklist

Client: Underwood Date & Time Received: 11/21/18 1030 Date Labeled: 11/21/18 Labeled By: BID

Project: \_\_\_\_\_ Received By: Ba Label Verified By: CFR

# of Coolers Received: 1 Samples Arrived By: ✓ Shipping Service \_\_\_\_\_ Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (Specify: \_\_\_\_\_)

Coolant: ☐ None/Ambient ☐ Loose Ice ☒ Gel Ice ☐ Dry Ice Coolant Required: (Y) N Temp Blank Used: (Y) N for Cooler(s): \_\_\_\_\_

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y/N

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>N</u>	
Custody seals signed:	<u>N</u>	

TID: <u>9780</u>	CF: <u>10.3 °C</u>	Date/time: <u>11/21/18</u>	By: <u>AC</u>
Cooler 1: <u>3.0 °C</u>	w/ CF: <u>3.3 °C</u>	Cooler 4: <u>°C</u>	w/ CF: <u>°C</u>
Cooler 2: <u>11.0 °C</u>	w/ CF: <u>11.5 °C</u>	Cooler 5: <u>°C</u>	w/ CF: <u>°C</u>
Cooler 3: <u>°C</u>	w/ CF: <u>°C</u>	Cooler 6: <u>°C</u>	w/ CF: <u>°C</u>

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Preservation type:	<u>Y</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
Internal COC required:	<u>NA</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>Y</u>	

Anomalies/Non-conformances (attach additional pages if needed):

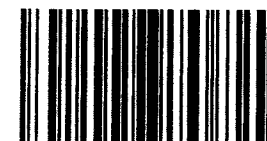
26 bottles on COC do not match bottle ID

Bottle IDs: D2851, D2853, D2855, D2857

COC: D2852, D2854, D2856, D2858

\*used → Thermo 39804 10.5

**8K00762**





Frontier Global Sciences

Chain of Custody Record & Laboratory Analysis Request:  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
Info@FrontierGS.com

http://www.FrontierGS.com

Client: UNDERWOOD ENGINEERS, INC.		Contact: Tim Puls								Analyses Requested		EFGS PM:	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Phone: (603) 436-6192 Fax:										Date:	
Project Name: Anti-Degradation - RIVER		E-mail: tpuls@underwoodengineers.com										TAT (business days) <u>20</u> (std)	
Report To: Tim Puls		Contract/PO:										(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Invoice To: Client										Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N (If yes, please contact PM)	
Phone: (603) 436-6192 Fax:		Address:										EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	
E-mail: tpuls@underwoodengineers.com		Phone: Fax:										QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High	
E-mail:												Comments	
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Total Metals (TM)	Dissolved Metals (DM)	Dissolved Hg (DHg)	Total Cyanide (TCn)	
1	B182031	RIVER_01_TM	1	SB	11/19/18 13:05	JEL	N	N	X				Total Metals include: Sb, Be, Cr, Fe, Ti
2	B182032	RIVER_02_TM	1	SB	13:02				X				Dissolved Metals Include: As, Cd, Cu, Pb, Ni, Se, Ag, Zn
3	B182033	RIVER_EB_TM	1	RW	12:37				X				
4	B182034	RIVER_MS_TM	1	SB	13:07				X				RW - Reagent Water
5	D2852	RIVER_01_DM	1	SB	12:48					X			<b>NOTE</b> most at B182031 (River 01 TM) was mistakenly filtered in the lab
6	D2854	RIVER_02_DM	1	SB	12:51					X			
7	D2856	RIVER_EB_DM	1	RW	12:35					X			
8	D2858	RIVER_MS_DM	1	SB	12:55					X			
9	B182035	RIVER_01_DHg	1	SB	13:09						X		
10	B182037	RIVER_02_DHg	1	SB	13:11						X		
11	B182038	RIVER_EB_DHg	1	RW	12:39						X		
12	B182039	RIVER_MS_DHg	1	SB	✓ 13:13						X		
For Laboratory Use Only			Matrix Codes:			Relinquished By:		Received By:		Received By:			
COC Seal: <u>NA</u>			FW: Fresh Water WW: Waste Water SB: Sea and Brackish Water SS: Soil and Sediment TS: Plant and Animal Tissue HC: Hydrocarbons TR: Trap OT: Other			<u>[Signature]</u>		<u>[Signature]</u>					
Cooler Temp: <u>X 3-3</u>						Name: <u>Steve Jones</u>		Name: <u>Brian Wachler</u>					
Carrier: <u>UPS</u>						Organization: <u>UNH</u>		Organization: <u>EFGS</u>					
VTSR: <u>1030</u>						Date & Time: <u>11/19/18</u>		Date & Time: <u>11/21/18 1030</u>					
# of Coolers:						Tracking number: <u>5452 996 8221</u>							
Sample Disposal:						By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.							
<input type="checkbox"/> Return (shipping fees may apply)						Customer Approval: _____ Date: _____							
<input checked="" type="checkbox"/> Standard Disposal - 30 Days after report													
<input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)													



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Chain of Custody Record & Laboratory Analysis Request:  
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Hydrocarbon & Other Samples11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

Page 2 of 2

Client: UNDERWOOD ENGINEERS, INC.			Contact: Tim Puls			Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Analyses Requested					EFGS PM:	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801			Phone: (603) 436-6192 Fax:											Date:	
Project Name: Anti-Degradation - RIVER			E-mail: tpuls@underwoodengineers.com											TAT (business days) (20) (std)	
Report To: Tim Puls			Contract/PO:											15 10 5 4 3 2 24 hrs.	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801			Invoice To: Client											(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)	
Phone: (603) 436-6192 Fax:			Address:								Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N				
E-mail: tpuls@underwoodengineers.com			Phone: Fax:								(If yes, please contact PM)				
E-mail: tpuls@underwoodengineers.com			E-mail:								EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N				
											QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High				
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time				Total Metals (TM)	Dissolved Metals (DM)	Dissolved Hg (DHg)	Total Cyanide (TCn)	Comments		
1	002258	RIVER_01_TCn	1	SB	11/15/18 12:42	JEL	N	NaOH				X	Total Metals include: Sb, Be, Cr, Fe, Ti		
2	002259	RIVER_TB_TCn	1	RW	11:45	↓	↓	↓				X	Dissolved Metals include: As, Cd, Cu, Pb, Ni, Se, Ag, Zn		
3													RW - Reagent Water		
4															
5															
6															
7															
8															
9															
10															
11															
12															
For Laboratory Use Only			Matrix Codes:			Relinquished By:			Received By:			Received By:			
COC Seal:			Comments:			Name:			Name:			Name:			
Cooler Temp:			FW: Fresh Water WW: Waste Water SB: Sea and Brackish Water SS: Soil and Sediment TS: Plant and Animal Tissue HC: Hydrocarbons TR: Trap OT: Other			Organization:			Organization:			Organization:			
Carrier:						Date & Time:			Date & Time:			Date & Time:			
VTSR:						Tracking number:									
# of Coolers:															
Sample Disposal:						By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.									
<input type="checkbox"/> Return (shipping fees may apply)						Customer Approval:						Date:			
<input checked="" type="checkbox"/> Standard Disposal - 30 Days after report															
<input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)															

**SUBCONTRACT ORDER**  
**Eurofins Frontier Global Sciences, Inc.**  
**8K00762**

**SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone: 7148955494  
Fax: x

**Analysis**

**Comments**

Sample ID: 002258 RIVER\_01\_TCn

EFGS Lab ID: 8K00762-13

Matrix: Water

Sampled: 15-Nov-18 12:42 (GMT-05:00) Eastern Time (US &

Due: 21-Dec-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

*Containers Supplied:*

57\_1000 mL PETG (A)

Sample ID: 002259 RIVER\_TB\_TCn

EFGS Lab ID: 8K00762-14

Matrix: Water

Sampled: 15-Nov-18 11:45 (GMT-05:00) Eastern Time (US &

Due: 21-Dec-18 19:00

Misc. Subcontract 1

EPA SM4500 CN E

*Containers Supplied:*

57\_1000 mL PETG (A)

12 866 050 01 5075 7948

Used By

Date

Received By

Date

Used By

Date

Received By

Date



Frontier Global Sciences

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Bothell, WA 98011  
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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

**B182032 RIVER\_02\_TM**

**8K00762-02**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
---------	--------	-----------------	-----------------	-------	----------	-------	----------	----------	----------	--------	-------

**Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion**

<b>Antimony</b>	<b>0.159</b>	0.091	0.202	µg/L	10	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	QM-12, R-05, J
Beryllium	ND	0.040	0.606	µg/L	10	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U, R-05
<b>Chromium</b>	<b>0.67</b>	0.20	1.01	µg/L	10	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	R-05, J
<b>Iron</b>	<b>284</b>	11	101	µg/L	10	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	R-05
Thallium	ND	0.061	0.202	µg/L	10	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U, R-05

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Amy Goodall, Project Manager



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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

**B182033 RIVER\_EB\_TM**  
**8K00762-03**

Analyte	Detection		Reporting	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
	Result	Limit	Limit								
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	0.010	0.009	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	J
Beryllium	ND	0.004	0.061	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Chromium	ND	0.02	0.10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Iron	ND	1	10	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U
Thallium	ND	0.006	0.020	µg/L	1	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U

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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

**B182034 RIVER\_MS\_TM**  
**8K00762-04**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
<b>Antimony</b>	<b>0.154</b>	0.091	0.202	µg/L	10	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	QM-12, R-05, J
Beryllium	ND	0.040	0.606	µg/L	10	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	U, R-05
<b>Chromium</b>	<b>0.71</b>	0.20	1.01	µg/L	10	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	R-05, J
<b>Iron</b>	<b>304</b>	11	101	µg/L	10	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	R-05
Thallium	ND	0.061	0.202	µg/L	10	F812177	03-Dec-18	8L04026	05-Dec-18	EPA 200.8	R-05, U

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Underwood Engineers  
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Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

**D2852 RIVER\_01\_DM Dissolved**  
**8K00762-05**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2820 Reductive Precipitation</b>											
Arsenic	0.76	0.04	0.38	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	
Cadmium	0.051	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Copper	0.60	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A08016	08-Jan-19	EPA 1640	
Lead	0.105	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Nickel	0.68	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Selenium	ND	0.16	1.50	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640 Mod.	U
Silver	0.02	0.01	0.10	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Zinc	2.39	0.14	0.50	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	

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Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

**D2854 RIVER\_02\_DM Dissolved**  
**8K00762-06**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2820 Reductive Precipitation</b>											
Arsenic	0.76	0.04	0.38	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	
Cadmium	0.040	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Copper	0.58	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A08016	08-Jan-19	EPA 1640	
Lead	0.105	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Nickel	0.73	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Selenium	ND	0.16	1.50	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640 Mod.	U
Silver	0.03	0.01	0.10	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Zinc	2.31	0.14	0.50	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	

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Underwood Engineers  
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Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

**D2856 RIVER\_EB\_DM Dissolved**  
**8K00762-07**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2820 Reductive Precipitation</b>											
Arsenic	ND	0.04	0.38	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	U
<b>Cadmium</b>	<b>0.123</b>	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Copper	ND	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	U
Lead	ND	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	U
<b>Nickel</b>	<b>0.20</b>	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Selenium	ND	0.16	1.50	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640 Mod.	U
<b>Silver</b>	<b>0.02</b>	0.01	0.10	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
<b>Zinc</b>	<b>0.24</b>	0.14	0.50	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J

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Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

**D2858 RIVER\_MS\_DM Dissolved**  
**8K00762-08**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2820 Reductive Precipitation</b>											
Arsenic	0.76	0.04	0.38	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	
Cadmium	0.039	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Copper	0.58	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640	
Lead	0.103	0.020	0.100	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Nickel	0.68	0.08	0.25	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Selenium	ND	0.16	1.50	µg/L	5	F812486	02-Jan-19	9A07016	07-Jan-19	EPA 1640 Mod.	U
Silver	0.02	0.01	0.10	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Zinc	2.11	0.14	0.50	µg/L	5	F812486	02-Jan-19	9A04012	04-Jan-19	EPA 1640	

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Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

**Reported:**  
15-Jan-19 17:37

**B182035 RIVER\_01\_DHg Dissolved**  
**8K00762-09**

Analyte	Result	Detection	Reporting	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
		Limit	Limit								
Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation											
Mercury	1.23	0.08	0.50	ng/L	1	F812291	20-Nov-18	8L08008	08-Dec-18	EPA 1631E	

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**Reported:**  
15-Jan-19 17:37

**B182037 RIVER\_02\_DHg Dissolved**  
**8K00762-10**

Analyte	Result	Detection	Reporting	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
		Limit	Limit								
Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation											
Mercury	1.19	0.08	0.50	ng/L	1	F812291	20-Nov-18	8L08008	08-Dec-18	EPA 1631E	

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**Reported:**  
15-Jan-19 17:37

**B182038 RIVER\_EB\_DHg Dissolved**  
**8K00762-11**

Analyte	Result	Detection	Reporting	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
		Limit	Limit								
Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation											
Mercury	ND	0.08	0.50	ng/L	1	F812291	20-Nov-18	8L08008	08-Dec-18	EPA 1631E	U

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**Reported:**  
15-Jan-19 17:37

**B182039 RIVER\_MS\_DHg Dissolved**  
**8K00762-12**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	1.23	0.08	0.50	ng/L	1	F812296	26-Nov-18	8L11018	10-Dec-18	EPA 1631E	

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Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F812291 - EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Blank (F812291-BLK1)</b>					Prepared & Analyzed: 08-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812291-BLK2)</b>					Prepared & Analyzed: 08-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812291-BLK3)</b>					Prepared & Analyzed: 08-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>LCS (F812291-BS1)</b>					Prepared & Analyzed: 08-Dec-18						
Mercury	14.30	0.08	0.50	ng/L	14.688		97.3	80-120			
<b>LCS Dup (F812291-BSD1)</b>					Prepared & Analyzed: 08-Dec-18						
Mercury	14.41	0.08	0.50	ng/L	14.688		98.1	80-120	0.771	24	
<b>Duplicate (F812291-DUP1)</b>					Source: 8K00376-09 Prepared & Analyzed: 08-Dec-18						
Mercury	1.61	0.08	0.50	ng/L		1.65			2.83	24	AD
<b>Matrix Spike (F812291-MS1)</b>					Source: 8K00376-09 Prepared & Analyzed: 08-Dec-18						
Mercury	6.38	0.08	0.50	ng/L	5.0702	1.65	93.3	71-125			AS
<b>Matrix Spike (F812291-MS2)</b>					Source: 8K00376-12 Prepared & Analyzed: 08-Dec-18						
Mercury	2.73	0.08	0.50	ng/L	2.5351	0.24	98.1	71-125			AS
<b>Matrix Spike Dup (F812291-MSD1)</b>					Source: 8K00376-09 Prepared & Analyzed: 08-Dec-18						
Mercury	6.58	0.08	0.50	ng/L	5.0702	1.65	97.1	71-125	2.98	24	AS
<b>Matrix Spike Dup (F812291-MSD2)</b>					Source: 8K00376-12 Prepared & Analyzed: 08-Dec-18						
Mercury	2.64	0.08	0.50	ng/L	2.5351	0.24	94.6	71-125	3.23	24	AS

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F812296 - EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Blank (F812296-BLK1)</b>					Prepared & Analyzed: 10-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812296-BLK2)</b>					Prepared & Analyzed: 10-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812296-BLK3)</b>					Prepared & Analyzed: 10-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>LCS (F812296-BS1)</b>					Prepared & Analyzed: 10-Dec-18						
Mercury	14.85	0.08	0.50	ng/L	14.688		101	80-120			
<b>LCS Dup (F812296-BSD1)</b>					Prepared & Analyzed: 10-Dec-18						
Mercury	14.95	0.08	0.50	ng/L	14.688		102	80-120	0.684	24	
<b>Duplicate (F812296-DUP1)</b>					<b>Source: 8L00092-01</b>		Prepared & Analyzed: 10-Dec-18				
Mercury	12.72	0.08	0.50	ng/L		12.42			2.39	24	AD
<b>Matrix Spike (F812296-MS1)</b>					<b>Source: 8K00369-05</b>		Prepared & Analyzed: 10-Dec-18				
Mercury	11.72	0.08	0.50	ng/L	10.140	2.50	90.9	71-125			AS
<b>Matrix Spike (F812296-MS2)</b>					<b>Source: 8K00762-12RE1</b>		Prepared & Analyzed: 10-Dec-18				
Mercury	6.16	0.08	0.50	ng/L	5.0702	1.23	97.2	71-125			AS
<b>Matrix Spike Dup (F812296-MSD1)</b>					<b>Source: 8K00369-05</b>		Prepared & Analyzed: 10-Dec-18				
Mercury	11.52	0.08	0.50	ng/L	10.140	2.50	89.0	71-125	1.64	24	AS
<b>Matrix Spike Dup (F812296-MSD2)</b>					<b>Source: 8K00762-12RE1</b>		Prepared & Analyzed: 10-Dec-18				
Mercury	6.12	0.08	0.50	ng/L	5.0702	1.23	96.4	71-125	0.644	24	AS

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812486 - EFGS SOP2820 Reductive Precipitation

##### Blank (F812486-BLK1)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Nickel	0.23	0.08	0.25	µg/L							J
Zinc	0.47	0.14	0.50	µg/L							J
Silver	0.02	0.01	0.10	µg/L							J
Cadmium	0.022	0.020	0.100	µg/L							J
Lead	ND	0.020	0.100	µg/L							U

##### Blank (F812486-BLK2)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Nickel	0.21	0.08	0.25	µg/L							J
Zinc	0.31	0.14	0.50	µg/L							J
Silver	0.02	0.01	0.10	µg/L							J
Cadmium	0.020	0.020	0.100	µg/L							J
Lead	ND	0.020	0.100	µg/L							U

##### Blank (F812486-BLK3)

Prepared: 02-Jan-19 Analyzed: 07-Jan-19

Copper	ND	0.08	0.25	µg/L							U
Arsenic	ND	0.04	0.38	µg/L							U
Selenium	ND	0.16	1.50	µg/L							U

##### Blank (F812486-BLK4)

Prepared: 02-Jan-19 Analyzed: 07-Jan-19

Copper	ND	0.08	0.25	µg/L							U
Arsenic	ND	0.04	0.38	µg/L							U
Selenium	ND	0.16	1.50	µg/L							U

##### LCS (F812486-BS1)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Silver	4.68	0.05	0.50	µg/L	6.2500		74.9	30-151			
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##### LCS (F812486-BS2)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Nickel	9.55	0.08	0.25	µg/L	12.502		76.4	71-130			
Lead	10.58	0.020	0.100	µg/L	12.502		84.6	62-129			

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Reported:  
15-Jan-19 17:37

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812486 - EFGS SOP2820 Reductive Precipitation

##### LCS (F812486-BS3)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Zinc	11.13	0.69	2.50	µg/L	12.502		89.0	75-95		
Cadmium	8.920	0.101	0.500	µg/L	10.002		89.2	73-105		

##### LCS (F812486-BS4)

Prepared: 02-Jan-19 Analyzed: 07-Jan-19

Copper	10.92	0.08	0.25	µg/L	12.500		87.4	77-109		
Arsenic	9.84	0.04	0.38	µg/L	12.500		78.8	58-110		
Selenium	11.11	0.16	1.50	µg/L	12.498		88.9	70-120		

##### LCS Dup (F812486-BSD1)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Silver	2.54	0.05	0.50	µg/L	6.2500		40.7	30-151	59.2	20	QR-06
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##### LCS Dup (F812486-BSD2)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Nickel	9.17	0.08	0.25	µg/L	12.502		73.4	71-130	4.04	20	
Lead	10.26	0.020	0.100	µg/L	12.502		82.1	62-129	3.06	20	

##### LCS Dup (F812486-BSD3)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Zinc	9.46	0.69	2.50	µg/L	12.502		75.7	75-95	16.2	20	
Cadmium	8.082	0.101	0.500	µg/L	10.002		80.8	73-105	9.86	20	

##### LCS Dup (F812486-BSD4)

Prepared: 02-Jan-19 Analyzed: 07-Jan-19

Copper	12.19	0.08	0.25	µg/L	12.500		97.5	77-109	11.0	20	
Arsenic	9.93	0.04	0.38	µg/L	12.500		79.4	58-110	0.825	20	
Selenium	11.07	0.16	1.50	µg/L	12.498		88.6	70-120	0.327	25	

##### Matrix Spike (F812486-MS1)

Source: 8J01083-07

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Silver	4.40	0.05	0.50	µg/L	6.2500	ND	70.4	30-151			
Cadmium	9.480	0.101	0.500	µg/L	10.002	ND	94.8	73-105			

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812486 - EFGS SOP2820 Reductive Precipitation

<b>Matrix Spike (F812486-MS2)</b>		<b>Source: 8K00762-08</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Silver	5.83	0.05	0.50	µg/L	6.2500	ND	93.2	30-151			
Cadmium	9.482	0.101	0.500	µg/L	10.002	ND	94.8	73-105			
<b>Matrix Spike (F812486-MS3)</b>		<b>Source: 8J01083-07</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Nickel	6.93	0.08	0.25	µg/L	12.502	0.41	52.2	71-130			QM-05
Zinc	12.02	0.14	0.50	µg/L	12.502	0.91	88.9	75-95			
Lead	11.71	0.020	0.100	µg/L	12.502	0.024	93.5	62-129			
<b>Matrix Spike (F812486-MS4)</b>		<b>Source: 8K00762-08</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Nickel	10.72	0.08	0.25	µg/L	12.502	0.68	80.3	71-130			
Zinc	13.54	0.14	0.50	µg/L	12.502	2.11	91.4	75-95			
Lead	11.97	0.020	0.100	µg/L	12.502	0.103	94.9	62-129			
<b>Matrix Spike (F812486-MS5)</b>		<b>Source: 8J01083-07RE1</b>			Prepared: 02-Jan-19 Analyzed: 07-Jan-19						
Copper	13.48	0.08	0.25	µg/L	12.500	0.53	104	77-109			
Arsenic	11.88	0.04	0.38	µg/L	12.500	0.88	88.0	58-110			
Selenium	8.22	0.16	1.50	µg/L	12.498	ND	65.8	42-131			
<b>Matrix Spike (F812486-MS6)</b>		<b>Source: 8K00762-08RE1</b>			Prepared: 02-Jan-19 Analyzed: 07-Jan-19						
Copper	13.24	0.08	0.25	µg/L	12.500	0.58	101	77-109			
Arsenic	12.14	0.04	0.38	µg/L	12.500	0.76	91.0	58-110			
Selenium	11.75	0.16	1.50	µg/L	12.498	ND	94.0	42-131			
<b>Matrix Spike Dup (F812486-MSD1)</b>		<b>Source: 8J01083-07</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Silver	5.27	0.05	0.50	µg/L	6.2500	ND	84.3	30-151	17.9	20	
Cadmium	9.298	0.101	0.500	µg/L	10.002	ND	93.0	73-105	1.93	20	
<b>Matrix Spike Dup (F812486-MSD2)</b>		<b>Source: 8K00762-08</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Silver	5.48	0.05	0.50	µg/L	6.2500	ND	87.7	30-151	6.10	20	
Cadmium	8.670	0.101	0.500	µg/L	10.002	ND	86.7	73-105	8.94	20	

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812486 - EFGS SOP2820 Reductive Precipitation

<b>Matrix Spike Dup (F812486-MSD3)</b>		<b>Source: 8J01083-07</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Nickel	8.43	0.08	0.25	µg/L	12.502	0.41	64.2	71-130	19.5	20	QM-05
Zinc	12.08	0.14	0.50	µg/L	12.502	0.91	89.3	75-95	0.499	20	
Lead	12.27	0.020	0.100	µg/L	12.502	0.024	98.0	62-129	4.67	20	
<b>Matrix Spike Dup (F812486-MSD4)</b>		<b>Source: 8K00762-08</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Nickel	10.56	0.08	0.25	µg/L	12.502	0.68	79.0	71-130	1.53	20	
Zinc	12.85	0.14	0.50	µg/L	12.502	2.11	85.9	75-95	5.21	20	
Lead	11.54	0.020	0.100	µg/L	12.502	0.103	91.5	62-129	3.61	20	
<b>Matrix Spike Dup (F812486-MSD5)</b>		<b>Source: 8J01083-07RE1</b>			Prepared: 02-Jan-19 Analyzed: 07-Jan-19						
Copper	13.63	0.08	0.25	µg/L	12.500	0.53	105	77-109	1.10	20	
Arsenic	12.09	0.04	0.38	µg/L	12.500	0.88	89.6	58-110	1.71	20	
Selenium	8.23	0.16	1.50	µg/L	12.498	ND	65.8	42-131	0.0359	25	
<b>Matrix Spike Dup (F812486-MSD6)</b>		<b>Source: 8K00762-08RE1</b>			Prepared: 02-Jan-19 Analyzed: 07-Jan-19						
Copper	13.39	0.08	0.25	µg/L	12.500	0.58	102	77-109	1.14	20	
Arsenic	12.22	0.04	0.38	µg/L	12.500	0.76	91.7	58-110	0.696	20	
Selenium	11.41	0.16	1.50	µg/L	12.498	ND	91.3	42-131	2.92	25	

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812177 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F812177-BLK1)

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	ND	0.004	0.060	µg/L							U
Chromium	ND	0.02	0.10	µg/L							U
Iron	ND	1	10	µg/L							U
Antimony	0.011	0.009	0.020	µg/L							J
Thallium	ND	0.006	0.020	µg/L							U

##### Blank (F812177-BLK2)

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	ND	0.004	0.060	µg/L							U
Chromium	ND	0.02	0.10	µg/L							U
Iron	ND	1	10	µg/L							U
Antimony	ND	0.009	0.020	µg/L							U
Thallium	ND	0.006	0.020	µg/L							U

##### LCS (F812177-BS1)

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	42.21	0.020	0.301	µg/L	40.010		105	85-115			
Chromium	46.78	0.10	0.50	µg/L	49.990		93.6	85-115			
Iron	1178	6	50	µg/L	1250.0		94.2	85-115			
Antimony	42.72	0.045	0.100	µg/L	40.030		107	85-115			
Thallium	39.17	0.030	0.100	µg/L	39.990		97.9	85-115			

##### LCS Dup (F812177-BS1)

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	42.53	0.020	0.301	µg/L	40.010		106	85-115	0.756	20	
Chromium	47.02	0.10	0.50	µg/L	49.990		94.0	85-115	0.502	20	
Iron	1180	6	50	µg/L	1250.0		94.4	85-115	0.178	20	
Antimony	42.77	0.045	0.100	µg/L	40.030		107	85-115	0.126	20	
Thallium	39.61	0.030	0.100	µg/L	39.990		99.0	85-115	1.12	20	

##### Matrix Spike (F812177-MS1)

Source: 8K00745-04

Prepared: 03-Dec-18 Analyzed: 05-Dec-18

Beryllium	42.88	0.020	0.304	µg/L	40.010	ND	107	70-130			
Chromium	47.84	0.10	0.51	µg/L	49.990	0.28	95.1	70-130			
Iron	1246	6	51	µg/L	1250.0	139	88.6	70-130			
Thallium	38.29	0.030	0.101	µg/L	39.990	ND	95.8	70-130			

Eurofins Frontier Global Sciences, LLC

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amy Goodall, Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812177 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F812177-MS2)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	41.54	0.020	0.304	µg/L	40.010	ND	104	70-130			
Chromium	47.11	0.10	0.51	µg/L	49.990	0.56	93.1	70-130			
Iron	1344	6	51	µg/L	1250.0	261	86.7	70-130			
Thallium	37.24	0.030	0.101	µg/L	39.990	ND	93.1	70-130			
<b>Matrix Spike (F812177-MS3)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	10.83	0.020	0.303	µg/L	10.250	ND	106	70-130			AS
Chromium	192.8	0.10	0.50	µg/L	205.00	0.28	93.9	70-130			AS
Iron	1115	6	50	µg/L	1025.0	139	95.2	70-130			AS
Thallium	9.824	0.030	0.101	µg/L	10.250	ND	95.8	70-130			AS
<b>Matrix Spike (F812177-MS4)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	10.21	0.020	0.303	µg/L	10.250	ND	99.6	70-130			AS
Chromium	224.5	0.10	0.50	µg/L	205.00	0.56	109	70-130			AS
Iron	1331	6	50	µg/L	1025.0	261	104	70-130			AS
Thallium	9.262	0.030	0.101	µg/L	10.250	ND	90.4	70-130			AS
<b>Matrix Spike (F812177-MS9)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	41.43	0.046	0.101	µg/L	40.030	0.124	103	70-130			
<b>Matrix Spike (F812177-MSA)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	40.14	0.046	0.101	µg/L	40.030	0.229	99.7	70-130			
<b>Matrix Spike (F812177-MSB)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	10.05	0.045	0.101	µg/L	10.250	0.124	96.9	70-130			AS
<b>Matrix Spike Dup (F812177-MSD1)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	43.21	0.020	0.304	µg/L	40.010	ND	108	70-130	0.780	20	
Chromium	49.02	0.10	0.51	µg/L	49.990	0.28	97.5	70-130	2.44	20	
Iron	1255	6	51	µg/L	1250.0	139	89.3	70-130	0.741	20	
Thallium	39.00	0.030	0.101	µg/L	39.990	ND	97.5	70-130	1.83	20	

Eurofins Frontier Global Sciences, LLC

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Amy Goodall, Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812177 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F812177-MSD2)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	40.87	0.020	0.304	µg/L	40.010	ND	102	70-130	1.62	20	
Chromium	48.69	0.10	0.51	µg/L	49.990	0.56	96.3	70-130	3.29	20	
Iron	1373	6	51	µg/L	1250.0	261	89.0	70-130	2.12	20	
Thallium	36.50	0.030	0.101	µg/L	39.990	ND	91.3	70-130	1.98	20	
<b>Matrix Spike Dup (F812177-MSD3)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	10.69	0.020	0.303	µg/L	10.250	ND	104	70-130	1.29	20	AS
Chromium	191.4	0.10	0.50	µg/L	205.00	0.28	93.2	70-130	0.730	20	AS
Iron	1120	6	50	µg/L	1025.0	139	95.7	70-130	0.404	20	AS
Thallium	9.603	0.030	0.101	µg/L	10.250	ND	93.7	70-130	2.27	20	AS
<b>Matrix Spike Dup (F812177-MSD4)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 05-Dec-18						
Beryllium	10.32	0.020	0.303	µg/L	10.250	ND	101	70-130	1.10	20	AS
Chromium	192.5	0.10	0.50	µg/L	205.00	0.56	93.6	70-130	15.4	20	AS
Iron	1227	6	50	µg/L	1025.0	261	94.2	70-130	8.13	20	AS
Thallium	9.383	0.030	0.101	µg/L	10.250	ND	91.5	70-130	1.29	20	AS
<b>Matrix Spike Dup (F812177-MSD9)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	38.63	0.046	0.101	µg/L	40.030	0.124	96.2	70-130	6.99	20	
<b>Matrix Spike Dup (F812177-MSDA)</b>		<b>Source: 8K00745-13</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	42.92	0.046	0.101	µg/L	40.030	0.229	107	70-130	6.70	20	
<b>Matrix Spike Dup (F812177-MSDB)</b>		<b>Source: 8K00745-04</b>			Prepared: 03-Dec-18 Analyzed: 07-Dec-18						
Antimony	10.56	0.045	0.101	µg/L	10.250	0.124	102	70-130	4.92	20	AS

Eurofins Frontier Global Sciences, LLC

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Amy Goodall, Project Manager



Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater  
Project Number: Trace Metals In Wastewater  
Project Manager: Tim Puls

Reported:  
15-Jan-19 17:37

### Notes and Definitions

- U Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
- R-05 The sample was diluted due to the presence of high levels of non-target analytes or particulates resulting in elevated reporting limits.
- QR-06 The RPD value for the LCS/LCSD was outside of acceptance limits. Batch QC acceptable based on MS/MSD, and where applicable, matrix duplicate RPD value(s) within control limits.
- QM-12 Continuing calibration verification (CCV) and/or blank spike/blank spike duplicate (BS/BSD) recoveries above upper control limits. All reported sample concentrations were below the reporting limit.
- QM-05 The spike recovery was outside acceptance limits for the MS/MSD and or AS/ASD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
- J The result is an estimated concentration.
- AS This MS and/or MSD is an analytical spike and/or an analytical spike duplicate.
- AD This matrix duplicate is an analytical duplicate.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the method detection limit if reported to the MDL or above the reporting limit if reported to the MRL.
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference



**WORK ORDER NUMBER: 18-11-1948**

*The difference is service*



AIR | SOIL | WATER | MARINE CHEMISTRY

### Analytical Report For

**Client:** Eurofins Frontier Global Sciences, Inc.

**Client Project Name:** 8K00762

**Attention:** Amy Goodall  
11720 North Creek Parkway North  
Suite 4  
Bothell, WA 98011-8244

A handwritten signature in black ink, appearing to read "Carla Hollowell".

Approved for release on 12/05/2018 by:  
Carla Hollowell  
Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience (Calscience) certifies that the test results provided in this report meet all NELAC Institute requirements for parameters for which accreditation is required or available. Any exceptions to NELAC Institute requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

# Contents

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Client Project Name: 8K00762  
 Work Order Number: 18-11-1948

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## Work Order Narrative

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Work Order: 18-11-1948

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**Condition Upon Receipt:**

Samples were received under Chain-of-Custody (COC) on 11/27/18. They were assigned to Work Order 18-11-1948.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

**Holding Times:**

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

**Quality Control:**

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

**Subcontractor Information:**

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

**Additional Comments:**

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

**DoD Projects:**

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

**Sample Summary**

---

Client:	Eurofins Frontier Global Sciences, Inc.	Work Order:	18-11-1948
	11720 North Creek Parkway North, Suite 4	Project Name:	8K00762
	Bothell, WA 98011-8244	PO Number:	
		Date/Time Received:	11/27/18 10:15
		Number of Containers:	2

---

Attn: Amy Goodall

---

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
002258 RIVER_01_TCn	18-11-1948-1	11/15/18 12:42	1	Aqueous
002259 RIVER_TB_TCn	18-11-1948-2	11/15/18 11:45	1	Aqueous

## Analytical Report

Eurofins Frontier Global Sciences, Inc.  
 11720 North Creek Parkway North, Suite 4  
 Bothell, WA 98011-8244

Date Received: 11/27/18  
 Work Order: 18-11-1948  
 Preparation: N/A  
 Method: SM 4500-CN E  
 Units: mg/L

Project: 8K00762

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
002258 RIVER_01_TCn	18-11-1948-1-A	11/15/18 12:42	Aqueous	UV 9	11/29/18	11/29/18 14:28	I1129CNL1

Parameter	Result	RL	DF	Qualifiers
Cyanide, Total	ND	0.020	1.00	

002259 RIVER_TB_TCn	18-11-1948-2-A	11/15/18 11:45	Aqueous	UV 9	11/29/18	11/29/18 14:28	I1129CNL1
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Parameter	Result	RL	DF	Qualifiers
Cyanide, Total	ND	0.020	1.00	

Method Blank	099-05-061-4315	N/A	Aqueous	UV 9	11/29/18	11/29/18 14:28	I1129CNL1
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Parameter	Result	RL	DF	Qualifiers
Cyanide, Total	ND	0.020	1.00	


  
 Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

## Quality Control - LCS/LCSD

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 11/27/18  
Work Order: 18-11-1948  
Preparation: N/A  
Method: SM 4500-CN E

Project: 8K00762

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-05-061-4315	LCS	Aqueous	UV 9	11/29/18	11/29/18 14:28	I1129CNL1			
099-05-061-4315	LCSD	Aqueous	UV 9	11/29/18	11/29/18 14:28	I1129CNL1			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Cyanide, Total	0.2000	0.1705	85	0.1662	83	80-120	3	0-20	

## Glossary of Terms and Qualifiers

Work Order: 18-11-1948

Page 1 of 1

<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDS or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.



**SUBCONTRACT ORDER**  
Eurofins Frontier Global Sciences, Inc.

8K00762

**18-11-1948****SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

**Analysis****Comments**

Sample ID: 002258 RIVER\_01\_TCn

(1)

EFGS Lab ID: 8K00762-13

Matrix: Water

Sampled: 15-Nov-18 12:42 (GMT-05:00) Eastern Time (US &amp;

Due: 21-Dec-18 19:00

**Misc. Subcontract 1****EPA SM4500 CN E***Containers Supplied:*

57\_1000 mL PETG (A)

Sample ID: 002259 RIVER\_TB\_TCn

(2)

EFGS Lab ID: 8K00762-14

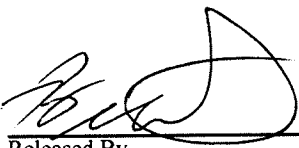
Matrix: Water

Sampled: 15-Nov-18 11:45 (GMT-05:00) Eastern Time (US &amp;

Due: 21-Dec-18 19:00

**Misc. Subcontract 1****EPA SM4500 CN E***Containers Supplied:*

57\_1000 mL PETG (A)



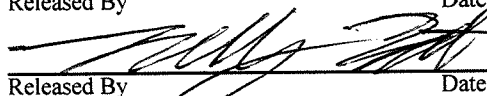
Released By

Date

11/26/18

Received By

Date



Released By

Date

11-26-18

Received By

Date



11/27/18

1015

(ups)

1948

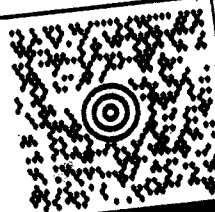
FRONT DESK  
(425) 686-1996  
FRONTIER GLOBAL SCIENCES  
11720 N CREEK PKWY N  
BOTHELL WA 98011-8244

25 LBS

1 OF 1

DWT: 19,14,14

SHIP TO:  
SAMPLE RECEIVING  
(714) 895-5494  
EUROFINS CALSCIENCE, INC.  
7440 LINCOLN WAY  
GARDEN GROVE CA 92841



CA 927 9-09



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Dept No.: OVERHEAD  
REF 2:Subcontract

W6 21.0.23 Zebra ZP 450 06.0A 10/2018



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## SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1CLIENT: EFGSDATE: 11/27/2018

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: 0.0°C); Temperature (w/o CF): 3.7 °C (w/ CF): 3.7 °C; ☐ Blank ☒ Sample☐ Sample(s) outside temperature criteria (PM/APM contacted by: \_\_\_\_\_)☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling☐ Sample(s) received at ambient temperature; placed on ice for transport by courierAmbient Temperature: ☐ Air ☐ FilterChecked by: UFSO

## CUSTODY SEAL:

Cooler ☒ Present and Intact☐ Present but Not Intact☐ Not Present☐ N/AChecked by: UFSOSample(s) ☐ Present and Intact☐ Present but Not Intact☒ Not Present☐ N/AChecked by: UFSO

## SAMPLE CONDITION:

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sampling date <input type="checkbox"/> Sampling time <input type="checkbox"/> Matrix <input type="checkbox"/> Number of containers			
<input type="checkbox"/> No analysis requested <input type="checkbox"/> Not relinquished <input type="checkbox"/> No relinquished date <input type="checkbox"/> No relinquished time			
Sampler's name indicated on COC .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample container label(s) consistent with COC .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and in good condition .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers for analyses requested .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sufficient volume/mass for analyses requested .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples received within holding time .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aqueous samples for certain analyses received within 15-minute holding time			
<input type="checkbox"/> pH <input type="checkbox"/> Residual Chlorine <input type="checkbox"/> Dissolved Sulfide <input type="checkbox"/> Dissolved Oxygen .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation chemical(s) noted on COC and/or sample container .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unpreserved aqueous sample(s) received for certain analyses			
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Total Metals <input type="checkbox"/> Dissolved Metals			
Acid/base preserved samples - pH within acceptable range .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Container(s) for certain analysis free of headspace.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Dissolved Gases (RSK-175) <input type="checkbox"/> Dissolved Oxygen (SM 4500)			
<input type="checkbox"/> Carbon Dioxide (SM 4500) <input type="checkbox"/> Ferrous Iron (SM 3500) <input type="checkbox"/> Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## CONTAINER TYPE:

(Trip Blank Lot Number: \_\_\_\_\_)

Aqueous: ☐ VOA ☐ VOA<sub>h</sub> ☐ VOA<sub>na2</sub> ☐ 100PJ ☐ 100PJ<sub>na2</sub> ☐ 125AGB ☐ 125AGB<sub>h</sub> ☐ 125AGB<sub>p</sub> ☐ 125PB ☐ 125PB<sub>znna</sub> (pH 9)  
☐ 250AGB ☐ 250CGB ☐ 250CGB<sub>s</sub> (pH 2) ☐ 250PB ☐ 250PB<sub>n</sub> (pH 2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJ<sub>s</sub> (pH 2) ☐ 500PB  
☐ 1AGB ☐ 1AGB<sub>na2</sub> ☐ 1AGB<sub>s</sub> (pH 2) ☐ 1AGB<sub>s</sub> (O&G) ☐ 1PB ☒ 1PB<sub>na</sub> (pH 7 12) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (\_\_\_\_) ☐ EnCores® (\_\_\_\_) ☐ TerraCores® (\_\_\_\_) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ \_\_\_\_\_ Other Matrix (\_\_\_\_): ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Container: A = Amber, B = Bottle, C = Clear, E = Envelope, G = Glass, J = Jar, P = Plastic, and Z = Ziploc/Resealable Bag

Preservative: b = buffered, f = filtered, h = HCl, n = HNO<sub>3</sub>, na = NaOH, na<sub>2</sub> = Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, p = H<sub>3</sub>PO<sub>4</sub>, Labeled/Checked by: UFSOs = H<sub>2</sub>SO<sub>4</sub>, u = ultra-pure, x = Na<sub>2</sub>SO<sub>3</sub>+NaHSO<sub>4</sub>·H<sub>2</sub>O, znna = Zn (CH<sub>3</sub>CO<sub>2</sub>)<sub>2</sub> + NaOHReviewed by: UFSO

## APPENDIX B

Laboratory Reports of Sample Results and Chain of Custody

Round 4 – December 11-12, 2018

EnviroSystems, Inc.  
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P.O. Box 778  
Hampton, N.H. 03843-0778  
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Steve Clifton  
Underwood Engineers, Inc.  
25 Vaughan Mall  
Portsmouth, NH 03801

PO Number: None  
Report Number: 31456  
Date Received: 12/12/18  
Date Reported: 12/27/18

Project: Piscataqua River

Attached please find results for analyses performed on samples received on 12/12/18 at 1200.  
Samples for total phenol analyses were subcontracted to Alpha Analytical of Westborough, MA.  
Data for subcontracted samples may be found in the report appendix.

Samples were received in acceptable condition, except where noted, and under chain of custody.

Instruments used in analysis were calibrated with the appropriate frequency and to the specifications of the referenced methods.

Analytes in blanks were below levels affecting sample results.

Matrix effects as monitored by matrix spike recovery or unusual physical properties were not apparent unless otherwise noted.

Accuracy and precision as monitored by laboratory control sample analyses were within acceptance limits unless otherwise noted.

Accreditations may be viewed at [www.envirosystems.com](http://www.envirosystems.com).

The results presented in this report relate only to the samples described on the chain(s) of custody and sample receipt log(s), and are intended to be used only by the submitter.

EnviroSystems, Incorporated

  
\_\_\_\_\_  
Jason Hobbs - Technical Manager of Analytical Chemistry  
Signature

Date 01/04/19

Attachment  
Report

Report No: 31456 SDG:  
 Project: Piscataqua River  
 Sample ID: PEASE\_004  
 Matrix: Water  
 Sampled: 12/12/18 0000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31456-004	19	2	mg/L	12/17/18 1425	12/21/18 0830	CA /SM 2540D
Total dissolved solids	31456-013	1900	5	mg/L	12/18/18 1510	12/20/18 1150	CA /SM 2540C
Biochemical Oxygen Demand	31456-001	7.8	J2 5	mg/L	12/12/18	12/17/18	CA /SM 5210 B
Ammonia-N	31456-003	3.2	0.1	mg/L as N	12/17/18 1400	12/17/18 1400	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31456-008	4.6	0.5	mg/L as N	12/18/18 0945	12/21/18 1000	CA /SM 4500-N C
Total Nitrogen	31456-008	7.02	0.5	mg/L as N	12/27/18	12/27/18	AM/Calculation
Nitrate plus nitrite-N	31456-008	2.42	0.1	mg/L as N	12/18/18 1200	12/18/18 1200	JHW/SM 4500-NO3 F
Total phosphorus	31456-011	31	0.8	mg/L	12/17/18 1230	12/18/18 1150	CA /SM 4500-P E

Notes:

J2 = LCS %R below limit.

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_004  
Matrix: Water  
Sampled: 12/12/18 0845

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31456-014	2	0.2	NTU	12/13/18 1800	12/13/18 1800	JLH/SM 2130 B
Oil and grease	31456-010	ND	5	mg/L	12/13/18 1130	12/18/18 1300	ELJ/EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31456  
 Project: Piscataqua River  
 Sample ID: PEASE\_004DUP  
 Matrix: Water  
 Sampled: 12/12/18 0000

SDG:

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31456-006	3.2	0.1	mg/L as N	12/17/18 1400	12/17/18 1400	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31456-009	5.1	0.5	mg/L as N	12/18/18 0945	12/21/18 1000	CA /SM 4500-N C
Total Nitrogen	31456-009	7.54	0.5	mg/L as N	12/27/18	12/27/18	AM/Calculation
Nitrate plus nitrite-N	31456-009	2.44	0.1	mg/L as N	12/18/18 1200	12/18/18 1200	JHW/SM 4500-NO3 F
Total phosphorus	31456-012	35	0.8	mg/L	12/17/18 1230	12/18/18 1150	CA /SM 4500-P E

Notes:

ESI



Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: NEW\_004  
Matrix: Water  
Sampled: 12/12/18 0000

Parameter		Result		Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31456-023	27		8	mg/L	12/17/18 1425	12/21/18 0830	CA /SM 2540D
Total dissolved solids	31456-032	1200		5	mg/L	12/18/18 1510	12/20/18 1150	CA /SM 2540C
Biochemical Oxygen Demand	31456-020	ND	J2	5	mg/L	12/12/18	12/17/18	CA /SM 5210 B
Ammonia-N	31456-024	0.65		0.1	mg/L as N	12/17/18 1400	12/17/18 1400	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31456-027	1.7		1	mg/L as N	12/18/18 0945	12/21/18 1000	CA /SM 4500-N C
Total Nitrogen	31456-027	2.24		1	mg/L as N	12/27/18	12/27/18	AM/Calculation
Nitrate plus nitrite-N	31456-027	0.54		0.05	mg/L as N	12/18/18 1200	12/18/18 1200	JHW/SM 4500-NO3 F
Total phosphorus	31456-030	0.77		0.4	mg/L	12/17/18 1230	12/18/18 1150	CA /SM 4500-P E

Notes:

ND = Not Detected

J2 = LCS %R below limit.

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: NEW\_004  
Matrix: Water  
Sampled: 12/12/18 0711

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31456-033	2.2	0.2	NTU	12/13/18 1800	12/13/18 1800	JLH/SM 2130 B
Oil and grease	31456-029	ND	5	mg/L	12/13/18 1130	12/18/18 1300	ELJ/EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: NEW\_004DUP  
Matrix: Water  
Sampled: 12/12/18 0000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31456-025	0.66	0.1	mg/L as N	12/17/18 1400	12/17/18 1400	JHW/SM 4500-NH3 G
Total Kjeldahl Nitrogen	31456-028	2	0.5	mg/L as N	12/18/18 0945	12/21/18 1000	CA /SM 4500-N C
Total Nitrogen	31456-028	2.54	0.5	mg/L as N	12/27/18	12/27/18	AM/Calculation
Nitrate plus nitrite-N	31456-028	0.54	0.05	mg/L as N	12/18/18 1200	12/18/18 1200	JHW/SM 4500-NO3 F
Total phosphorus	31456-031	1.6	0.4	mg/L	12/17/18 1230	12/18/18 1150	CA /SM 4500-P E

Notes:

ESI

Report No: 31456  
 Project: Piscataqua River  
 Sample ID: RIVER\_004  
 Matrix: Water  
 Sampled: 12/12/18

SDG:

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Temperature	31456-060	14.3	0.05	Units	12/12/18	12/12/18	MS/SM 2550B
Specific conductance	31456-060	33000	0.01	uS/cm	12/12/18	12/12/18	MS/SM 2510B
Dissolved Oxygen	31456-060	9.87	0.1	mg/L	12/12/18	12/12/18	MS/SM 4500-O-G
pH	31456-060	7.8	0.05	Units	12/12/18	12/12/18	MS/SM 4500 H+ B
Conductivity	31456-060	28000	0.01	uS/cm	12/12/18	12/12/18	MS/SM 2510B

Notes:

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_004  
Matrix: Water  
Sampled: 12/12/18 1000

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Turbidity	31456-051	2.3	0.2	NTU	12/13/18 1800	12/13/18 1800	JLH/SM 2130 B

Notes:

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_004  
Matrix: Water  
Sampled: 12/12/18 1021

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total suspended solids	31456-042	15	1	mg/L	12/17/18 1425	12/21/18 0830	CA /SM 2540D

Notes:

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_004  
Matrix: Water  
Sampled: 12/12/18 1020

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total dissolved solids	31456-050	21000	5	mg/L	12/18/18 1510	12/20/18 1150	CA /SM 2540C

Notes:

ESI

Report No: 31456 SDG:  
Project: Piscataqua River  
Sample ID: RIVER\_004  
Matrix: Water  
Sampled: 12/12/18 1024

Parameter	Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Biochemical Oxygen Demand 31456-039	ND J2	5	mg/L	12/12/18	12/17/18	CA /SM 5210 B

Notes:

ND = Not Detected  
J2 = LCS %R below limit.



Report No: 31456 SDG:  
Project: Piscataqua River

Sample ID: RIVER\_004  
Matrix: Water  
Sampled: 12/12/18 1020

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	31456-047	ND	5	mg/L	12/13/18 1130	12/18/18 1300	ELJ/EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_004  
Matrix: Water  
Sampled: 12/12/18 1032

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31456-043	ND	0.1	mg/L as N	12/17/18 1400	12/17/18 1400	JHW/SM 4500-NH3 G

Notes:

ND = Not Detected

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_004  
Matrix: Water  
Sampled: 12/12/18 1027

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total phosphorus	31456-048	0.047	0.02	mg/L	12/17/18 1230	12/18/18 1150	CA /SM 4500-P E

Notes:

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_003DUP  
Matrix: Water  
Sampled: 12/12/18 1032

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	31456-044	ND	0.1	mg/L as N	12/17/18 1400	12/17/18 1400	JHW/SM 4500-NH3 G

Notes:

ND = Not Detected

ESI

Report No: 31456  
Project: Piscataqua River  
Sample ID: RIVER\_004  
Matrix: Water  
Sampled: 12/12/18 1024

SDG:

Parameter		Result		Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total Kjeldahl Nitrogen	31456-045	0.15	J	0.5	mg/L as N	12/18/18 0945	12/21/18 1000	CA /SM 4500-N C
Total Nitrogen	31456-045	0.29		0.05	mg/L as N	12/27/18	12/27/18	AM/Calculation
Nitrate plus nitrite-N	31456-045	0.14		0.05	mg/L as N	12/18/18 1200	12/18/18 1200	JHW/SM 4500-NO3 F

Notes:

J = Result less than the sample quantitation limit but greater than MDL.

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_003DUP  
Matrix: Water  
Sampled: 12/12/18 1025

Parameter		Result		Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total Kjeldahl Nitrogen	31456-046	0.43	J	0.5	mg/L as N	12/18/18 0945	12/21/18 1000	CA /SM 4500-N C
Total Nitrogen	31456-046	0.57		0.5	mg/L as N	12/27/18	12/27/18	AM/Calculation
Nitrate plus nitrite-N	31456-046	0.14		0.05	mg/L as N	12/18/18 1200	12/18/18 1200	JHW/SM 4500-NO3 F

Notes:

J = Result less than the sample quantitation limit but greater than MDL.

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_003DUP  
Matrix: Water  
Sampled: 12/12/18 1027

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total phosphorus	31456-049	0.038	0.02	mg/L	12/17/18 1230	12/18/18 1150	CA /SM 4500-P E

Notes:

ESI

Lab Number: 31456-016  
Sample Designation: PEASE\_004  
Date Sampled: 12/12/18 0845  
Date Analyzed: 12/14/18  
Matrix: Water

**VOLATILE ORGANICS**

Method Reference: EPA Method 624.

	Concentration (ug/L)	Quantitation Limit (ug/L)
acrolein	U	10
acrylonitrile	U	10
dichlorodifluoromethane	U	2
chloromethane	U	2
vinyl chloride	U	2
bromomethane	U	2
chloroethane	U	2
trichlorofluoromethane	U	2
1,1-dichloroethene	U	2
methylene chloride	U	2
trans-1,2-dichloroethene	U	2
1,1-dichloroethane	U	2
cis-1,2-dichloroethene	U	2
chloroform	25	2
1,1,1-trichloroethane	U	2
carbon tetrachloride	U	2
benzene	U	2
1,2-dichloroethane	U	2
trichloroethene	U	2
1,2-dichloropropane	U	2
dibromomethane	U	2
bromodichloromethane	14	2
cis-1,3-dichloropropene	U	2
2-chloroethylvinylether	U	4
toluene	U	2
trans-1,3-dichloropropene	U	2
1,1,2-trichloroethane	U	2
tetrachloroethene	U	2
1,3-dichloropropane	U	2
dibromochloromethane	6.6	2
chlorobenzene	U	2
ethylbenzene	U	2
bromoform	U	2
1,1,2,2-tetrachloroethane	U	2
1,2-dichlorobenzene	U	2
1,3-dichlorobenzene	U	2
1,4-dichlorobenzene	U	2

SURROGATE STANDARDS	% Recovery	Acceptance Limits
dibromofluoromethane	86	70 - 130
toluene-d8	96	70 - 130
4-bromofluorobenzene	98	70 - 130

U = Below quantitation limit



Lab Number: 31456-035  
Sample Designation: NEW\_004  
Date Sampled: 12/12/18 0711  
Date Analyzed: 12/14/18  
Matrix: Water

**VOLATILE ORGANICS**

Method Reference: EPA Method 624.

	Concentration (ug/L)	Quantitation Limit (ug/L)
acrolein	U	10
acrylonitrile	U	10
dichlorodifluoromethane	U	2
chloromethane	U	2
vinyl chloride	U	2
bromomethane	U	2
chloroethane	U	2
trichlorofluoromethane	U	2
1,1-dichloroethene	U	2
methylene chloride	U	2
trans-1,2-dichloroethene	U	2
1,1-dichloroethane	U	2
cis-1,2-dichloroethene	U	2
chloroform	18	2
1,1,1-trichloroethane	U	2
carbon tetrachloride	U	2
benzene	U	2
1,2-dichloroethane	U	2
trichloroethene	U	2
1,2-dichloropropane	U	2
dibromomethane	U	2
bromodichloromethane	22	2
cis-1,3-dichloropropene	U	2
2-chloroethylvinylether	U	4
toluene	U	2
trans-1,3-dichloropropene	U	2
1,1,2-trichloroethane	U	2
tetrachloroethene	U	2
1,3-dichloropropane	U	2
dibromochloromethane	12	2
chlorobenzene	U	2
ethylbenzene	U	2
bromoform	2.3	2
1,1,2,2-tetrachloroethane	U	2
1,2-dichlorobenzene	U	2
1,3-dichlorobenzene	U	2
1,4-dichlorobenzene	U	2

**SURROGATE STANDARDS**

	% Recovery	Acceptance Limits
dibromofluoromethane	88	70 - 130
toluene-d8	94	70 - 130
4-bromofluorobenzene	100	70 - 130

U = Below quantitation limit

Lab Number: 31456-054  
Sample Designation: RIVER\_004  
Date Sampled: 12/12/18 1034  
Date Analyzed: 12/14/18  
Matrix: Water

# VOLATILE ORGANICS

Method Reference: EPA Method 624.

	Concentration (ug/L)	Quantitation Limit (ug/L)
acrolein	U	10
acrylonitrile	U	10
dichlorodifluoromethane	U	2
chloromethane	U	2
vinyl chloride	U	2
bromomethane	U	2
chloroethane	U	2
trichlorofluoromethane	U	2
1,1-dichloroethene	U	2
methylene chloride	U	2
trans-1,2-dichloroethene	U	2
1,1-dichloroethane	U	2
cis-1,2-dichloroethene	U	2
chloroform	U	2
1,1,1-trichloroethane	U	2
carbon tetrachloride	U	2
benzene	U	2
1,2-dichloroethane	U	2
trichloroethene	U	2
1,2-dichloropropane	U	2
dibromomethane	U	2
bromodichloromethane	U	2
cis-1,3-dichloropropene	U	2
2-chloroethylvinylether	U	4
toluene	U	2
trans-1,3-dichloropropene	U	2
1,1,2-trichloroethane	U	2
tetrachloroethene	U	2
1,3-dichloropropane	U	2
dibromochloromethane	U	2
chlorobenzene	U	2
ethylbenzene	U	2
bromoform	U	2
1,1,2,2-tetrachloroethane	U	2
1,2-dichlorobenzene	U	2
1,3-dichlorobenzene	U	2
1,4-dichlorobenzene	U	2

## SURROGATE STANDARDS

	% Recovery	Acceptance Limits
dibromofluoromethane	88	70 - 130
toluene-d8	96	70 - 130
4-bromofluorobenzene	98	70 - 130

U = Below quantitation limit

Lab Number: 31456-055  
Sample Designation: RIVER\_004TB  
Date Sampled: 12/12/18 1034  
Date Analyzed: 12/14/18  
Matrix: Water

**VOLATILE ORGANICS**

Method Reference: EPA Method 624.

	Concentration (ug/L)	Quantitation Limit (ug/L)
acrolein	U	10
acrylonitrile	U	10
dichlorodifluoromethane	U	2
chloromethane	U	2
vinyl chloride	U	2
bromomethane	U	2
chloroethane	U	2
trichlorofluoromethane	U	2
1,1-dichloroethene	U	2
methylene chloride	260	2
trans-1,2-dichloroethene	U	2
1,1-dichloroethane	U	2
cis-1,2-dichloroethene	U	2
chloroform	U	2
1,1,1-trichloroethane	U	2
carbon tetrachloride	U	2
benzene	U	2
1,2-dichloroethane	U	2
trichloroethene	U	2
1,2-dichloropropane	U	2
dibromomethane	U	2
bromodichloromethane	U	2
cis-1,3-dichloropropene	U	2
2-chloroethylvinylether	U	4
toluene	U	2
trans-1,3-dichloropropene	U	2
1,1,2-trichloroethane	U	2
tetrachloroethene	U	2
1,3-dichloropropane	U	2
dibromochloromethane	U	2
chlorobenzene	U	2
ethylbenzene	U	2
bromoform	U	2
1,1,2,2-tetrachloroethane	U	2
1,2-dichlorobenzene	U	2
1,3-dichlorobenzene	U	2
1,4-dichlorobenzene	U	2

**SURROGATE STANDARDS**

	% Recovery	Acceptance Limits
dibromofluoromethane	88	70 - 130
toluene-d8	98	70 - 130
4-bromofluorobenzene	98	70 - 130

U = Below quantitation limit

Lab Number: 31456-018  
Sample Designation: PEASE\_004  
Date Sampled: 12/12/18  
Date Extracted: 12/14/18  
Date Analyzed: 12/21/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	5	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	11
2-chlorophenol	U	3	4-nitrophenol	U	11
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	5	4,6-dinitro-2-methylphenol	U	11
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	5
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	5	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	21, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	44
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	5	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	22
hexachlorocyclopentadiene	U	5	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	5
2-chloronaphthalene	U, J2	5	benzo(k)fluoranthene	U	5
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	22, J17	25-175	nitrobenzene-d5	36	22-176
phenol-d5	20, J17	24-176	2-fluorobiphenyl	33, J17	38-162
2,4,6-tribromophenol	60	24-176	terphenyl-d14	59	53-147

U = Below quantitation limit  
B = di-n-butylphthalate was found in the blank at a concentration of 6.8 ug/L.  
J2 = LCS %R below limit. No sample remaining.  
J17 = SUR %R below limit.

Lab Number: 31456-037  
Sample Designation: NEW\_004  
Date Sampled: 12/12/18  
Date Extracted: 12/14/18  
Date Analyzed: 12/21/18  
Matrix: Water

# SEMIVOLATILE ORGANICS

Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	5	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	11
2-chlorophenol	U	3	4-nitrophenol	U	11
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	5	4,6-dinitro-2-methylphenol	U	11
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	5
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	5	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	19, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	43
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	5	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	22
hexachlorocyclopentadiene	U	5	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	5
2-chloronaphthalene	U, J2	5	benzo(k)fluoranthene	U	5
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

## SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	23, J17	25-175	nitrobenzene-d5	43	22-178
phenol-d5	22, J17	24-176	2-fluorobiphenyl	41	38-162
2,4,6-tribromophenol	82	24-176	terphenyl-d14	75	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 6.8 ug/L.

J2 = LCS %R below limit. No sample remaining.

J17 = SUR %R below limit.

Lab Number: 31456-058  
Sample Designation: RIVER\_004  
Date Sampled: 12/12/18  
Date Extracted: 12/14/18  
Date Analyzed: 12/21/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	7	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	13
2-chlorophenol	U	3	4-nitrophenol	U	13
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	7	4,6-dinitro-2-methylphenol	U	13
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	7
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	7	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	25, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	53
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	7	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	26
hexachlorocyclopentadiene	U	7	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	7
2-chloronaphthalene	U, J2, J5	7	benzo(k)fluoranthene	U	7
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	34	25-175	nitrobenzene-d5	44	22-178
phenol-d5	41	24-176	2-fluorobiphenyl	42	38-162
2,4,6-tribromophenol	62	24-176	terphenyl-d14	64	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 6.8 ug/L.

J2 = LCS %R below limit. No sample remaining.

J5 = MS %R below limit.

Lab Number: 31456-059  
Sample Designation: RIVER\_004TB  
Date Sampled: 12/12/18  
Date Extracted: 12/14/18  
Date Analyzed: 12/21/18  
Matrix: Water

# SEMIVOLATILE ORGANICS

Method Reference: EPA 625.

	Concentration (ug/L)	Reporting Limit (ug/L)		Concentration (ug/L)	Reporting Limit (ug/L)
N-nitrosodimethylamine	U	6	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	12
2-chlorophenol	U	3	4-nitrophenol	U	12
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	6	4,6-dinitro-2-methylphenol	U	12
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	6
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	6	hexachlorobenzene	U	3
3- and 4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	8.5, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	47
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	6	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	24
hexachlorocyclopentadiene	U	6	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	6
2-chloronaphthalene	U, J2	6	benzo(k)fluoranthene	U	6
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

# SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	41	25-175	nitrobenzene-d5	62	22-178
phenol-d5	38	24-176	2-fluorobiphenyl	65	38-162
2,4,6-tribromophenol	92	24-176	terphenyl-d14	87	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 6.8 ug/L.

J2 = LCS %R below limit.



## BACTERIAL ANALYSIS REPORT

ESI STUDY No.: 31456  
 Client: Underwood Engineers  
 Sample Receipt: 12/12/18 1200

### Fecal Coliform

Method: SM 9222D

Sample Identification	Lab ID Number	Sample Collection		Sample Analysis		Result (CFU/100mL)	Analyst
		Date	Time	Date	Time		
PEASE_004	31456-003	12/12/18	0845	12/12/18	1456	1	MW
NEW_004	31456-022	12/12/18	0711	12/12/18	1459	<2	MW
RIVER_004	31456-041	12/12/18	1033	12/12/18	1456	20	MW

### Enterococcus

Method: EPA 1600

Sample Identification	Lab ID Number	Sample Collection		Sample Analysis		Result (CFU/100mL)	Analyst
		Date	Time	Date	Time		
PEASE_004	31456-002	12/12/18	0845	12/12/18	1436	40	MW
NEW_004	31456-021	12/12/18	0711	12/12/18	1439	69	MW
RIVER_004	31456-040	12/12/18	1033	12/12/18	1436	13	MW

### Effluent Chemistry

Sample Number	Total Residual Chlorine (mg/L)
31456-002	0.0
31456-003	0.0
31456-021	0.0
31456-022	0.0
31456-040	0.0
31456-041	0.0

Analytical Methods: APHA. 2012. *Standard Methods for the Examination of Water and Wastewater*, 22<sup>nd</sup> Edition. Washington D.C.

U.S. Environmental Protection Agency Office of Water (4303T). 2003. *Method 1600: Membrane Filter Test for Enterococci in Water*. Washington D.C.



Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_004  
Matrix: Water  
Sampled: 12/12/18 0000

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total Suspended Solids	PB	ND	0	ND	mg/L	12/17/18 1425	12/21/18 0830	SM 2540D
Total Suspended Solids	LCS	10.1	10	102%R	mg/L	12/17/18 1425	12/21/18 0830	SM 2540D
Total Suspended Solids	LCSD	9.6	10	100%R, 5%RPD	mg/L	12/17/18 1425	12/21/18 0830	SM 2540D
Total dissolved Solids	PB	ND	0	ND	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	LCS	478	500	96%R	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	LCSD	516	500	103%R, 8%RPD	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	S1D	21534		2%RPD	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	S1S	22375	250	SNR	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Biochemical Oxygen Demand	PBA	ND	0		mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	PBB	ND	0		mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	LCS	129	198	65%R	mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	LCSD	136	198	69%R	mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	LCST	135	198	68%R, 2.3%RR	mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Ammonia-N	PB	ND	0		mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.2	10	102%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.3	10	103%R, 1%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1D	3.2		0%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1S	12.7	10	95%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0		mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.6	10	96%R	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.9	10	99%R, 3%RPD	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Nitrate plus nitrite-N	PB	ND			mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.0	1	100%R	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.0	1	100%R, 0%RPD	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Total phosphorus	PB	ND	0	ND	mg/L	12/18/18 1150	12/18/18 1150	SM 4500-P E
Total phosphorus	LCS	0.5	1	100%R	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	LCSD	0.5	1	102%R, 2%RPD	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	S1D	31.8		3%RPD	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E
Total phosphorus	S1S	51.6	20	104%R	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: PEASE\_004  
Matrix: Water  
Sampled: 12/12/18 0845

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	PB	ND			mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A
Oil and grease	LCS	43	40	108%R	mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A
Oil and grease	LCSD	42	40	105%R, 3%RR	mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A
Oil and grease	S1MS	44	40	108%R	mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A

Notes:

ND = Not Detected

Report No: 31456  
 Project: Piscataqua River  
 Sample ID: PEASE\_004DUP  
 Matrix: Water  
 Sampled: 12/12/18 0000

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	PB	ND	0		mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.2	10	102%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.3	10	103%R, 1%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1D	3.2		0%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1S	12.7	10	95%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0		mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.6	10	96%R	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.9	10	99%R, 3%RPD	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Nitrate plus nitrite-N	PB	ND			mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.0	1	100%R	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.0	1	100%R, 0%RPD	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Total phosphorus	PB	ND	0	ND	mg/L	12/18/18 1150	12/18/18 1150	SM 4500-P E
Total phosphorus	LCS	0.5	1	100%R	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	LCSD	0.5	1	102%R, 2%RPD	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	S1D	31.8		3%RPD	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E
Total phosphorus	S1S	51.6	20	104%R	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: NEW\_004  
Matrix: Water  
Sampled: 12/12/18 0000

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total Suspended Solids	PB	ND	0	ND	mg/L	12/17/18 1425	12/21/18 0830	SM 2540D
Total Suspended Solids	LCS	10.1	10	102%R	mg/L	12/17/18 1425	12/21/18 0830	SM 2540D
Total Suspended Solids	LCSD	9.6	10	100%R, 5%RPD	mg/L	12/17/18 1425	12/21/18 0830	SM 2540D
Total dissolved Solids	PB	ND	0	ND	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	LCS	478	500	96%R	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	LCSD	516	500	103%R, 8%RPD	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	S1D	21534		2%RPD	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	S1S	22375	250	SNR	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Biochemical Oxygen Demand	PBA	ND	0		mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	PBB	ND	0		mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	LCS	129	198	65%R	mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	LCSD	136	198	69%R	mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	LCST	135	198	68%R, 2.3%RR	mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Ammonia-N	PB	ND	0		mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.2	10	102%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.3	10	103%R, 1%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1D	3.2		0%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1S	12.7	10	95%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0		mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.6	10	96%R	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.9	10	99%R, 3%RPD	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Nitrate plus nitrite-N	PB	ND			mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.0	1	100%R	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.0	1	100%R, 0%RPD	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Total phosphorus	PB	ND	0	ND	mg/L	12/18/18 1150	12/18/18 1150	SM 4500-P E
Total phosphorus	LCS	0.5	1	100%R	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	LCSD	0.5	1	102%R, 2%RPD	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	S1D	31.8		3%RPD	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E
Total phosphorus	S1S	51.6	20	104%R	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: NEW\_004  
Matrix: Water  
Sampled: 12/12/18 0711

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Oil and grease	PB	ND			mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A
Oil and grease	LCS	43	40	108%R	mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A
Oil and grease	LCSD	42	40	105%R, 3%RR	mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A
Oil and grease	S1MS	44	40	108%R	mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31456  
 Project: Piscataqua River  
 Sample ID: NEW\_004DUP  
 Matrix: Water  
 Sampled: 12/12/18 0000

SDG:

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	PB	ND	0		mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.2	10	102%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.3	10	103%R, 1%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1D	3.2		0%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1S	12.7	10	95%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0		mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.6	10	96%R	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.9	10	99%R, 3%RPD	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Nitrate plus nitrite-N	PB	ND			mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.0	1	100%R	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.0	1	100%R, 0%RPD	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Total phosphorus	PB	ND	0	ND	mg/L	12/18/18 1150	12/18/18 1150	SM 4500-P E
Total phosphorus	LCS	0.5	1	100%R	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	LCSD	0.5	1	102%R, 2%RPD	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	S1D	31.8		3%RPD	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E
Total phosphorus	S1S	51.6	20	104%R	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E

Notes:

ND = Not Detected

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_004  
Matrix: Water  
Sampled: 12/12/18

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total Suspended Solids	PB	ND	0	ND	mg/L	12/17/18 1425	12/21/18 0830	SM 2540D
Total Suspended Solids	LCS	10.1	10	102%R	mg/L	12/17/18 1425	12/21/18 0830	SM 2540D
Total Suspended Solids	LCSD	9.6	10	100%R, 5%RPD	mg/L	12/17/18 1425	12/21/18 0830	SM 2540D
Total dissolved Solids	PB	ND	0	ND	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	LCS	478	500	96%R	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	LCSD	516	500	103%R, 8%RPD	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	S1D	21534		2%RPD	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Total dissolved Solids	S1S	22375	250	SNR	mg/L	12/18/18 1510	12/20/18 1150	SM 2540C
Biochemical Oxygen Demand	PBA	ND	0		mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	PBB	ND	0		mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	LCS	129	198	65%R	mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	LCSD	136	198	69%R	mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Biochemical Oxygen Demand	LCST	135	198	68%R, 2.3%RR	mg/L DO depletion	12/12/18	12/17/18	SM 5210 B
Ammonia-N	PB	ND	0		mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.2	10	102%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.3	10	103%R, 1%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1D	3.2		0%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1S	12.7	10	95%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0		mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.6	10	96%R	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.9	10	99%R, 3%RPD	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Nitrate plus nitrite-N	PB	ND			mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.0	1	100%R	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.0	1	100%R, 0%RPD	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Total phosphorus	PB	ND	0	ND	mg/L	12/18/18 1150	12/18/18 1150	SM 4500-P E
Total phosphorus	LCS	0.5	1	100%R	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	LCSD	0.5	1	102%R, 2%RPD	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	S1D	31.8		3%RPD	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E
Total phosphorus	S1S	51.6	20	104%R	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E
Oil and grease	PB	ND			mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A
Oil and grease	LCS	43	40	108%R	mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A
Oil and grease	LCSD	42	40	105%R, 3%RR	mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A
Oil and grease	S1MS	44	40	108%R	mg/L	12/13/18 1130	12/18/18 1300	EPA 1664A

Notes:

ND = Not Detected

ESI

Report No: 31456  
Project: Piscataqua River

SDG:

Sample ID: RIVER\_004DUP  
Matrix: Water  
Sampled: 12/12/18

Parameter		Result	True Value	Percent Recovery	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Ammonia-N	PB	ND	0		mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.2	10	102%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	LCS	10.3	10	103%R, 1%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1D	3.2		0%RPD	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Ammonia-N	S1S	12.7	10	95%R	mg/L as N	12/17/18 1400	12/17/18 1400	SM 4500-NH3 G
Total Kjeldahl Nitrogen	PB	ND	0		mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.6	10	96%R	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Total Kjeldahl Nitrogen	LCS	9.9	10	99%R, 3%RPD	mg/L as N	12/18/18 0945	12/21/18 1000	SM 4500-N C
Nitrate plus nitrite-N	PB	ND			mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCS	1.0	1	100%R	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Nitrate plus nitrite-N	LCSD	1.0	1	100%R, 0%RPD	mg/L as N	12/18/18 1200	12/18/18 1200	SM 4500-NO3 F
Total phosphorus	PB	ND	0	ND	mg/L	12/18/18 1150	12/18/18 1150	SM 4500-P E
Total phosphorus	LCS	0.5	1	100%R	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	LCSD	0.5	1	102%R, 2%RPD	mg/L	12/17/18 1230	12/18/18 1150	SM 4500-P E
Total phosphorus	S1D	31.8		3%RPD	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E
Total phosphorus	S1S	51.6	20	104%R	mg/L	12/17/18 1230	12/17/18 1230	SM 4500-P E

Notes:

ND = Not Detected

ESI



Lab Number: PB121418A  
Sample Designation: Laboratory Blank  
Date Sampled: 12/14/18  
Date Analyzed: 12/14/18  
Matrix: Water

**VOLATILE ORGANICS**

Method Reference: EPA Method 624.

	Concentration (ug/L)	Quantitation Limit (ug/L)
acrolein	U	10
acrylonitrile	U	10
dichlorodifluoromethane	U	2
chloromethane	U	2
vinyl chloride	U	2
bromomethane	U	2
chloroethane	U	2
trichlorofluoromethane	U	2
1,1-dichloroethene	U	2
methylene chloride	U	2
trans-1,2-dichloroethene	U	2
1,1-dichloroethane	U	2
cis-1,2-dichloroethene	U	2
chloroform	U	2
1,1,1-trichloroethane	U	2
carbon tetrachloride	U	2
benzene	U	2
1,2-dichloroethane	U	2
trichloroethene	U	2
1,2-dichloropropane	U	2
dibromomethane	U	2
bromodichloromethane	U	2
cis-1,3-dichloropropene	U	2
2-chloroethylvinylether	U	4
toluene	U	2
trans-1,3-dichloropropene	U	2
1,1,2-trichloroethane	U	2
tetrachloroethene	U	2
1,3-dichloropropane	U	2
dibromochloromethane	U	2
chlorobenzene	U	2
ethylbenzene	U	2
bromoform	U	2
1,1,2,2-tetrachloroethane	U	2
1,2-dichlorobenzene	U	2
1,3-dichlorobenzene	U	2
1,4-dichlorobenzene	U	2

**SURROGATE STANDARDS**

	% Recovery	Acceptance Limits
1,2-dichloroethane-d4	77	70 - 130
toluene-d8	97	70 - 130
4-bromofluorobenzene	98	70 - 130

U = Below quantitation limit

Lab Number: LCS121418W  
Sample Designation: Laboratory Control Sample  
Date Sampled: 12/14/18  
Date Analyzed: 12/14/18  
Matrix: Water

# VOLATILE ORGANICS

Method Reference: EPA Method 624.

	LCS Concentration (ug/L)	Amount Added (ug/L)	Recovery (%)	Acceptance Limits (%)	
acrolein	12	20	59	NA	- NA
acrylonitrile	13	20	64	NA	- NA
dichlorodifluoromethane	13	20	64	NA	- NA
chloromethane	15	20	73	1	- 273
vinyl chloride	13	20	66	1	- 251
bromomethane	14	20	69	1	- 242
chloroethane	13	20	67	14	- 230
trichlorofluoromethane	14	20	71	17	- 181
1,1-dichloroethene	14	20	70	1	- 234
methylene chloride	17	20	84	1	- 221
trans-1,2-dichloroethene	14	20	72	54	- 156
1,1-dichloroethane	15	20	76	59	- 155
cis-1,2-dichloroethene	15	20	77	1	- NA
chloroform	15	20	77	51	- 138
1,1,1-trichloroethane	16	20	78	52	- 162
carbon tetrachloride	15	20	74	70	- 140
benzene	16	20	79	37	- 151
1,2-dichloroethane	17	20	84	49	- 155
trichloroethene	16	20	78	71	- 157
1,2-dichloropropane	16	20	81	1	- 210
dibromomethane	16	20	82	NA	- NA
bromodichloromethane	18	20	88	35	- 155
cis-1,3-dichloropropene	17	20	84	1	- 227
2-chloroethylvinylether	16	20	82	1	- 305
toluene	16	20	78	47	- 150
trans-1,3-dichloropropene	17	20	84	17	- 183
1,1,2-trichloroethane	16	20	81	52	- 150
tetrachloroethene	15	20	76	64	- 148
1,3-dichloropropane	15	20	75	NA	- NA
dibromochloromethane	18	20	88	53	- 149
chlorobenzene	16	20	79	37	- 160
ethylbenzene	15	20	75	37	- 162
bromoform	16	20	79	45	- 169
1,1,2,2-tetrachloroethane	15	20	73	46	- 157
1,2-dichlorobenzene	16	20	80	18	- 190
1,3-dichlorobenzene	15	20	75	59	- 156
1,4-dichlorobenzene	15	20	76	18	- 190

## SURROGATE STANDARDS

	% Recovery	Acceptance Limits
dibromofluoromethane	90	70 - 130
toluene-d8	94	70 - 130
4-bromofluorobenzene	103	70 - 130

U = Below quantitation limit

Lab Number: LCSD121418W  
Sample Designation: Laboratory Control Sample Duplicate  
Date Sampled: 12/14/18  
Date Analyzed: 12/14/18  
Matrix: Water

# VOLATILE ORGANICS

Method Reference: EPA Method 624.

	LCS Concentration (ug/L)	Amount Added (ug/L)	Recovery (%)	Acceptance Limits (%)
acrolein	11	20	57	NA - NA
acrylonitrile	12	20	62	NA - NA
dichlorodifluoromethane	13	20	64	NA - NA
chloromethane	14	20	70	1 - 273
vinyl chloride	13	20	64	1 - 251
bromomethane	13	20	66	1 - 242
chloroethane	13	20	65	14 - 230
trichlorofluoromethane	14	20	68	17 - 181
1,1-dichloroethene	14	20	68	1 - 234
methylene chloride	15	20	76	1 - 221
trans-1,2-dichloroethene	14	20	70	54 - 156
1,1-dichloroethane	15	20	73	59 - 155
cis-1,2-dichloroethene	15	20	74	NA - NA
chloroform	15	20	73	51 - 138
1,1,1-trichloroethane	15	20	77	52 - 162
carbon tetrachloride	14	20	70	70 - 140
benzene	16	20	78	37 - 151
1,2-dichloroethane	16	20	81	49 - 155
trichloroethene	15	20	77	71 - 157
1,2-dichloropropane	16	20	81	1 - 210
dibromomethane	16	20	78	NA - NA
bromodichloromethane	17	20	86	35 - 155
cis-1,3-dichloropropene	16	20	80	1 - 227
2-chloroethylvinylether	14	20	69	1 - 305
toluene	15	20	77	47 - 150
trans-1,3-dichloropropene	16	20	80	17 - 183
1,1,2-trichloroethane	16	20	78	52 - 150
tetrachloroethene	15	20	76	64 - 148
1,3-dichloropropane	15	20	73	NA - NA
dibromochloromethane	17	20	84	53 - 149
chlorobenzene	15	20	76	37 - 160
ethylbenzene	15	20	73	37 - 162
bromoform	15	20	77	45 - 169
1,1,2,2-tetrachloroethane	14	20	72	46 - 157
1,2-dichlorobenzene	16	20	79	18 - 190
1,3-dichlorobenzene	15	20	74	59 - 156
1,4-dichlorobenzene	15	20	75	18 - 190

SURROGATE STANDARDS	% Recovery	Acceptance Limits
dibromofluoromethane	86	70 - 130
toluene-d8	94	70 - 130
4-bromofluorobenzene	102	70 - 130

U = Below quantitation limit

Lab Number: 31456-016S  
Sample Designation: PEASE\_004 (Matrix Spike)  
Date Sampled: 12/12/18 0845  
Date Analyzed: 12/14/18  
Matrix: Water

# VOLATILE ORGANICS

Method Reference: EPA Method 624.

	Sample Concentration	Matrix Spike Concentration	Amount Added	Recovery (%)	Acceptance Limits (%)
acrolein	U	U	100	NA	NA-NA
acrylonitrile	U	U	100	NA	NA-NA
dichlorodifluoromethane	U	12	20	60	NA-NA
chloromethane	U	13	20	65	1-273
vinyl chloride	U	12	20	60	1-251
bromomethane	U	15	20	75	1-242
chloroethane	U	13	20	65	14-230
trichlorofluoromethane	U	13	20	65	17-181
1,1-dichloroethene	U	13	20	65	1-234
methylene chloride	U	14	20	70	1-221
trans-1,2-dichloroethene	U	13	20	65	54-156
1,1-dichloroethane	U	14	20	70	59-155
cis-1,2-dichloroethene	U	14	20	70	NA-NA
chloroform	25	38	20	65	51-138
1,1,1-trichloroethane	U	14	20	70	52-162
carbon tetrachloride	U	14	20	70	70-140
benzene	U	14	20	70	37-151
1,2-dichloroethane	U	15	20	75	49-155
trichloroethene	U	15	20	75	71-157
1,2-dichloropropane	U	15	20	75	1-210
dibromomethane	U	15	20	75	NA-NA
bromodichloromethane	14	29	20	75	35-155
cis-1,3-dichloropropene	U	15	20	75	1-227
toluene	U	14	20	70	47-150
trans-1,3-dichloropropene	U	15	20	75	17-183
1,1,2-trichloroethane	U	15	20	75	52-150
tetrachloroethene	U	14	20	70	64-148
1,3-dichloropropane	U	14	20	70	NA-NA
dibromochloromethane	6.6	23	20	82	53-149
chlorobenzene	U	14	20	70	37-160
ethylbenzene	U	13	20	65	37-162
bromoform	U	15	20	75	45-169
1,1,2,2-tetrachloroethane	U	14	20	70	46-157
1,2-dichlorobenzene	U	14	20	70	18-190
1,3-dichlorobenzene	U	13	20	65	59-156
1,4-dichlorobenzene	U	14	20	70	18-190

SURROGATE STANDARDS	% Recovery	% Recovery	Acceptance Limits
1,2-dichloroethane-d4	86.0	91.5	70 - 130
toluene-d8	96.0	93.6	70 - 130
4-bromofluorobenzene	98.0	103.2	70 - 130

U = Below quantitation limit

NC = Not calculated due to sample value being greater than five times the spike value.

Lab Number: PB177W  
Sample Designation: Laboratory Blank  
Date Sampled: 12/14/18 0930  
Date Extracted: 12/14/18 0930  
Date Analyzed: 12/22/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Quantitation Limit (ug/L)		Concentration (ug/L)	Quantitation Limit (ug/L)
N-nitrosodimethylamine	U	5	acenaphthene	U	3
phenol	U	3	2,4-dinitrophenol	U	10
2-chlorophenol	U	3	4-nitrophenol	U	10
bis(2-chloroethyl)ether	U	3	fluorene	U	3
1,3-dichlorobenzene	U	3	4-chlorophenyl-phenylether	U	3
1,4-dichlorobenzene	U	3	diethylphthalate	U	3
1,2-dichlorobenzene	U	5	4,6-dinitro-2-methylphenol	U	10
2-methylphenol (m-cresol)	U	3	N-nitrosodiphenylamine	U	5
bis(2-chloroisopropyl)ether	U	3	1,2-diphenylhydrazine (azobenzene)	U	3
hexachloroethane	U	3	4-bromophenyl-phenylether	U	3
N-nitroso-di-n-propylamine	U	5	hexachlorobenzene	U	3
4-methylphenol (p-cresol)	U	3	pentachlorophenol	U	3
nitrobenzene	U	3	phenanthrene	U	3
isophorone	U	3	anthracene	U	3
2-nitrophenol	U	3	di-n-butylphthalate	6.8, B	3
2,4-dimethylphenol	U	3	fluoranthene	U	3
bis(2-chloroethoxy)methane	U	3	benzidine	U	40
2,4-dichlorophenol	U	3	pyrene	U	3
1,2,4-trichlorobenzene	U	5	butylbenzylphthalate	U	3
naphthalene	U	3	benzo(a)anthracene	U	3
hexachloro-1,3-butadiene	U	3	chrysene	U	3
4-chloro-3-methylphenol	U	3	3,3'-dichlorobenzidine	U	20
hexachlorocyclopentadiene	U	5	bis(2-ethylhexyl)phthalate	U	3
2,4,5-trichlorophenol	U	3	di-n-octylphthalate	U	3
2,4,6-trichlorophenol	U	3	benzo(b)fluoranthene	U	5
2-chloronaphthalene	U	5	benzo(k)fluoranthene	U	5
acenaphthylene	U	3	benzo(a)pyrene	U	3
dimethylphthalate	U	3	indeno(1,2,3-cd)pyrene	U	3
2,6-dinitrotoluene	U	3	dibenzo(a,h)anthracene	U	3
2,4-dinitrotoluene	U	3	benzo(g,h,i)perylene	U	3

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	40	25-175	nitrobenzene-d5	52	22-178
phenol-d5	37	24-176	2-fluorobiphenyl	48	38-162
2,4,6-tribromophenol	90	24-176	terphenyl-d14	88	53-147

U = Below quantitation limit

B = di-n-butylphthalate was found in the blank at a concentration of 6.8 ug/L.

Lab Number: LCS177W  
Sample Designation: Laboratory Control Sample  
Date Sampled: 12/14/18 0930  
Date Extracted: 12/14/18 0930  
Date Analyzed: 12/22/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)
N-nitrosodimethylamine	38	100	38	30-150	acenaphthene	56	100	56	47-145
phenol	31	100	31	5-120	2,4-dinitrophenol	44	100	44	1-191
2-chlorophenol	54	100	54	23-134	4-nitrophenol	35	100	35	1-132
bis(2-chloroethyl)ether	47	100	47	12-158	fluorene	59	100	59	59-121
1,3-dichlorobenzene	53	100	53	30-150	4-chlorophenyl-phenylether	59	100	59	25-158
1,4-dichlorobenzene	55	100	55	30-150	diethylphthalate	54	100	54	1-120
1,2-dichlorobenzene	57	100	57	30-150	4,6-dinitro-2-methylphenol	61	100	61	1-181
2-methylphenol (m-cresol)	NA	NA	NA	30-150	N-nitrosodiphenylamine	64	100	64	30-150
bis(2-chloroisopropyl)ether	69	100	69	36-166	1,2-diphenylhydrazine	NA	NA	NA	30-150
hexachloroethane	60	100	60	40-120	4-bromophenyl-phenylether	61	100	61	53-127
N-nitroso-di-n-propylamine	74	100	74	1-230	hexachlorobenzene	64	100	64	1-152
4-methylphenol (p-cresol)	NA	NA	NA	30-150	pentachlorophenol	73	100	73	14-176
nitrobenzene	59	100	59	35-180	phenanthrene	64	100	64	54-120
isophorone	57	100	57	21-196	anthracene	64	100	64	27-133
2-nitrophenol	66	100	66	29-182	di-n-butylphthalate	74	100	74	1-120
2,4-dimethylphenol	74	100	74	32-119	fluoranthene	72	100	72	26-137
bis(2-chloroethoxy)methane	68	100	68	33-184	benzidine	NA	NA	NA	30-150
2,4-dichlorophenol	72	100	72	39-135	pyrene	75	100	75	52-120
1,2,4-trichlorobenzene	48	100	48	44-142	butylbenzylphthalate	70	100	70	1-152
naphthalene	60	100	60	21-133	benzo(a)anthracene	74	100	74	33-143
hexachloro-1,3-butadiene	47	100	47	24-120	chrysene	72	100	72	17-168
4-chloro-3-methylphenol	64	100	64	22-147	3,3'-dichlorobenzidine	NA	NA	NA	1-262
hexachlorocyclopentadiene	61	100	61	30-150	bis(2-ethylhexyl)phthalate	34	100	34	8-158
2,4,6-trichlorophenol	66	100	66	37-144	di-n-octylphthalate	38	100	38	4-146
2-chloronaphthalene	51	100	51, J2	60-120	benzo(b)fluoranthene	84	100	84	24-159
acenaphthylene	62	100	62	33-145	benzo(k)fluoranthene	78	100	78	11-162
dimethylphthalate	52	100	52	1-120	benzo(a)pyrene	75	100	75	17-163
2,6-dinitrotoluene	58	100	58	50-158	indeno(1,2,3-cd)pyrene	82	100	82	1-171
2,4-dinitrotoluene	59	100	59	39-139	dibenzo(a,h)anthracene	79	100	79	1-227
					benzo(g,h,i)perylene	86	100	86	1-219

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	37	25-175	nitrobenzene-d5	59	22-178
phenol-d5	34	24-176	2-fluorobiphenyl	55	38-162
2,4,6-tribromophenol	84	24-176	terphenyl-d14	80	53-147

U = Below quantitation limit

NA = Not Added

J2 = LCS %R below limit. No sample remaining.



Lab Number: LCSD177W  
Sample Designation: Laboratory Control Sample Duplicate  
Date Sampled: 12/14/18 0930  
Date Extracted: 12/14/18 0930  
Date Analyzed: 12/22/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)
N-nitrosodimethylamine	39	100	39	30-150	acenaphthene	55	100	56	47-145
phenol	32	100	32	5-120	2,4-dinitrophenol	51	100	51	1-191
2-chlorophenol	59	100	59	23-134	4-nitrophenol	36	100	36	1-132
bis(2-chloroethyl)ether	46	100	46	12-158	fluorene	59	100	59	59-121
1,3-dichlorobenzene	53	100	53	30-150	4-chlorophenyl-phenylether	60	100	60	25-158
1,4-dichlorobenzene	55	100	55	30-150	diethylphthalate	54	100	54	1-120
1,2-dichlorobenzene	57	100	57	30-150	4,6-dinitro-2-methylphenol	69	100	69	1-181
2-methylphenol (m-cresol)	NA	NA	NA	30-150	N-nitrosodiphenylamine	63	100	63	30-150
bis(2-chloroisopropyl)ether	68	100	68	36-166	1,2-diphenylhydrazine	NA	NA	NA	30-150
hexachloroethane	59	100	59	40-120	4-bromophenyl-phenylether	61	100	61	53-127
N-nitroso-di-n-propylamine	70	100	70	1-230	hexachlorobenzene	65	100	65	1-152
4-methylphenol (p-cresol)	NA	NA	NA	30-150	pentachlorophenol	80	100	80	14-176
nitrobenzene	57	100	57	35-180	phenanthrene	64	100	64	54-120
isophorone	55	100	55	21-196	anthracene	64	100	64	27-133
2-nitrophenol	75	100	75	29-182	di-n-butylphthalate	72	100	72	1-120
2,4-dimethylphenol	64	100	64	32-119	fluoranthene	74	100	74	26-137
bis(2-chloroethoxy)methane	66	100	66	33-184	benzidine	NA	NA	NA	30-150
2,4-dichlorophenol	81	100	81	39-135	pyrene	76	100	76	52-120
1,2,4-trichlorobenzene	46	100	46	44-142	butylbenzylphthalate	70	100	70	1-152
naphthalene	58	100	58	21-133	benzo(a)anthracene	74	100	74	33-143
hexachloro-1,3-butadiene	45	100	45	24-120	chrysene	72	100	72	17-168
4-chloro-3-methylphenol	68	100	68	22-147	3,3'-dichlorobenzidine	NA	NA	NA	1-262
hexachlorocyclopentadiene	59	100	59	30-150	bis(2-ethylhexyl)phthalate	35	100	35	8-158
2,4,6-trichlorophenol	73	100	73	37-144	di-n-octylphthalate	41	100	41	4-146
2-chloronaphthalene	51	100	51, J2	60-120	benzo(b)fluoranthene	88	100	88	24-159
acenaphthylene	62	100	62	33-145	benzo(k)fluoranthene	93	100	93	11-162
dimethylphthalate	51	100	51	1-120	benzo(a)pyrene	77	100	77	17-163
2,6-dinitrotoluene	58	100	58	50-158	indeno(1,2,3-cd)pyrene	73	100	73	1-171
2,4-dinitrotoluene	60	100	60	39-139	dibenzo(a,h)anthracene	67	100	67	1-227
					benzo(g,h,i)perylene	73	100	73	1-219

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	39	25-175	nitrobenzene-d5	58	22-178
phenol-d5	35	24-176	2-fluorobiphenyl	53	38-162
2,4,6-tribromophenol	94	24-176	terphenyl-d14	80	53-147

U = Below quantitation limit  
NA = Not Added  
J2 = LCS %R below limit. No sample remaining.

Lab Number: 31456-058MS  
Sample Designation: Matrix Spike  
Date Sampled: 12/14/18 0930  
Date Extracted: 12/14/18 0930  
Date Analyzed: 12/21/18  
Matrix: Water

SEMIVOLATILE ORGANICS  
Method Reference: EPA 625.

	Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)		Concentration (ug/L)	Added (ug/L)	Recovery (%)	Limits (%)
N-nitrosodimethylamine	48	100	48	30-150	acenaphthene	59	100	59	47-145
phenol	48	100	48	5-120	2,4-dinitrophenol	43	100	43	1-191
2-chlorophenol	61	100	61	23-134	4-nitrophenol	42	100	42	1-132
bis(2-chloroethyl)ether	49	100	49	12-158	fluorene	60	100	60	59-121
1,3-dichlorobenzene	58	100	58	30-150	4-chlorophenyl-phenylether	61	100	61	25-158
1,4-dichlorobenzene	61	100	61	30-150	diethylphthalate	55	100	55	1-120
1,2-dichlorobenzene	63	100	63	30-150	4,6-dinitro-2-methylphenol	60	100	60	1-181
2-methylphenol (m-cresol)	NA	NA	NA	30-150	N-nitrosodiphenylamine	66	100	66	30-150
bis(2-chloroisopropyl)ether	73	100	73	36-166	1,2-diphenylhydrazine	NA	NA	NA	30-150
hexachloroethane	64	100	64	40-120	4-bromophenyl-phenylether	62	100	62	53-127
N-nitroso-di-n-propylamine	73	100	73	1-230	hexachlorobenzene	63	100	63	1-152
4-methylphenol (p-cresol)	NA	NA	NA	30-150	pentachlorophenol	22	100	22	14-176
nitrobenzene	62	100	62	35-180	phenanthrene	64	100	64	54-120
isophorone	59	100	59	21-196	anthracene	65	100	65	27-133
2-nitrophenol	68	100	68	29-182	di-n-butylphthalate	81	100	81	1-120
2,4-dimethylphenol	62	100	62	32-119	fluoranthene	72	100	72	28-137
bis(2-chloroethoxy)methane	69	100	69	33-184	benzidine	NA	NA	NA	30-150
2,4-dichlorophenol	75	100	75	39-135	pyrene	70	100	70	52-120
1,2,4-trichlorobenzene	49	100	49	44-142	butylbenzylphthalate	67	100	67	1-152
naphthalene	63	100	63	21-133	benzo(a)anthracene	70	100	70	33-143
hexachloro-1,3-butadiene	49	100	49	24-120	chrysene	68	100	68	17-168
4-chloro-3-methylphenol	68	100	68	22-147	3,3'-dichlorobenzidine	NA	NA	NA	1-262
hexachlorocyclopentadiene	45	100	45	30-150	bis(2-ethylhexyl)phthalate	34	100	34	8-158
2,4,6-trichlorophenol	62	100	62	37-144	di-n-octylphthalate	37	100	37	4-146
2-chloronaphthalene	54	100	54, J5	60-120	benzo(b)fluoranthene	80	100	80	24-159
acenaphthylene	66	100	66	33-145	benzo(k)fluoranthene	82	100	82	11-162
dimethylphthalate	58	100	58	1-120	benzo(a)pyrene	72	100	72	17-163
2,6-dinitrotoluene	58	100	58	50-158	indeno(1,2,3-cd)pyrene	73	100	73	1-171
2,4-dinitrotoluene	59	100	59	39-139	dibenzo(a,h)anthracene	68	100	68	1-227
					benzo(g,h,i)perylene	75	100	75	1-219

SURROGATE STANDARDS

	Recovery (%)	Acceptance Limits (%)		Recovery (%)	Acceptance Limits (%)
2-fluorophenol	47	25-175	nitrobenzene-d5	62	22-178
phenol-d5	56	24-176	2-fluorobiphenyl	60	38-162
2,4,6-tribromophenol	66	24-176	terphenyl-d14	75	53-147

U = Below quantitation limit  
NA = Not Added  
J5 = MS %R below limit.



## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 1 of 3

STUDY NO: 31456  
 SDG No: Underwood Engineers, Inc.  
 Project: Piscataqua River  
 Delivered via: ESI  
 Date and Time Received: 12/12/18 1200 Date and Time Logged into Lab: 12/12/18 1313  
 Received By: JK Logged into Lab by: ELJ AM  
 Air bill / Way bill: No Air bill included in folder if received? NA  
 Cooler on ice/packs: Yes Custody Seals present? NA  
 Cooler Blank Temp (C) at arrival: 8.7 Custody Seals intact? NA  
 Number of COC Pages: 6  
 COC Serial Number(s): A1017011  
 COC Complete: Yes Does the info on the COC match the samples? Yes  
     Sampled Date: Yes Were samples received within holding time? Yes  
     Field ID complete: Yes Were all samples properly labeled? Yes  
     Sampled Time: No Were proper sample containers used? Yes  
     Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
 COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
 Were all samples received? Yes Were VOC vials free of headspace? Yes  
 Client notification/authorization: Required pH Test strip ID number: A-5086

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
PEASE_004	31456-001	W	BOD	500 P	4C	Yes
PEASE_004	31456-002	W	Enterococci	100 Sterile	4C	Yes
PEASE_004	31456-003	W	FC	100 Sterile	4C	Yes
PEASE_004	31456-004	W	TSS	1000 P	4C	Yes
PEASE_004	31456-005	W	NH3	125 P	H2SO4	Yes
PEASE_004DUP	31456-006	W	NH3	125 P	H2SO4	Yes
PEASE_004	31456-008	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
PEASE_004DUP	31456-009	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
PEASE_004	31456-010	W	OG	2x1000 G	H2SO4	Yes
PEASE_004	31456-011	W	TP	250 P	H2SO4	Yes
PEASE_004DUP	31456-012	W	TP	250 P	H2SO4	Yes
PEASE_004	31456-013	W	TDS	1000 P	4C	Yes
PEASE_004	31456-014	W	Turbidity	250 P	4C	Yes
PEASE_004	31456-015	W	TPhen	1000 G	H2SO4	Yes
PEASE_004	31456-016	W	VOC624	2x40 G	4C	Yes
PEASE_004	31456-017	W	HOLD VOC624	2x40 G	HCl	Yes
PEASE_004	31456-018	W	ABN625	2x1000 G	4C	Yes
NEW_004	31456-020	W	BOD	500 P	4C	Yes
NEW_004	31456-021	W	Enterococci	100 Sterile	4C	Yes
NEW_004	31456-022	W	FC	100 Sterile	4C	Yes
NEW_004	31456-023	W	TSS	1000 P	4C	Yes

Notes and qualifications:

See COC

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 2 of 3

STUDY NO: 31456  
SDG No: Underwood Engineers, Inc.  
Project: Piscataqua River  
Delivered via: ESI  
Date and Time Received: 12/12/18 1200 Date and Time Logged into Lab: 12/12/18 1313  
Received By: JK Logged into Lab by: ELJ MM  
Air bill / Way bill: No Air bill included in folder if received? NA  
Cooler on ice/packs: Yes Custody Seals present? NA  
Cooler Blank Temp (C) at arrival: 8.7 Custody Seals intact? NA  
Number of COC Pages: 6  
COC Serial Number(s): A1017011  
COC Complete: Yes Does the info on the COC match the samples? Yes  
Sampled Date: Yes Were samples received within holding time? Yes  
Field ID complete: Yes Were all samples properly labeled? Yes  
Sampled Time: No Were proper sample containers used? Yes  
Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
Were all samples received? Yes Were VOC vials free of headspace? Yes  
Client notification/authorization: Required pH Test strip ID number: A-5086

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NEW_004	31456-024	W	NH3	125 P	H2SO4	Yes
NEW_004DUP	31456-025	W	NH3	125 P	H2SO4	Yes
NEW_004	31456-027	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
NEW_004DUP	31456-028	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
NEW_004	31456-029	W	OG	2x1000 G	H2SO4	Yes
NEW_004	31456-030	W	TP	250 P	H2SO4	Yes
NEW_004DUP	31456-031	W	TP	250 P	H2SO4	Yes
NEW_004	31456-032	W	TDS	1000 P	4C	Yes
NEW_004	31456-033	W	Turbidity	250 P	4C	Yes
NEW_004	31456-034	W	TPhen	1000 G	H2SO4	Yes
NEW_004	31456-035	W	VOC624	2x40 G	4C	Yes
NEW_004	31456-036	W	HOLD VOC624	2x40 G	HCl	Yes
NEW_004	31456-037	W	ABN625	2x1000 G	4C	Yes
RIVER_004	31456-039	W	BOD	500 P	4C	Yes
RIVER_004	31456-040	W	Enterococci	100 Sterile	4C	Yes
RIVER_004	31456-041	W	FC	100 Sterile	4C	Yes
RIVER_004	31456-042	W	TSS	1000 P	4C	Yes
RIVER_004	31456-043	W	NH3	125 P	H2SO4	Yes
RIVER_003DUP	31456-044	W	NH3	125 P	H2SO4	Yes
RIVER_003	31456-045	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes
RIVER_003DUP	31456-046	W	TKN,NO3+NO2,TN	500 P	H2SO4	Yes

Notes and qualifications:

See COC

## SAMPLE RECEIPT AND CONDITION DOCUMENTATION

Page 3 of 3

STUDY NO: 31456  
 SDG No: Underwood Engineers, Inc.  
 Project: Piscataqua River  
 Delivered via: ESI  
 Date and Time Received: 12/12/18 1200 Date and Time Logged into Lab: 12/12/18 1313  
 Received By: JK Logged into Lab by: ELJ RM  
 Air bill / Way bill: No Air bill included in folder if received? NA  
 Cooler on ice/packs: Yes Custody Seals present? NA  
 Cooler Blank Temp (C) at arrival: 8.7 Custody Seals intact? NA  
 Number of COC Pages: 6  
 COC Serial Number(s): A1017011  
 COC Complete: Yes Does the info on the COC match the samples? Yes  
     Sampled Date: Yes Were samples received within holding time? Yes  
     Field ID complete: Yes Were all samples properly labeled? Yes  
     Sampled Time: No Were proper sample containers used? Yes  
     Analysis request: Yes Were samples received intact? (none broken or leaking) Yes  
 COC Signed and dated: Yes Were sample volumes sufficient for requested analysis? Yes  
 Were all samples received? Yes Were VOC vials free of headspace? Yes  
 Client notification/authorization: Required pH Test strip ID number: A-5086

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
RIVER_004	31456-047	W	OG	2x1000 G	H2SO4	Yes
RIVER_004	31456-048	W	TP	250 P	H2SO4	Yes
RIVER_003DUP	31456-049	W	TP	250 P	H2SO4	Yes
RIVER_004	31456-050	W	TDS	1000 P	4C	Yes
RIVER_004	31456-051	W	Turbidity	250 P	4C	Yes
RIVER_004	31456-052	W	TPhen	1000 G	H2SO4	Yes
RIVER_004TB	31456-053	W	TPhen	1000 G	H2SO4	Yes
RIVER_004	31456-054	W	VOC624	2x40 G	4C	Yes
RIVER_004TB	31456-055	W	VOC624	2x40 G	4C	Yes
RIVER_004	31456-056	W	HOLD VOC624	2x40 G	HCl	Yes
RIVER_004TB	31456-057	W	HOLD VOC624	2x40 G	HCl	Yes
RIVER_004	31456-058	W	ABN625	2x1000 G	4C	Yes
RIVER_004TB	31456-059	W	ABN625	2x1000 G	4C	Yes

Notes and qualifications:

See COC

## CHAIN OF CUSTODY DOCUMENTATION

Client:	Underwood Engineers, Inc.	Contact:	Steve Clifton	Project Name:	Piscataqua River
Report to:	Steve Clifton	Address:	25 Vaughan Mall	Project Number:	P0771
Invoice to:	Steve Clifton	Address:	Portsmouth, NH 03801	Task:	0001
Voice:	603-436-6192	Fax:		Project Manager:	Steve Clifton
Protocol:	NPDES	email:			

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com- posite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preser- vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested/ Special Instructions:
001 PEASE 004		12/11-12/12	24h	UE	C	1	500	P	4C	Water	N	BOD
002 PEASE 004		12/12/18	8:45A	G	C	1	100	le	4C	Water	N	Enterococci
003 PEASE 004		12/12/18	8:45A	G	C	1	100	le	4C	Water	N	FC
004 PEASE 004		12/11-12/12	24h		C	1	1000	P	4C	Water	N	TSS
005 PEASE 004			"		C	1	125	P	H2SO4	Water	N	NH3
006 PEASE 004DUP			"		C	1	125	P	H2SO4	Water	N	NH3
007 PEASE 004		12/12/18	8:47A		C	1	500	P	4C	Water	N	TRC
008 PEASE 004		12/11-12/12	24h		C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
009 PEASE 004DUP			"		C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
010 PEASE 004		12/12/18	8:48A		G	2	1000	G	H2SO4	Water	N	OG
011 PEASE 004		12/11-12/12	24h	V	C	1	250	P	H2SO4	Water	N	TP
012 PEASE 004DUP			"		C	1	250	P	H2SO4	Water	N	TP

Relinquished By:	<i>Steve Clifton</i>	Date:	12/12/18	Time:	11:00
Relinquished By:	<i>Steve Clifton</i>	Date:	12/12/18	Time:	17:00

Comments: 8700


## CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.		Contact: Steve Clifton	Project Name: Piscataqua River	
Report to: Steve Clifton		Address: 25 Vaughan Mall	Project Number: P0771	Task: 0001
Invoice to: Steve Clifton		Project Manager: Steve Clifton		
Voice: 603-436-6192		Fax:	email:	

[illegible]

Relinquished By:

Date: 12/12/15 Time: 11:00

Received By: 

Date: 12.1.18 Time: 11:00

**Relinquished**

Date: 2.11.18 Time: 12:00

Received at Lab By: Jezebel Kelly

Date: 7/17/18 Time: 1755

Comments:

8.7



## CHAIN OF CUSTODY DOCUMENTATION

Client:	Underwood Engineers, Inc.	Contact:	Steve Clifton	Project Name:	Piscataqua River
Report to:	Steve Clifton	Address:	25 Vaughan Mall	Project Number:	P0771
Invoice to:	Steve Clifton	Address:	Portsmouth, NH 03801	Task:	0001
Voice:	603-436-6192	Fax:		Project Manager:	Steve Clifton
Protocol:	NPDES			email:	

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com- posite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preser- vation	Matrix S-Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
020 NEW_004		12/11/18	24 hr	CE	C	1	500	P	4C	Water	N	BOD
021 NEW_004		12/12/18	7:11 AM		G	1	100	le	4C	Water	N	Enterococci
022 NEW_004		12/12/18	7:11 AM		G	1	100	le	4C	Water	N	FC
023 NEW_004		12/11-12/13	24 hr		C	1	1000	P	4C	Water	N	TSS
024 NEW_004		"	"		C	1	125	P	H2SO4	Water	N	NH3
025 NEW_004DUP		"	"		C	1	125	P	H2SO4	Water	N	NH3
026 NEW_004		12/12/18	8:20 AM		G	1	500	P	4C	Water	N	TRC
027 NEW_004		12/11-12/13	24 hr		C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
028 NEW_004DUP		"	"		C	1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
029 NEW_004		12/12/18	7:08 AM		G	2	1000	G	H2SO4	Water	N	OG
030 NEW_004		12/11-12/13	24 hr		C	1	250	P	H2SO4	Water	N	TP
031 NEW_004DUP		"	"		C	1	250	P	H2SO4	Water	N	TP

Relinquished By:	Tim R. B.	Date:	12/12/18	Time:	11:00
Relinquished By:	Steve Clifton	Date:	12/12/18	Time:	12:00
Comments:	None Spilled in cooler (TP)				

## CHAIN OF CUSTODY DOCUMENTATION

Client:	Underwood Engineers, Inc.	Contact: Steve Clifton	Project Name:	Piscataqua River
Report to:	Steve Clifton	Address: 25 Vaughan Mall	Project Number:	P0771
Invoice to:	Steve Clifton	Address: Portsmouth, NH 03801	Task:	0001
Voice:	603-436-6192	Fax:	Project Manager:	Steve Clifton
			email:	

[illegible]

Relinquished By: <i>[Signature]</i>	Date: 1/15/18	Time: 11:00	Received By: <i>[Signature]</i>	Date: 1-22-18	Time: 11:00
Relinquished By: <i>[Signature]</i>	Date: 2/2/18	Time: 2:00	Received at Lab By: <i>[Signature]</i>	Date: 17/12/18	Time: 17:00
Comments: <i>[Signature]</i> <sup>13 JK 12/12/18</sup>					

8.7



EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31454

# CHAIN OF CUSTODY DOCUMENTATION

Client:	Underwood Engineers, Inc.	Contact:	Steve Clifton	Project Name:	Piscataqua River		
Report to:	Steve Clifton	Address:	25 Vaughan Mall	Project Number:	P0771	Task:	0001
Invoice to:	Steve Clifton	Address:	Portsmouth, NH 03801	Project Manager:	Steve Clifton		
Voice:	603-436-6192	Fax:		email:			

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S-Solid W-Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
039	RIVER 004	12/12/18	10:23		1	500	P	4C	Water	N	BOD
040	RIVER 004		10:33		1	100	le	4C	Water	N	Enterococci
041	RIVER 004		10:38		1	100	le	4C	Water	N	FC
042	RIVER 004		10:21		1	1000	P	4C	Water	N	TSS
043	RIVER 004		10:30		1	125	P	H2SO4	Water	N	NH3
044	RIVER 004 DUP		10:30		1	125	P	H2SO4	Water	N	NH3
045	RIVER 004		10:24		1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
046	RIVER 003 DUP		10:15		1	500	P	H2SO4	Water	N	TKN, NO3+NO2, TN
047	RIVER 004		10:30		2	1000	G	H2SO4	Water	N	OG
048	RIVER 004		10:29		1	250	P	H2SO4	Water	N	TP
049	RIVER 004 DUP		10:29		1	250	P	H2SO4	Water	N	TP
050	RIVER 004		10:30		1	1000	P	4C	Water	N	TDS

Relinquished By:	<i>Steve Clifton</i>	Date:	12/12/18	Time:	11:41	Received By:	<i>Steve Clifton</i>	Date:	12/12/18	Time:	11:00
Relinquished By:	<i>Steve Clifton</i>	Date:	12/12/18	Time:	12:00	Received at Lab By:	<i>Jacqueline Kelly</i>	Date:	12/12/18	Time:	17:00
Comments:											

8.7





EnviroSystems, Inc.  
1 Lafayette Road  
Hampton, NH 03842

Voice: 603-926-3345  
FAX: 603-926-3521

ESI Job No: 31454

# CHAIN OF CUSTODY DOCUMENTATION

Client: Underwood Engineers, Inc.	Contact: Steve Clifton	Project Name: Piscataqua River
Report to: Steve Clifton	Address: 25 Vaughan Mall	Project Number: P0771 Task: 0001
Invoice to: Steve Clifton	Address: Portsmouth, NH 03801	Project Manager: Steve Clifton
Voice: 603-436-6192	Fax: 0	email:

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Grab or composite (G/C)	No	Container Size (mL)	Type (P/G/T)	Field Preservation	Matrix S-Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested Special Instructions:
051	RIVER_004	12/12/18	10:30		1	250	P	4C	Water	N	Turbidity
052	RIVER_004	12/12/18	10:30		1	1000	G	H2SO4	Water	N	TPhen
053	RIVER_004TB	12/12/18	10:30		1	1000	G	H2SO4	Water	N	TPhen
054	RIVER_004	12/12/18	10:30		2	40 G	G	4C	Water	N	VOC624
055	RIVER_004TB	12/12/18	10:30		2	40 G	G	4C	Water	N	VOC624
056	RIVER_004	12/12/18	10:30		2	40 G	G	HCl	Water	N	HOLD VOC624
057	RIVER_004TB	12/12/18	10:30		2	40 G	G	HCl	Water	N	HOLD VOC624
058	RIVER_004	12/12/18	10:30		2	1000	G	4C	Water	N	ABN625
059	RIVER_004TB	12/12/18	10:30		2	1000	G	4C	Water	N	ABN625

Relinquished By: Jim Feb	Date: 12/12/18	Time: 11:00	Received By: D. White	Date: 12/12/18	Time: 11:00
Relinquished By: D. White	Date: 12/12/18	Time: 12:00	Received at Lab By: J. Garguilo	Date: 12/12/18	Time: 12:00

Comments: 12/12/18 8.7

COC Number: A1017011

11A7

Sample Delivery Group No: Dec 2018 Page of

[illegible]

## MICROBIOLOGICAL ASSAY DATA SHEET

Client: Underwood Engineers, Inc.	Date: 12/12/10	Initials: MW
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Client: Underwood Engineers, Inc.	Date: 12/12/10	Initials: MW
-----------------------------------	----------------	--------------

ESI #: 31456	Col.Dil.H <sub>2</sub> O: M-3355	M-El: M-3353
--------------	----------------------------------	--------------

ESI #: 31456	Col.Dil.H <sub>2</sub> O: M-3355	M-El: M-3353
--------------	----------------------------------	--------------

Date collected: 12/12/19	Pipette Used: A-5025	Positive lot #: EFB113018A
--------------------------	----------------------	----------------------------

Date collected: 12/12/19	Pipette Used: A-5025	Positive lot #: EFB113018A
--------------------------	----------------------	----------------------------

[illegible]

M-EI stored in Incubator #309	Temp: 41.0	1449	12/12/19	to	1440	12/13/19
-------------------------------	------------	------	----------	----	------	----------

M-EI stored in Incubator #309	Temp: 41.0	1449	12/12/19	to	1440	12/13/19
-------------------------------	------------	------	----------	----	------	----------

Method EPA 1600	Counted:	1440	12/13/18	Counted By: MW
-----------------	----------	------	----------	----------------

Method EPA 1600	Counted:	1440	12/13/18	Counted By: MW
-----------------	----------	------	----------	----------------

31456

**Sample Chlorine Check**Cl Strips A-5224 Date & Time 12/12/18 1425 Initial MW

Sample	Result
021	0.0 mg/L
040	0.0 mg/L
002	0.0 mg/L

31456

## Sample Chlorine Check

Cl Strips A-5224 Date & Time 12/12/18 1425 Initial MW

Sample	Result
022	0.0 mg/L
041	0.0 mg/L
003	0.0 mg/L

## Microbiology Report Review Checklist

STUDY #: 31456

CLIENT: Underwood Engineers, Inc.

PROJECT: \_\_\_\_\_

DATE IN: 12/21/18

DATE DUE: \_\_\_\_\_

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	12/13/18	MW	
Sample Receipt Complete	↓	↓	
Bench Sheets Complete (dates, times, initials, etc...)			

Technical Report Review	Date	Initials	Comments
Data Acceptability Review	12/27/18	LF	
Draft Report	↓	↓	
Final Report Reviewed			
QA Audit / Review Complete			
Report Printed to PDF			
Report scanned to archive			
Report Sent to Client			
Invoice Sent			



## ANALYTICAL REPORT

Lab Number:	L1851125
Client:	Enthalpy Analytical 1 Lafayette Road PO Box 778 Hampton, NH 03843
ATTN:	Alexandra Mackinnon
Phone:	(603) 926-3345
Project Name:	31456
Project Number:	Not Specified
Report Date:	12/18/18

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



Serial\_No:12181819:15

Project Name: 31456  
Project Number: Not Specified

Lab Number: L1851125  
Report Date: 12/18/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1851125-01	31456-015	WATER	Not Specified	12/12/18 00:00	12/12/18
L1851125-02	31456-034	WATER	Not Specified	12/12/18 00:00	12/12/18
L1851125-03	31456-053	WATER	Not Specified	12/12/18 10:21	12/12/18
L1851125-04	31456-052	WATER	Not Specified	12/12/18 10:20	12/12/18



**Project Name:** 31456  
**Project Number:** Not Specified

**Lab Number:** L1851125  
**Report Date:** 12/18/18

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

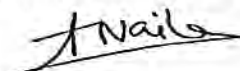
#### HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Amita Naik

Title: Technical Director/Representative

Date: 12/18/18

# **INORGANICS & MISCELLANEOUS**

**Project Name:** 31456  
**Project Number:** Not Specified

**Lab Number:** L1851125  
**Report Date:** 12/18/18

**SAMPLE RESULTS**

**Lab ID:** L1851125-01  
**Client ID:** 31456-015  
**Sample Location:** Not Specified

**Date Collected:** 12/12/18 00:00  
**Date Received:** 12/12/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	—	1	12/17/18 06:15	12/18/18 05:16	4,420.1	GD



**Project Name:** 31456  
**Project Number:** Not Specified

**Lab Number:** L1851125  
**Report Date:** 12/18/18

**SAMPLE RESULTS**

**Lab ID:** L1851125-02  
**Client ID:** 31456-034  
**Sample Location:** Not Specified

**Date Collected:** 12/12/18 00:00  
**Date Received:** 12/12/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	—	1	12/17/18 06:15	12/18/18 05:17	4,420.1	GD



**Project Name:** 31456  
**Project Number:** Not Specified

**Lab Number:** L1851125  
**Report Date:** 12/18/18

**SAMPLE RESULTS**

**Lab ID:** L1851125-03  
**Client ID:** 31456-053  
**Sample Location:** Not Specified

**Date Collected:** 12/12/18 10:21  
**Date Received:** 12/12/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	—	1	12/17/18 06:15	12/18/18 05:19	4,420.1	GD



Project Name: 31456  
Project Number: Not Specified

Lab Number: L1851125  
Report Date: 12/18/18

## SAMPLE RESULTS

Lab ID: L1851125-04  
Client ID: 31456-052  
Sample Location: Not Specified

Date Collected: 12/12/18 10:20  
Date Received: 12/12/18  
Field Prep: Not Specified

Sample Depth:  
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phenolics, Total	ND		mg/l	0.030	—	1	12/17/18 06:15	12/18/18 05:20	4,420.1	GD



Project Name: 31456  
Project Number: Not Specified

Lab Number: L1851125  
Report Date: 12/18/18

**Method Blank Analysis**  
**Batch Quality Control**

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-04 Batch: WG1190182-1									
Phenolics, Total	ND	mg/l	0.030	--	1	12/17/18 06:15	12/18/18 05:11	4,420.1	GD

# Lab Control Sample Analysis

Batch Quality Control

Lab Number: L1851125  
Report Date: 12/18/18

Project Name: 31456  
Project Number: Not Specified

Parameter	LCS		LCSD		%Recovery Limits		RPD		RPD Limits	
	%Recovery	Qual	%Recovery	Qual	%Recovery	Limits	RPD	Qual	RPD	Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 Batch: WG1190182-2										
Phenolics, Total	88		-		70-130		-			





# Matrix Spike Analysis Batch Quality Control

Project Name: 31456  
Project Number: Not Specified

Lab Number: L1851125  
Report Date: 12/18/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	MSD Recovery Limits	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1190182-4 QC Sample: L1851048-01 Client ID: MS Sample									
Phenolics, Total	ND	0.4	0.35	88	-	-	70-130	-	20

## Lab Duplicate Analysis

*Batch Quality Control*

**Project Name:** 31456  
**Project Number:** Not Specified

**Lab Number:** L1851125  
**Report Date:** 12/18/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1190182-3 QC Sample: L1851048-01 Client ID: DUP Sample						
Phenolics, Total	ND	ND	mg/l	NC		20

Serial\_No: 12181819:15  
 Lab Number: L1851125  
 Report Date: 12/18/18

Project Name: 31456  
 Project Number: Not Specified

### Sample Receipt and Container Information

Were project specific reporting limits specified? YES

**Cooler Information**  
 Cooler B Custody Seal Absent

Container Information		Initial		Final		Temp		Frozen		Analysis(*)
Container ID	Container Type	Cooler	pH	pH	deg	C	Pres	Seal	Date/Time	
L1851125-01A	Amber 950ml H2SO4 preserved	B	<2	<2	4.8		Y	Absent		TPHENOL-420(28)
L1851125-02A	Amber 950ml H2SO4 preserved	B	<2	<2	4.8		Y	Absent		TPHENOL-420(28)
L1851125-03A	Amber 950ml H2SO4 preserved	B	<2	<2	4.8		Y	Absent		TPHENOL-420(28)
L1851125-04A	Amber 950ml H2SO4 preserved	B	<2	<2	4.8		Y	Absent		TPHENOL-420(28)

**Project Name:** 31456  
**Project Number:** Not Specified

**Lab Number:** L1851125  
**Report Date:** 12/18/18

## GLOSSARY

### Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

**Report Format:** Data Usability Report



**Project Name:** 31456  
**Project Number:** Not Specified

**Lab Number:** L1851125  
**Report Date:** 12/18/18

#### Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedances are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report



**Project Name:** 31456  
**Project Number:** Not Specified

**Lab Number:** L1851125  
**Report Date:** 12/18/18

## REFERENCES

- 4 Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.  
 Facility: Company-wide  
 Department: Quality Assurance  
 Title: Certificate/Approval Program Summary

ID No.:17873  
 Revision 12  
 Published Date: 10/9/2018 4:58:19 PM  
 Page 1 of 1

## Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

### Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene  
 EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.  
 EPA 8270D: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

#### SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.  
 EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene.  
 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzoethiophene, 1-Methylnaphthalene.  
 Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

### Westborough Facility:

#### Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; EPA 353.2: Nitrate-N, Nitrite-N; SM4500NO<sub>3</sub>-F: Nitrate-N, Nitrite-N; SM4500F-C, SM4500CN-CE,  
 EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B  
 EPA 332: Perchlorate; EPA 524.2: THMs and VOCs; EPA 504.1: EDB, DBCP.  
 Microbiology: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.

#### Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH<sub>3</sub>-BH: Ammonia-N and Kjeldahl-N, EPA 350.1:  
 Ammonia-N, LACHAT 10-107-06-1-B: Ammonia-N, EPA 351.1, SM4500NO<sub>3</sub>-F, EPA 353.2: Nitrate-N, SM4500P-E, SM4500P-B, E, SM4500SO<sub>4</sub>-E,  
 SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.  
 EPA 624.1: Volatile Halocarbons & Aromatics,  
 EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,  
 Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs  
 EPA 625.1: SVOC (Acid/Base/Neutral Extractables), EPA 600/4-81-045: PCB-Oil.  
 Microbiology: SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.

### Mansfield Facility:

#### Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. EPA 200.8: Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. EPA 245.1 Hg.  
 EPA 522.

#### Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.  
 EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.  
 EPA 245.1 Hg.  
 SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.











Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

16 January 2019

Tim Puls  
Underwood Engineers  
25 Vaughan Mall  
Portsmouth, NH 03801

RE: Trace Metals In Wastewater - WWTF

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Amy Goodall". The signature is written in a cursive, flowing style.

Amy Goodall  
Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - WWTF  
Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:53

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B182588 NEW_01_TM	8L00520-01	Water	12-Dec-18 00:00	14-Dec-18 10:40
B182590 NEW_02_TM	8L00520-02	Water	12-Dec-18 00:00	14-Dec-18 10:40
B182591 NEW_EB_TM	8L00520-03	Water	11-Dec-18 07:05	14-Dec-18 10:40
B182585 NEW_01_THg	8L00520-06	Water	12-Dec-18 00:00	14-Dec-18 10:40
B182582 NEW_02_THg	8L00520-07	Water	12-Dec-18 00:00	14-Dec-18 10:40
B182583 NEW_EB_THg	8L00520-08	Water	11-Dec-18 07:05	14-Dec-18 10:40
B182593 PEASE_01_TM	8L00520-10	Water	12-Dec-18 00:00	14-Dec-18 10:40
B182570 PEASE_02_TM	8L00520-11	Water	12-Dec-18 00:00	14-Dec-18 10:40
B182571 PEASE_EB_TM	8L00520-12	Water	11-Dec-18 08:05	14-Dec-18 10:40
B182579 PEASE_01_THg	8L00520-15	Water	12-Dec-18 00:00	14-Dec-18 10:40
B182581 PEASE_02_THg	8L00520-16	Water	12-Dec-18 00:00	14-Dec-18 10:40
B182580 PEASE_EB_THg	8L00520-17	Water	11-Dec-18 08:05	14-Dec-18 10:40

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager

Page 2 of 45



Frontier Global Sciences

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - WWTF  
Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

#### SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 14-Dec-18 10:40. The samples were received intact, on-ice within two sealed coolers at

Cooler	Temp C°
Default Cooler	10.4
New Cooler 2	5.3

Samples were shipped to Eurofins Calscience in Garden Grove, CA for the EPA SM4500 Total CN analysis per the initial project setup.

The subcontract report is located after the notes and definitions section of the EFGS report.

#### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total mercury by flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631E.

Samples were prepared and analyzed for total recoverable metals by inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 200.8 (EFGS-054).

#### ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager



Frontier Global Sciences

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - WWTF  
Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:53

and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries. All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager

## Sample Receipt Checklist

Client: Underwood Engineers, Inc

Date & Time Received: 1040 12-14-18

Date Labeled: 12/13/18 Labeled By: B

Project: Anti-degradation - WWTF

Received By: SMM

Label Verified By: B

# of Coolers Received: 2 Samples Arrived By: ✓ Shipping Service \_\_\_\_\_ Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (Specify: \_\_\_\_\_)

Coolant: ☒ None/Ambient ☒ Loose Ice ☐ Gel Ice ☐ Dry Ice Coolant Required: Y/N Temp Blank Used: Y/N for Cooler(s): 10.1 #1

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y/N

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>N</u>	
Custody seals signed:	<u>N/A</u>	

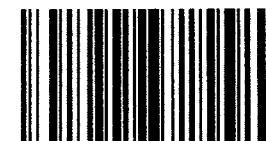
TID: <u>181139780</u> CF: <u>40.3</u> °C	Date/time: <u>12-14-18 1040</u> By: <u>SMM</u>
Cooler 1: <u>10.1</u> °C w/ CF: <u>10.4</u> °C	Cooler 4: °C w/ CF: °C
Cooler 2: <u>4.9</u> °C w/ CF: <u>5.3</u> °C	Cooler 5: °C w/ CF: °C
Cooler 3: °C w/ CF: °C	Cooler 6: °C w/ CF: °C

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Preservation type:	<u>Y</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
Internal COC required:	<u>N/A</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>Y</u>	

Anomalies/Non-conformances (attach additional pages if needed):

8L00520



**Chain of Custody Record & Laboratory Analysis Request:**  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com



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Page 1 of 2

8260520

Client: UNDERWOOD ENGINEERS, INC.						Contact: Tim Puls		Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Analyses Requested				EFGS PM:	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Phone: (603) 436-6192 Fax:									Date:	
Project Name: Anti-Degradation - WWTF						E-mail: tpuls@underwoodengineers.com							TAT (business days): <u>20</u> (std)		15 10 5 4 3 2 24 hrs.	
Report To: Tim Puls						Contract/PO:							(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)		Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Invoice To: Client							(If yes, please contact PM)		EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	
Phone: (603) 436-6192 Fax:						Phone: Fax:						QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High				
E-mail: tpuls@underwoodengineers.com						E-mail:										

No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Total Metals (TM)	Total Cn (TCn)	Total Mercury (THg)	Comments
1	B182588	NEW_01_TM	1	WW	12/11-12/12/18	UE	N		X			Total Metals include: Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Ni, Se, Ag, Tl, Zn
2	B182590	NEW_02_TM	1	WW	" "				X			
3	B182591	NEW_EB_TM	1	RW	12/11/18 7:05				X			
4	B182592	NEW_MS_TM	1	WW	12/11-12/12 24h				X			
5	008508	NEW_01_TcN	1	WW	" "			NH <sub>4</sub>		X		
6	B182585	NEW_01_THg	1	WW	" "						X	
7	B182582	NEW_02_THg	1	WW	" "						X	
8	B182583	NEW_EB_THg	1	RW	12/11/18 7:05						X	
9	B182584	NEW_MS_THg	1	WW	12/11-12/12 24h						X	
10	B182593	PEASE_01_TM	1	WW	" "				X			
11	B182570	PEASE_02_TM	1	WW	" "				X			
12	B182571	PEASE_EB_TM	1	RW	12/11/18 8:05	UE	N		X			

For Laboratory Use Only		Matrix Codes:	Relinquished By:	Received By:	Received By:
COC Seal: <u>N/A</u>	Comments: #1	FW: Fresh Water	<u>Tim Puls</u>	<u>Steve Jones</u>	<u>SMN</u>
Cooler Temp: <u>10.4</u>		WW: Waste Water	Name: <u>Tim Puls</u>	Name: <u>Steve Jones</u>	Name: <u>SCOTT MCCOBB</u>
Carrier: <u>NBS</u>		SB: Sea and Brackish Water	Organization: <u>LIE</u>	Organization: <u>UNH</u>	Organization: <u>EF&amp;S</u>
VTSR: <u>1040</u>		SS: Soil and Sediment	Date & Time: <u>12/12/18 11AM</u>	Date & Time: <u>12/12/18 11AM</u>	Date & Time: <u>12-14-18 1040</u>
# of Coolers: <u>2</u>		TS: Plant and Animal Tissue	Tracking number: <u>5452 496 833 8</u>		
		HC: Hydrocarbons			
		TR: Trap			
		OT: Other			

Sample Disposal: <input type="checkbox"/> Return (shipping fees may apply) <input checked="" type="checkbox"/> Standard Disposal – 30 Days after report <input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)	By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.  Customer Approval: <u>Tim Puls</u> Date: <u>12/12/18</u>
--	--

**Chain of Custody Record & Laboratory Analysis Request:**  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

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Page 2 of 2

8200520

Client: UNDERWOOD ENGINEERS, INC.						Contact: Tim Puls		Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Analyses Requested					EFGS PM:	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Phone: (603) 436-6192 Fax:										Date:	
Project Name: Anti-Degradation - WWTF						E-mail: tpuls@underwoodengineers.com										TAT (business days): <u>20</u> (std)	
Report To: Tim Puls						Contract/PO:										<b>15 10 5 4 3 2 24 hrs.</b>	
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801						Invoice To: Client										(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)	
Phone: (603) 436-6192 Fax:						Address:										Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
E-mail: tpuls@underwoodengineers.com						Phone: Fax:							(If yes, please contact PM)				
E-mail:													EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N				
													QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High				
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time						Total Metals (TM)	Total Cn (TCn)	Total Mercury (THg)	Comments			
1	B182589	PEASE_MS_TM	1	WW	12/11-12/12/18	UE	N	-			X			Total Metals include: Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Ni, Se, Ag, Tl, Zn			
2	008527	PEASE_01_TcN	1	WW	" "							X					
3	B182579	PEASE_01_THg	1	WW	" "								X				
4	B182581	PEASE_02_THg	1	WW	" "								X				
5	B182580	PEASE_EB_THg	1	RW	12/11/18 8:05								X				
6	B182578	PEASE_MS_THg	1	WW	12/11-12/12/18	UE	N	-					X				
7																	
8																	
9																	
10																	
11																	
12																	

For Laboratory Use Only		Matrix Codes:		Relinquished By:		Received By:	
COC Seal: <u>NA</u>	Comments: <u>#1</u>	<b>FW:</b> Fresh Water	<b>WW:</b> Waste Water <b>SB:</b> Sea and Brackish Water <b>SS:</b> Soil and Sediment <b>TS:</b> Plant and Animal Tissue <b>HC:</b> Hydrocarbons <b>TR:</b> Trap <b>OT:</b> Other	<u>Tim Puls</u>	<u>Steve Jones</u>	<u>SMM</u>	
Cooler Temp: <u>10.4</u>				Name: <u>Tim Puls</u>	Name: <u>Steve Jones</u>	Name: <u>Sean McCord</u>	
Carrier: <u>WBS</u>				Organization: <u>UE</u>	Organization: <u>VNH</u>	Organization: <u>EFGS</u>	
VTSR: <u>1040</u>				Date & Time: <u>12/12/18 11AM</u>	Date & Time: <u>12/12/18 11AM</u>	Date & Time: <u>1040 12-14-18</u>	
# of Coolers: <u>2</u>				Tracking number: <u>5457 496 833 8</u>			

Sample Disposal:

☐ Return (shipping fees may apply)

☒ Standard Disposal – 30 Days after report

☐ Retain for \_\_\_\_\_ weeks after report (storage fees may apply)

By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.

Customer Approval: Tim Puls Date: 12/12/18



**SUBCONTRACT ORDER**  
**Eurofins Frontier Global Sciences, Inc.**

**8L00520**

**SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

Analysis	Comments
----------	----------

Sample ID: 008508 NEW\_01\_TCn

EFGS Lab ID: 8L00520-05      Matrix: Water

Sampled: 12-Dec-18 00:00 (GMT-05:00) Eastern Time (US &

Due: 16-Jan-19 19:00

**Misc. Subcontract 1**

EPA SM4500 CN E

*Containers Supplied:*

04\_1000 ml HDPE Bottle

Sample ID: 008527 PEASE\_01\_TCn

EFGS Lab ID: 8L00520-14      Matrix: Water

Sampled: 12-Dec-18 00:00 (GMT-05:00) Eastern Time (US &

Due: 16-Jan-19 19:00


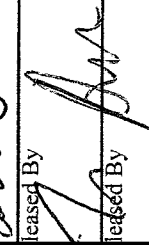
**Misc. Subcontract 1**

EPA SM4500 CN E

*Containers Supplied:*

04\_1000 ml HDPE Bottle

17 8600 0500151601727

 12/18/18  
 12/18/18

Revised By	Received By	Date
Revised By	Received By	Date



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Project: Trace Metals In Wastewater - WWTF  
Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

**B182588 NEW\_01\_TM**

**8L00520-01**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	0.125	0.045	0.101	µg/L	5	F812432	27-Dec-18	9A04007	03-Jan-19	EPA 200.8	R-05
Arsenic	0.70	0.10	0.30	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Beryllium	0.004	0.004	0.061	µg/L	1	F812432	27-Dec-18	9A02014	31-Dec-18	EPA 200.8	J
Cadmium	0.053	0.008	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Chromium	0.26	0.02	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Copper	5.94	0.02	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Iron	159	1	10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Lead	0.820	0.005	0.040	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Nickel	2.72	0.04	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Selenium	1.20	0.44	0.61	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Silver	2.75	0.002	0.020	µg/L	1	F812432	27-Dec-18	9A02014	31-Dec-18	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Zinc	80.5	0.16	0.50	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	

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Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

**B182590 NEW\_02\_TM**  
**8L00520-02**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	0.135	0.045	0.101	µg/L	5	F812432	27-Dec-18	9A04007	03-Jan-19	EPA 200.8	R-05
Arsenic	0.69	0.10	0.30	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Beryllium	0.004	0.004	0.061	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	J
Cadmium	0.053	0.008	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Chromium	0.32	0.02	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Copper	6.08	0.02	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Iron	159	1	10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Lead	0.828	0.005	0.040	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Nickel	2.76	0.04	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Selenium	1.06	0.44	0.61	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	
Silver	2.79	0.002	0.020	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Zinc	83.2	0.16	0.50	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	

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Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

**B182591 NEW\_EB\_TM**  
**8L00520-03**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	ND	0.009	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	QB-02, U
Arsenic	ND	0.10	0.30	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Beryllium	ND	0.004	0.061	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	QM-12, U
Cadmium	ND	0.008	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Chromium	ND	0.02	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
<b>Copper</b>	<b>0.04</b>	0.02	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	J
Iron	ND	1	10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Lead	ND	0.005	0.040	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Nickel	ND	0.04	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Selenium	ND	0.44	0.61	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Silver	ND	0.002	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Thallium	ND	0.006	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
<b>Zinc</b>	<b>5.38</b>	0.16	0.50	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	

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Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:53

**B182585 NEW\_01\_THg**  
**8L00520-06**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	6.82	0.08	0.50	ng/L	1	F812497	17-Dec-18	8L31004	30-Dec-18	EPA 1631E	

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Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:53

**B182582 NEW\_02\_THg**  
**8L00520-07**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	6.21	0.08	0.50	ng/L	1	F812497	17-Dec-18	8L31004	30-Dec-18	EPA 1631E	

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Project Manager: Tim Puls

**Reported:**  
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**B182583 NEW\_EB\_THg**  
**8L00520-08**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	ND	0.08	0.50	ng/L	1	F812497	17-Dec-18	8L31004	30-Dec-18	EPA 1631E	U

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Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

**B182593 PEASE\_01\_TM**  
**8L00520-10**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	0.158	0.045	0.101	µg/L	5	F812432	27-Dec-18	9A04007	04-Jan-19	EPA 200.8	R-05
Arsenic	3.15	0.10	0.30	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Beryllium	ND	0.020	0.303	µg/L	5	F812432	27-Dec-18	9A04007	04-Jan-19	EPA 200.8	U, R-05
Cadmium	0.052	0.008	0.020	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Chromium	0.49	0.02	0.10	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Copper	9.76	0.02	0.10	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Iron	215	1	10	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Lead	0.211	0.005	0.040	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Nickel	3.58	0.04	0.10	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Selenium	1.44	0.44	0.61	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Silver	0.019	0.002	0.020	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	J
Thallium	ND	0.006	0.020	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	U
Zinc	71.4	0.16	0.50	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	

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Project: Trace Metals In Wastewater - WWTF  
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Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

**B182570 PEASE\_02\_TM**  
**8L00520-11**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	0.161	0.045	0.101	µg/L	5	F812432	27-Dec-18	9A04007	04-Jan-19	EPA 200.8	R-05
Arsenic	3.15	0.10	0.30	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Beryllium	ND	0.020	0.303	µg/L	5	F812432	27-Dec-18	9A04007	04-Jan-19	EPA 200.8	U, R-05
Cadmium	0.058	0.008	0.020	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Chromium	0.48	0.02	0.10	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Copper	9.88	0.02	0.10	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Iron	223	1	10	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Lead	0.224	0.005	0.040	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Nickel	3.68	0.04	0.10	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Selenium	1.36	0.44	0.61	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Silver	0.021	0.002	0.020	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	
Thallium	ND	0.006	0.020	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	U
Zinc	72.1	0.16	0.50	µg/L	1	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	

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Reported:  
16-Jan-19 16:53

**B182571 PEASE\_EB\_TM**  
**8L00520-12**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion</b>											
Antimony	ND	0.009	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U, QB-02
Arsenic	ND	0.10	0.30	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Beryllium	ND	0.004	0.061	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U, QM-12
Cadmium	ND	0.008	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Chromium	ND	0.02	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
<b>Copper</b>	<b>0.02</b>	0.02	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	J
Iron	ND	1	10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Lead	ND	0.005	0.040	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Nickel	ND	0.04	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Selenium	ND	0.44	0.61	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Silver	ND	0.002	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Thallium	ND	0.006	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
<b>Zinc</b>	<b>22.3</b>	0.16	0.50	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	

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Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:53

**B182579 PEASE\_01\_THg**  
**8L00520-15**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	6.49	0.08	0.50	ng/L	1	F812497	17-Dec-18	8L31004	30-Dec-18	EPA 1631E	

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Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:53

**B182581 PEASE\_02\_THg**  
**8L00520-16**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Mercury</b>	<b>9.61</b>	0.08	0.50	ng/L	1	F812496	17-Dec-18	8L31003	30-Dec-18	EPA 1631E	

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Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:53

**B182580 PEASE\_EB\_THg**  
**8L00520-17**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
Mercury	ND	0.08	0.50	ng/L	1	F812496	17-Dec-18	8L31003	30-Dec-18	EPA 1631E	U

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Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F812432-BLK1)

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Arsenic	ND	0.10	0.30	µg/L							U
Silver	ND	0.002	0.020	µg/L							U

##### Blank (F812432-BLK2)

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Arsenic	ND	0.10	0.30	µg/L							U
Silver	ND	0.002	0.020	µg/L							U

##### LCS (F812432-BS1)

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Arsenic	50.24	0.50	1.50	µg/L	50.000		100	85-115			
Silver	25.21	0.010	0.100	µg/L	25.000		101	85-115			

##### LCS Dup (F812432-BSD1)

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Arsenic	45.54	0.50	1.50	µg/L	50.000		91.1	85-115	9.81	20	
Silver	25.54	0.010	0.100	µg/L	25.000		102	85-115	1.31	20	

##### Matrix Spike (F812432-MS2)

Source: 8L00520-01

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Arsenic	43.77	1.01	3.04	µg/L	50.000	ND	87.5	70-130			
Silver	26.78	0.020	0.202	µg/L	25.000	3.003	95.1	70-130			

##### Matrix Spike (F812432-MS3)

Source: 8L00520-10

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Arsenic	46.64	1.01	3.04	µg/L	50.000	3.34	86.6	70-130			
Silver	23.95	0.020	0.202	µg/L	25.000	0.022	95.7	70-130			

##### Matrix Spike (F812432-MS5)

Source: 8L00520-01

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Arsenic	372.6	1.01	3.03	µg/L	410.00	ND	90.9	70-130			AS
Silver	23.33	0.020	0.202	µg/L	20.500	3.003	99.2	70-130			AS

##### Matrix Spike (F812432-MS6)

Source: 8L00520-10

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Arsenic	378.5	1.01	3.03	µg/L	410.00	3.34	91.5	70-130			AS
Silver	20.16	0.020	0.202	µg/L	20.500	0.022	98.2	70-130			AS

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Project: Trace Metals In Wastewater - WWTF  
Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F812432-MS7)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Arsenic	58.54	2.53	7.59	µg/L	50.000	2.59	112	70-130			
Silver	22.13	0.051	0.506	µg/L	25.000	ND	88.5	70-130			
<b>Matrix Spike (F812432-MSA)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Arsenic	1161	2.52	7.57	µg/L	1025.0	2.59	113	70-130			AS
Silver	46.49	0.050	0.505	µg/L	51.250	ND	90.7	70-130			AS
<b>Matrix Spike Dup (F812432-MSD2)</b>		<b>Source: 8L00520-01</b>			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Arsenic	44.40	1.01	3.04	µg/L	50.000	ND	88.8	70-130	1.44	20	
Silver	26.99	0.020	0.202	µg/L	25.000	3.003	95.9	70-130	0.763	20	
<b>Matrix Spike Dup (F812432-MSD3)</b>		<b>Source: 8L00520-10</b>			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Arsenic	47.71	1.01	3.04	µg/L	50.000	3.34	88.7	70-130	2.26	20	
Silver	24.52	0.020	0.202	µg/L	25.000	0.022	98.0	70-130	2.36	20	
<b>Matrix Spike Dup (F812432-MSD5)</b>		<b>Source: 8L00520-01</b>			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Arsenic	366.8	1.01	3.03	µg/L	410.00	ND	89.5	70-130	1.58	20	AS
Silver	23.24	0.020	0.202	µg/L	20.500	3.003	98.7	70-130	0.394	20	AS
<b>Matrix Spike Dup (F812432-MSD6)</b>		<b>Source: 8L00520-10</b>			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Arsenic	372.8	1.01	3.03	µg/L	410.00	3.34	90.1	70-130	1.52	20	AS
Silver	20.25	0.020	0.202	µg/L	20.500	0.022	98.7	70-130	0.462	20	AS
<b>Matrix Spike Dup (F812432-MSD7)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Arsenic	58.24	2.53	7.59	µg/L	50.000	2.59	111	70-130	0.508	20	
Silver	21.85	0.051	0.506	µg/L	25.000	ND	87.4	70-130	1.30	20	
<b>Matrix Spike Dup (F812432-MSDA)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Arsenic	1156	2.52	7.57	µg/L	1025.0	2.59	113	70-130	0.404	20	AS
Silver	46.67	0.050	0.505	µg/L	51.250	ND	91.1	70-130	0.382	20	AS

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Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F812496 - EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Blank (F812496-BLK1)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812496-BLK2)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812496-BLK3)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>LCS (F812496-BS1)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	15.39	0.08	0.50	ng/L	14.688		105	80-120			
<b>LCS Dup (F812496-BSD1)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	15.23	0.08	0.50	ng/L	14.688		104	80-120	1.03	24	
<b>Duplicate (F812496-DUP1)</b>					<b>Source: 8K00927-41</b>		Prepared & Analyzed: 30-Dec-18				
Mercury	0.93	0.09	0.52	ng/L		1.14			20.5	24	AD
<b>Duplicate (F812496-DUP2)</b>					<b>Source: 8K00927-41</b>		Prepared & Analyzed: 30-Dec-18				
Mercury	0.92	0.09	0.52	ng/L		1.14			21.1	24	AD
<b>Matrix Spike (F812496-MS1)</b>					<b>Source: 8K00981-01RE1</b>		Prepared & Analyzed: 30-Dec-18				
Mercury	26.04	0.08	0.50	ng/L	20.200	6.10	98.7	71-125			AS
<b>Matrix Spike (F812496-MS2)</b>					<b>Source: 8K00982-01RE1</b>		Prepared & Analyzed: 30-Dec-18				
Mercury	13.68	0.08	0.50	ng/L	10.100	3.82	97.7	71-125			AS
<b>Matrix Spike (F812496-MS3)</b>					<b>Source: 8L00520-16RE1</b>		Prepared & Analyzed: 30-Dec-18				
Mercury	28.63	0.08	0.50	ng/L	20.200	9.61	94.2	71-125			AS

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812496 - EFGS SOP2796 EPA 1631 Oxidation

<b>Matrix Spike Dup (F812496-MSD1)</b>		<b>Source: 8K00981-01RE1</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	25.81	0.08	0.50	ng/L	20.200	6.10	97.6	71-125	0.890	24	AS
<b>Matrix Spike Dup (F812496-MSD2)</b>		<b>Source: 8K00982-01RE1</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	13.89	0.08	0.50	ng/L	10.100	3.82	99.7	71-125	1.49	24	AS
<b>Matrix Spike Dup (F812496-MSD3)</b>		<b>Source: 8L00520-16RE1</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	28.06	0.08	0.50	ng/L	20.200	9.61	91.3	71-125	2.01	24	AS

#### Batch F812497 - EFGS SOP2796 EPA 1631 Oxidation

<b>Blank (F812497-BLK1)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812497-BLK2)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812497-BLK3)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812497-BLK4)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	ND	0.09	0.52	ng/L							U, QB-06
<b>LCS (F812497-BS1)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	14.67	0.08	0.50	ng/L	14.688		99.9	80-120			
<b>LCS Dup (F812497-BSD1)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	14.57	0.08	0.50	ng/L	14.688		99.2	80-120	0.665	24	

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812497 - EFGS SOP2796 EPA 1631 Oxidation

<b>Duplicate (F812497-DUP1)</b>		<b>Source: 8L00059-14</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	8.11	0.08	0.50	ng/L		8.20			1.07	24	AD
<b>Matrix Spike (F812497-MS1)</b>		<b>Source: 8L00519-09</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	2.82	0.08	0.50	ng/L	2.5250	0.59	88.5	71-125			AS
<b>Matrix Spike (F812497-MS2)</b>		<b>Source: 8L00520-06</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	23.71	0.08	0.50	ng/L	20.200	6.82	83.6	71-125			AS
<b>Matrix Spike (F812497-MS3)</b>		<b>Source: 8L00520-15</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	22.91	0.08	0.50	ng/L	20.200	6.49	81.3	71-125			AS
<b>Matrix Spike Dup (F812497-MSD1)</b>		<b>Source: 8L00519-09</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	2.86	0.08	0.50	ng/L	2.5250	0.59	90.1	71-125	1.39	24	AS
<b>Matrix Spike Dup (F812497-MSD2)</b>		<b>Source: 8L00520-06</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	23.29	0.08	0.50	ng/L	20.200	6.82	81.5	71-125	1.78	24	AS
<b>Matrix Spike Dup (F812497-MSD3)</b>		<b>Source: 8L00520-15</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	22.96	0.08	0.50	ng/L	20.200	6.49	81.5	71-125	0.217	24	AS

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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F812432-BLK1)

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Beryllium	ND	0.004	0.060	µg/L							QM-12, U
Chromium	ND	0.02	0.10	µg/L							U
Iron	ND	1	10	µg/L							U
Nickel	ND	0.04	0.10	µg/L							U
Copper	ND	0.02	0.10	µg/L							U
Zinc	0.18	0.16	0.50	µg/L							J
Selenium	ND	0.44	0.60	µg/L							U
Cadmium	ND	0.008	0.020	µg/L							U
Antimony	0.030	0.009	0.020	µg/L							QB-10
Thallium	ND	0.006	0.020	µg/L							U
Lead	ND	0.005	0.040	µg/L							U

##### Blank (F812432-BLK2)

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Beryllium	ND	0.004	0.060	µg/L							QM-12, U
Chromium	ND	0.02	0.10	µg/L							U
Iron	ND	1	10	µg/L							U
Nickel	ND	0.04	0.10	µg/L							U
Copper	ND	0.02	0.10	µg/L							U
Zinc	ND	0.16	0.50	µg/L							U
Selenium	ND	0.44	0.60	µg/L							U
Cadmium	ND	0.008	0.020	µg/L							U
Antimony	ND	0.009	0.020	µg/L							QB-02, U
Thallium	ND	0.006	0.020	µg/L							U
Lead	ND	0.005	0.040	µg/L							U

##### Blank (F812432-BLK3)

Prepared: 27-Dec-18 Analyzed: 31-Dec-18

Nickel	ND	0.04	0.10	µg/L							U
Antimony	0.011	0.009	0.020	µg/L							J

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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

LCS (F812432-BS1)				Prepared: 27-Dec-18 Analyzed: 29-Dec-18							
Beryllium	51.58	0.020	0.301	µg/L	40.010		129	85-115			QM-12
Chromium	47.07	0.10	0.50	µg/L	49.990		94.2	85-115			
Iron	1179	6	50	µg/L	1250.0		94.3	85-115			
Nickel	47.94	0.20	0.50	µg/L	50.010		95.9	85-115			
Copper	49.13	0.10	0.50	µg/L	50.000		98.3	85-115			
Zinc	51.17	0.80	2.50	µg/L	50.010		102	85-115			
Selenium	55.13	2.20	3.01	µg/L	49.990		110	85-115			
Cadmium	39.43	0.040	0.100	µg/L	40.010		98.6	85-115			
Thallium	37.47	0.030	0.100	µg/L	39.990		93.7	85-115			
Lead	48.09	0.025	0.200	µg/L	50.010		96.2	85-115			

LCS (F812432-BS3)				Prepared: 27-Dec-18 Analyzed: 31-Dec-18							
Nickel	47.48	0.20	0.50	µg/L	50.010		94.9	85-115			
Antimony	35.53	0.045	0.100	µg/L	40.030		88.8	85-115			

LCS Dup (F812432-BSD1)				Prepared: 27-Dec-18 Analyzed: 29-Dec-18							
Beryllium	39.74	0.020	0.301	µg/L	40.010		99.3	85-115	25.9	20	QR-06
Chromium	54.93	0.10	0.50	µg/L	49.990		110	85-115	15.4	20	
Iron	1313	6	50	µg/L	1250.0		105	85-115	10.8	20	
Nickel	53.00	0.20	0.50	µg/L	50.010		106	85-115	10.0	20	
Copper	53.50	0.10	0.50	µg/L	50.000		107	85-115	8.53	20	
Zinc	47.20	0.80	2.50	µg/L	50.010		94.4	85-115	8.07	20	
Selenium	45.05	2.20	3.01	µg/L	49.990		90.1	85-115	20.1	20	QR-06
Cadmium	36.72	0.040	0.100	µg/L	40.010		91.8	85-115	7.12	20	
Thallium	40.64	0.030	0.100	µg/L	39.990		102	85-115	8.11	20	
Lead	53.35	0.025	0.200	µg/L	50.010		107	85-115	10.4	20	

LCS Dup (F812432-BSD3)				Prepared: 27-Dec-18 Analyzed: 31-Dec-18							
Nickel	50.45	0.20	0.50	µg/L	50.010		101	85-115	6.07	20	
Antimony	36.98	0.045	0.100	µg/L	40.030		92.4	85-115	4.00	20	

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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

Matrix Spike (F812432-MS2)		Source: 8L00520-01			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Beryllium	38.36	0.040	0.607	µg/L	40.010	ND	95.9	70-130			
Chromium	52.38	0.20	1.01	µg/L	49.990	0.26	104	70-130			
Iron	1371	11	101	µg/L	1250.0	159	97.0	70-130			
Nickel	52.36	0.40	1.01	µg/L	50.010	2.72	99.3	70-130			
Copper	55.29	0.20	1.01	µg/L	50.000	5.94	98.7	70-130			
Zinc	103.8	1.62	5.06	µg/L	50.010	80.52	46.5	70-130			QM-07
Selenium	45.66	4.45	6.07	µg/L	49.990	ND	91.3	70-130			
Cadmium	33.02	0.081	0.202	µg/L	40.010	ND	82.5	70-130			
Thallium	40.52	0.061	0.202	µg/L	39.990	ND	101	70-130			
Lead	51.94	0.051	0.405	µg/L	50.010	0.820	102	70-130			

Matrix Spike (F812432-MS3)		Source: 8L00520-10			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Beryllium	40.70	0.040	0.607	µg/L	40.010	ND	102	70-130			
Chromium	53.05	0.20	1.01	µg/L	49.990	0.49	105	70-130			
Iron	1447	11	101	µg/L	1250.0	227	97.6	70-130			
Nickel	53.63	0.40	1.01	µg/L	50.010	4.09	99.1	70-130			
Copper	60.50	0.20	1.01	µg/L	50.000	10.49	100	70-130			
Zinc	104.9	1.62	5.06	µg/L	50.010	75.75	58.4	70-130			QM-07
Selenium	44.23	4.45	6.07	µg/L	49.990	ND	88.5	70-130			
Cadmium	34.14	0.081	0.202	µg/L	40.010	ND	85.3	70-130			
Thallium	41.77	0.061	0.202	µg/L	39.990	ND	104	70-130			
Lead	53.25	0.051	0.405	µg/L	50.010	0.245	106	70-130			

Matrix Spike (F812432-MS5)		Source: 8L00520-01			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Beryllium	21.22	0.040	0.606	µg/L	20.500	ND	104	70-130			AS
Chromium	438.8	0.20	1.01	µg/L	410.00	0.26	107	70-130			AS
Iron	2334	11	101	µg/L	2050.0	159	106	70-130			AS
Nickel	519.4	0.40	1.01	µg/L	512.50	2.72	101	70-130			AS
Copper	520.4	0.20	1.01	µg/L	512.50	5.94	100	70-130			AS
Zinc	981.8	1.62	5.05	µg/L	1025.0	80.52	87.9	70-130			AS
Selenium	371.1	4.44	6.06	µg/L	410.00	ND	90.5	70-130			AS
Cadmium	35.97	0.081	0.202	µg/L	41.000	ND	87.7	70-130			AS
Thallium	21.54	0.061	0.202	µg/L	20.500	ND	105	70-130			AS
Lead	109.5	0.050	0.404	µg/L	102.50	0.820	106	70-130			AS

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Amy Goodall, Project Manager



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Project: Trace Metals In Wastewater - WWTF  
Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F812432-MS6)</b>		<b>Source: 8L00520-10</b>			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Beryllium	21.51	0.040	0.606	µg/L	20.500	ND	105	70-130			AS
Chromium	437.3	0.20	1.01	µg/L	410.00	0.49	107	70-130			AS
Iron	2350	11	101	µg/L	2050.0	227	104	70-130			AS
Nickel	516.1	0.40	1.01	µg/L	512.50	4.09	99.9	70-130			AS
Copper	521.9	0.20	1.01	µg/L	512.50	10.49	99.8	70-130			AS
Zinc	1004	1.62	5.05	µg/L	1025.0	75.75	90.6	70-130			AS
Selenium	372.9	4.44	6.06	µg/L	410.00	ND	91.0	70-130			AS
Cadmium	35.90	0.081	0.202	µg/L	41.000	ND	87.6	70-130			AS
Thallium	21.94	0.061	0.202	µg/L	20.500	ND	107	70-130			AS
Lead	109.7	0.050	0.404	µg/L	102.50	0.245	107	70-130			AS

<b>Matrix Spike (F812432-MS7)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Beryllium	40.00	0.101	1.52	µg/L	40.010	ND	100	70-130			
Chromium	53.35	0.51	2.53	µg/L	49.990	0.97	105	70-130			
Iron	1372	28	253	µg/L	1250.0	105	101	70-130			
Nickel	47.91	1.01	2.53	µg/L	50.010	1.83	92.1	70-130			
Copper	45.81	0.51	2.53	µg/L	50.000	0.52	90.6	70-130			
Zinc	56.40	4.05	12.6	µg/L	50.010	10.46	91.8	70-130			
Selenium	74.51	11.1	15.2	µg/L	49.990	11.45	126	70-130			
Cadmium	40.61	0.202	0.506	µg/L	40.010	ND	101	70-130			
Thallium	37.31	0.152	0.506	µg/L	39.990	ND	93.3	70-130			
Lead	46.92	0.126	1.01	µg/L	50.010	0.188	93.4	70-130			

<b>Matrix Spike (F812432-MS8)</b>		<b>Source: 8L00520-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Antimony	41.19	0.228	0.506	µg/L	40.030	ND	103	70-130			

<b>Matrix Spike (F812432-MS9)</b>		<b>Source: 8L00520-10</b>			Prepared: 27-Dec-18 Analyzed: 01-Jan-19						
Antimony	43.01	0.228	0.506	µg/L	40.030	ND	107	70-130			

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Reported:  
16-Jan-19 16:53

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F812432-MSA)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Beryllium	54.11	0.101	1.51	µg/L	51.250	ND	106	70-130			AS
Chromium	1088	0.50	2.52	µg/L	1025.0	0.97	106	70-130			AS
Iron	5313	28	252	µg/L	5125.0	105	102	70-130			AS
Nickel	1230	1.01	2.52	µg/L	1281.2	1.83	95.8	70-130			AS
Copper	1179	0.50	2.52	µg/L	1281.2	0.52	92.0	70-130			AS
Zinc	2735	4.04	12.6	µg/L	2562.5	10.46	106	70-130			AS
Selenium	1301	11.1	15.1	µg/L	1025.0	11.45	126	70-130			AS
Cadmium	106.8	0.202	0.505	µg/L	102.50	ND	104	70-130			AS
Antimony	56.12	0.227	0.505	µg/L	51.250	ND	109	70-130			AS
Thallium	47.29	0.151	0.505	µg/L	51.250	ND	92.3	70-130			AS
Lead	241.4	0.126	1.01	µg/L	256.25	0.188	94.1	70-130			AS
<b>Matrix Spike (F812432-MSB)</b>		<b>Source: 8L00520-01</b>			Prepared: 27-Dec-18 Analyzed: 01-Jan-19						
Antimony	53.48	0.227	0.505	µg/L	51.250	ND	104	70-130			AS
<b>Matrix Spike (F812432-MSD)</b>		<b>Source: 8L00520-10</b>			Prepared: 27-Dec-18 Analyzed: 01-Jan-19						
Antimony	52.54	0.227	0.505	µg/L	51.250	ND	103	70-130			AS
<b>Matrix Spike (F812432-MSD)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 03-Jan-19						
Antimony	40.68	0.455	1.01	µg/L	40.030	ND	102	70-130			
<b>Matrix Spike Dup (F812432-MSD2)</b>		<b>Source: 8L00520-01</b>			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Beryllium	40.14	0.040	0.607	µg/L	40.010	ND	100	70-130	4.54	20	
Chromium	53.11	0.20	1.01	µg/L	49.990	0.26	106	70-130	1.37	20	
Iron	1410	11	101	µg/L	1250.0	159	100	70-130	2.79	20	
Nickel	53.66	0.40	1.01	µg/L	50.010	2.72	102	70-130	2.45	20	
Copper	56.34	0.20	1.01	µg/L	50.000	5.94	101	70-130	1.89	20	
Zinc	105.8	1.62	5.06	µg/L	50.010	80.52	50.6	70-130	1.98	20	QM-07
Selenium	47.13	4.45	6.07	µg/L	49.990	ND	94.3	70-130	3.18	20	
Cadmium	33.80	0.081	0.202	µg/L	40.010	ND	84.5	70-130	2.32	20	
Thallium	41.46	0.061	0.202	µg/L	39.990	ND	104	70-130	2.29	20	
Lead	53.58	0.051	0.405	µg/L	50.010	0.820	105	70-130	3.11	20	

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Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

Matrix Spike Dup (F812432-MSD3)		Source: 8L00520-10			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Beryllium	41.71	0.040	0.607	µg/L	40.010	ND	104	70-130	2.46	20	
Chromium	53.68	0.20	1.01	µg/L	49.990	0.49	106	70-130	1.17	20	
Iron	1481	11	101	µg/L	1250.0	227	100	70-130	2.36	20	
Nickel	55.42	0.40	1.01	µg/L	50.010	4.09	103	70-130	3.29	20	
Copper	61.43	0.20	1.01	µg/L	50.000	10.49	102	70-130	1.51	20	
Zinc	104.9	1.62	5.06	µg/L	50.010	75.75	58.3	70-130	0.0267	20	QM-07
Selenium	45.61	4.45	6.07	µg/L	49.990	ND	91.2	70-130	3.07	20	
Cadmium	35.46	0.081	0.202	µg/L	40.010	ND	88.6	70-130	3.77	20	
Thallium	41.57	0.061	0.202	µg/L	39.990	ND	104	70-130	0.496	20	
Lead	53.26	0.051	0.405	µg/L	50.010	0.245	106	70-130	0.0228	20	

Matrix Spike Dup (F812432-MSD5)		Source: 8L00520-01			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Beryllium	20.99	0.040	0.606	µg/L	20.500	ND	102	70-130	1.10	20	AS
Chromium	434.2	0.20	1.01	µg/L	410.00	0.26	106	70-130	1.06	20	AS
Iron	2275	11	101	µg/L	2050.0	159	103	70-130	2.53	20	AS
Nickel	515.8	0.40	1.01	µg/L	512.50	2.72	100	70-130	0.694	20	AS
Copper	516.5	0.20	1.01	µg/L	512.50	5.94	99.6	70-130	0.751	20	AS
Zinc	975.8	1.62	5.05	µg/L	1025.0	80.52	87.3	70-130	0.614	20	AS
Selenium	362.9	4.44	6.06	µg/L	410.00	ND	88.5	70-130	2.24	20	AS
Cadmium	35.47	0.081	0.202	µg/L	41.000	ND	86.5	70-130	1.40	20	AS
Thallium	21.38	0.061	0.202	µg/L	20.500	ND	104	70-130	0.730	20	AS
Lead	109.1	0.050	0.404	µg/L	102.50	0.820	106	70-130	0.313	20	AS

Matrix Spike Dup (F812432-MSD6)		Source: 8L00520-10			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Beryllium	21.70	0.040	0.606	µg/L	20.500	ND	106	70-130	0.902	20	AS
Chromium	435.2	0.20	1.01	µg/L	410.00	0.49	106	70-130	0.490	20	AS
Iron	2340	11	101	µg/L	2050.0	227	103	70-130	0.411	20	AS
Nickel	514.6	0.40	1.01	µg/L	512.50	4.09	99.6	70-130	0.286	20	AS
Copper	516.7	0.20	1.01	µg/L	512.50	10.49	98.8	70-130	1.00	20	AS
Zinc	998.3	1.62	5.05	µg/L	1025.0	75.75	90.0	70-130	0.589	20	AS
Selenium	372.1	4.44	6.06	µg/L	410.00	ND	90.7	70-130	0.227	20	AS
Cadmium	35.75	0.081	0.202	µg/L	41.000	ND	87.2	70-130	0.434	20	AS
Thallium	21.74	0.061	0.202	µg/L	20.500	ND	106	70-130	0.910	20	AS
Lead	108.8	0.050	0.404	µg/L	102.50	0.245	106	70-130	0.832	20	AS

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Project Number: Anti-Degradation - WWTF  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:53

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F812432-MSD7)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Beryllium	40.34	0.101	1.52	µg/L	40.010	ND	101	70-130	0.846	20	
Chromium	52.05	0.51	2.53	µg/L	49.990	0.97	102	70-130	2.47	20	
Iron	1353	28	253	µg/L	1250.0	105	99.8	70-130	1.44	20	
Nickel	47.45	1.01	2.53	µg/L	50.010	1.83	91.2	70-130	0.976	20	
Copper	45.16	0.51	2.53	µg/L	50.000	0.52	89.3	70-130	1.41	20	
Zinc	54.29	4.05	12.6	µg/L	50.010	10.46	87.6	70-130	3.81	20	
Selenium	74.55	11.1	15.2	µg/L	49.990	11.45	126	70-130	0.0468	20	
Cadmium	40.00	0.202	0.506	µg/L	40.010	ND	100	70-130	1.52	20	
Thallium	36.16	0.152	0.506	µg/L	39.990	ND	90.4	70-130	3.12	20	
Lead	45.89	0.126	1.01	µg/L	50.010	0.188	91.4	70-130	2.21	20	
<b>Matrix Spike Dup (F812432-MSD8)</b>		<b>Source: 8L00520-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Antimony	41.94	0.228	0.506	µg/L	40.030	ND	105	70-130	1.80	20	
<b>Matrix Spike Dup (F812432-MSD9)</b>		<b>Source: 8L00520-10</b>			Prepared: 27-Dec-18 Analyzed: 01-Jan-19						
Antimony	43.78	0.228	0.506	µg/L	40.030	ND	109	70-130	1.77	20	
<b>Matrix Spike Dup (F812432-MSDA)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Beryllium	57.08	0.101	1.51	µg/L	51.250	ND	111	70-130	5.35	20	AS
Chromium	1081	0.50	2.52	µg/L	1025.0	0.97	105	70-130	0.661	20	AS
Iron	5310	28	252	µg/L	5125.0	105	102	70-130	0.0680	20	AS
Nickel	1213	1.01	2.52	µg/L	1281.2	1.83	94.6	70-130	1.35	20	AS
Copper	1181	0.50	2.52	µg/L	1281.2	0.52	92.1	70-130	0.110	20	AS
Zinc	2748	4.04	12.6	µg/L	2562.5	10.46	107	70-130	0.478	20	AS
Selenium	1288	11.1	15.1	µg/L	1025.0	11.45	125	70-130	0.992	20	AS
Cadmium	103.5	0.202	0.505	µg/L	102.50	ND	101	70-130	3.12	20	AS
Antimony	55.26	0.227	0.505	µg/L	51.250	ND	108	70-130	1.54	20	AS
Thallium	47.30	0.151	0.505	µg/L	51.250	ND	92.3	70-130	0.0195	20	AS
Lead	239.3	0.126	1.01	µg/L	256.25	0.188	93.3	70-130	0.875	20	AS

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F812432-MSDB)</b>		<b>Source: 8L00520-01</b>		Prepared: 27-Dec-18 Analyzed: 01-Jan-19							
Antimony	53.79	0.227	0.505	µg/L	51.250	ND	105	70-130	0.585	20	AS
<b>Matrix Spike Dup (F812432-MSDC)</b>		<b>Source: 8L00520-10</b>		Prepared: 27-Dec-18 Analyzed: 01-Jan-19							
Antimony	53.82	0.227	0.505	µg/L	51.250	ND	105	70-130	2.39	20	AS
<b>Matrix Spike Dup (F812432-MSDD)</b>		<b>Source: 8L00519-01</b>		Prepared: 27-Dec-18 Analyzed: 03-Jan-19							
Antimony	41.32	0.455	1.01	µg/L	40.030	ND	103	70-130	1.56	20	

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Project Manager: Tim Puls

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### Notes and Definitions

- U Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
- R-05 The sample was diluted due to the presence of high levels of non-target analytes or particulates resulting in elevated reporting limits.
- QR-06 The RPD value for the LCS/LCSD was outside of acceptance limits. Batch QC acceptable based on MS/MSD, and where applicable, matrix duplicate RPD value(s) within control limits.
- QM-12 Continuing calibration verification (CCV) and/or blank spike/blank spike duplicate (BS/BSD) recoveries above upper control limits. All reported sample concentrations were below the reporting limit.
- QM-07 The spike recovery was outside control limits for the MS and/or MSD. The batch was accepted based on LCS and LCSD recoveries within control limits and, when analysis permits, acceptable AS/ASD.
- QB-10 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. Only report sample results greater than 10 times the contamination value (QB-01), or samples less than the MRL (QB-02).
- QB-06 The blank was preserved to 5% BrCl rather than 1%. The control limit for blanks preserved to greater than 1% BrCl is the preservation percentage multiplied by the MRL.
- QB-02 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the sample concentrations are less than the MRL.
- J The result is an estimated concentration.
- AS This MS and/or MSD is an analytical spike and/or an analytical spike duplicate.
- AD This matrix duplicate is an analytical duplicate.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the method detection limit if reported to the MDL or above the reporting limit if reported to the MRL.
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference



**WORK ORDER NUMBER: 18-12-1711**

*The difference is service*



AIR | SOIL | WATER | MARINE CHEMISTRY

**Analytical Report For**

**Client:** Eurofins Frontier Global Sciences, Inc.

**Client Project Name:** 8L00520

**Attention:** Amy Goodall  
11720 North Creek Parkway North  
Suite 4  
Bothell, WA 98011-8244

Approved for release on 01/06/2019 by:  
Carla Hollowell  
Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience (Calscience) certifies that the test results provided in this report meet all NELAC Institute requirements for parameters for which accreditation is required or available. Any exceptions to NELAC Institute requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

Client Project Name: 8L00520  
 Work Order Number: 18-12-1711

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**Condition Upon Receipt:**

Samples were received under Chain-of-Custody (COC) on 12/19/18. They were assigned to Work Order 18-12-1711.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

**Holding Times:**

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

**Quality Control:**

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

**Subcontractor Information:**

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

**Additional Comments:**

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

**DoD Projects:**

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

## Sample Summary

Client: Eurofins Frontier Global Sciences, Inc.	Work Order: 18-12-1711
11720 North Creek Parkway North, Suite 4	Project Name: 8L00520
Bothell, WA 98011-8244	PO Number:
	Date/Time Received: 12/19/18 11:00
	Number of Containers: 2
Attn: Amy Goodall	

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
008508 NEW_01_TCn	18-12-1711-1	12/12/18 00:00	1	Aqueous
008527 PEASE_01_TCn	18-12-1711-2	12/12/18 00:00	1	Aqueous

## Analytical Report

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 12/19/18  
Work Order: 18-12-1711  
Preparation: N/A  
Method: SM 4500-CN E  
Units: mg/L

Project: 8L00520

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
008508 NEW_01_TCn	18-12-1711-1-A	12/12/18 00:00	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CNL1

Parameter	Result	RL	DF	Qualifiers
Cyanide, Total	ND	0.020	1.00	

008527 PEASE_01_TCn	18-12-1711-2-A	12/12/18 00:00	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CNL1
---------------------	----------------	----------------	---------	------	----------	----------------	-----------

Parameter	Result	RL	DF	Qualifiers
Cyanide, Total	ND	0.020	1.00	

Method Blank	099-05-061-4319	N/A	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CNL1
--------------	-----------------	-----	---------	------	----------	----------------	-----------

Parameter	Result	RL	DF	Qualifiers
Cyanide, Total	ND	0.020	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.



# Quality Control - Spike/Spike Duplicate

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 12/19/18  
Work Order: 18-12-1711  
Preparation: N/A  
Method: SM 4500-CN E

Project: 8L00520

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
18-12-1739-6	Sample	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CHS1
18-12-1739-6	Matrix Spike	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CHS1
18-12-1739-6	Matrix Spike Duplicate	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CHS1

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Cyanide, Total	ND	0.2000	0.1856	93	0.1868	93	70-130	1	0-25	

  
Return to Contents

## Quality Control - LCS/LCSD

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 12/19/18  
Work Order: 18-12-1711  
Preparation: N/A  
Method: SM 4500-CN E

Project: 8L00520

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-05-061-4319	LCS	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CNL1			
099-05-061-4319	LCSD	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CNL1			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Cyanide, Total	0.2000	0.1621	81	0.1640	82	80-120	1	0-20	

## Glossary of Terms and Qualifiers

Work Order: 18-12-1711

Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

SUBCONTRACT ORDER

Eurofins Frontier Global Sciences, Inc.

8L00520

18-12-1711

SENDING LABORATORY:

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

RECEIVING LABORATORY:

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

Analysis

Comments

Sample ID: 008508 NEW\_01\_TCn

①

EFGS Lab ID: 8L00520-05

Matrix: Water

Sampled: 12-Dec-18 00:00 (GMT-05:00) Eastern Time (US &

Due: 16-Jan-19 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:  
04\_1000 ml HDPE Bottle

Sample ID: 008527 PEASE\_01\_TCn

②

EFGS Lab ID: 8L00520-14

Matrix: Water

Sampled: 12-Dec-18 00:00 (GMT-05:00) Eastern Time (US &

Due: 16-Jan-19 19:00

Misc. Subcontract 1

EPA SM4500 CN E

Containers Supplied:  
04\_1000 ml HDPE Bottle

Released By

12/18/18  
Date

Received By

12/19/18 1100  
Date



## SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: EFCS

DATE: 12/19/2018

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: 0.0°C); Temperature (w/o CF): 3.6 °C (w/ CF): 3.6 °C; ☐ Blank ☒ Sample☐ Sample(s) outside temperature criteria (PM/APM contacted by: \_\_\_\_\_)☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling☐ Sample(s) received at ambient temperature; placed on ice for transport by courierAmbient Temperature: ☐ Air ☐ Filter

Checked by: VLB

## CUSTODY SEAL:

Cooler ☒ Present and Intact☐ Present but Not Intact☐ Not Present☐ N/A

Checked by: VLB

Sample(s) ☐ Present and Intact☐ Present but Not Intact☒ Not Present☐ N/A

Checked by: \_\_\_\_\_

## SAMPLE CONDITION:

Chain-of-Custody (COC) document(s) received with samples

Yes

No

N/A

COC document(s) received complete

Yes

No

N/A

☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time

Sampler's name indicated on COC

Yes

No

N/A

Sample container label(s) consistent with COC

Yes

No

N/A

Sample container(s) intact and in good condition

Yes

No

N/A

Proper containers for analyses requested

Yes

No

N/A

Sufficient volume/mass for analyses requested

Yes

No

N/A

Samples received within holding time

Yes

No

N/A

Aqueous samples for certain analyses received within 15-minute holding time

Yes

No

N/A

☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen

Yes

No

N/A

Proper preservation chemical(s) noted on COC and/or sample container

Yes

No

N/A

Unpreserved aqueous sample(s) received for certain analyses

☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals

Acid/base preserved samples - pH within acceptable range

Yes

No

N/A

Container(s) for certain analysis free of headspace

Yes

No

N/A

☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)

Tedar™ bag(s) free of condensation

Yes

No

N/A

## CONTAINER TYPE:

(Trip Blank Lot Number: \_\_\_\_\_)

Aqueous: ☐ VOA ☐ VOA<sub>h</sub> ☐ VOA<sub>na2</sub> ☐ 100PJ ☐ 100PJ<sub>na2</sub> ☐ 125AGB ☐ 125AGB<sub>h</sub> ☐ 125AGB<sub>p</sub> ☐ 125PB ☐ 125PBzma (pH\_\_9)☐ 250AGB ☐ 250CGB ☐ 250CGBs (pH\_\_2) ☐ 250PB ☐ 250PB<sub>h</sub> (pH\_\_2) ☐ 500AGB ☐ 500AG<sub>J</sub> ☐ 500AG<sub>J</sub>s (pH\_\_2) ☐ 500PB☐ 1AGB ☐ 1AGB<sub>na2</sub> ☐ 1AGBs (pH\_\_2) ☐ 1AGBs (O&G) ☐ 1PB ☒ 1PB<sub>na</sub> (pH\_\_12) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_Solid: ☐ 40ZCGJ ☐ 80ZCGJ ☐ 160ZCGJ ☐ Sleeve (\_\_\_\_) ☐ EnCores® (\_\_\_\_) ☐ TerraCores® (\_\_\_\_) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ \_\_\_\_\_ Other Matrix (\_\_\_\_): ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Container: A = Amber, B = Bottle, C = Clear, E = Envelope, G = Glass, J = Jar, P = Plastic, and Z = Ziploc/Resealable Bag

Preservative: b = buffered, f = filtered, h = HCl, n = HNO<sub>3</sub>, na = NaOH, na<sub>2</sub> = Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, p = H<sub>3</sub>PO<sub>4</sub>, Labeled/Checked by: VLBs = H<sub>2</sub>SO<sub>4</sub>, u = ultra-pure, x = Na<sub>2</sub>SO<sub>3</sub>+NaHSO<sub>4</sub>·H<sub>2</sub>O, zma = Zn (CH<sub>3</sub>CO<sub>2</sub>)<sub>2</sub> + NaOH Reviewed by: VLB





Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

16 January 2019

Tim Puls  
Underwood Engineers  
25 Vaughan Mall  
Portsmouth, NH 03801

RE: Trace Metals In Wastewater - River

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Amy Goodall". The signature is written in a cursive, flowing style.

Amy Goodall  
Project Manager





Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:45

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B182586 River_01_TM	8L00519-01	Water	12-Dec-18 10:30	14-Dec-18 10:40
B182572 River_02_TM	8L00519-02	Water	12-Dec-18 10:31	14-Dec-18 10:40
B182573 River_EB_TM	8L00519-03	Water	12-Dec-18 00:00	14-Dec-18 10:40
D2889 River_01_DM Dissolved	8L00519-05	Water	12-Dec-18 10:20	14-Dec-18 10:40
D2886 River_02_DM Dissolved	8L00519-06	Water	12-Dec-18 10:20	14-Dec-18 10:40
D2887 River_EB_DM Dissolved	8L00519-08	Water	12-Dec-18 00:00	14-Dec-18 10:40
B182574 River_01_DHgf Dissolved	8L00519-09	Water	12-Dec-18 10:26	14-Dec-18 10:40
B182575 River_02_DHg Dissolved	8L00519-10	Water	12-Dec-18 10:27	14-Dec-18 10:40
B182576 River_EB_DHg Dissolved	8L00519-11	Water	12-Dec-18 00:00	14-Dec-18 10:40

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager

Page 2 of 40



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:45

#### SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 14-Dec-18 10:40. The samples were received intact, on-ice within two sealed coolers at

<u>Cooler</u>	<u>Temp C°</u>
Default Cooler	10.4
New Cooler 2	5.3

Samples were shipped to Eurofins Calscience in Garden Grove, CA for the EPA SM4500 Total CN analysis per the initial project setup.

The subcontract report is located after the notes and definitions section of the EFGS report.

#### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total mercury by flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631E.

Samples were prepared and analyzed for total recoverable metals by inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 200.8 (EFGS-054).

Samples were prepared and analyzed for total metals by preconcentration followed by analysis via inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EPA 1640 Mod.

#### ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:45

duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries. All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amy Goodall, Project Manager

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# Sample Receipt Checklist

Client: Underwood Engineers, Inc

Date & Time Received: 1040 12-14-18

Date Labeled: 12/17/18 Labeled By: PM

Project: Anti-degradation - WWTF

Received By: SMM

Label Verified By: 18

# of Coolers Received: 2 Samples Arrived By: ✓ Shipping Service \_\_\_\_\_ Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (Specify: \_\_\_\_\_)

Coolant: ☒ None/Ambient ☒ Loose Ice ☐ Gel Ice ☐ Dry Ice Coolant Required: Y/N Temp Blank Used: Y/N for Cooler(s): 10.1 #1  
SMM 12-14-18 FTZ N/A

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y/N

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>N</u>	
Custody seals signed:	<u>N/A</u>	

TID: <u>161139780</u> CF: <u>40.3</u> °C	Date/time: <u>12-14-18 1040</u> By: <u>SMM</u>
Cooler 1: <u>10.1</u> °C w/ CF: <u>10.4</u> °C	Cooler 4: °C w/ CF: °C
Cooler 2: <u>4.9</u> °C w/ CF: <u>5.3</u> °C	Cooler 5: °C w/ CF: °C
Cooler 3: °C w/ CF: °C	Cooler 6: °C w/ CF: °C

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Preservation type:	<u>Y</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
Internal COC required:	<u>N/A</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>Y</u>	

Anomalies/Non-conformances (attach additional pages if needed):

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8L00519





Frontier Global Sciences

Chain of Custody Record & Laboratory Analysis Request:  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

Page 1 of 2

Client: UNDERWOOD ENGINEERS, INC.		Contact: Tim Puls		Analyses Requested		EFGS PM:							
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Phone: (603) 436-6192 Fax:				Date:							
Project Name: Anti-Degradation - RIVER		E-mail: tpuls@underwoodengineers.com				TAT (business days) <u>20</u> (std) <b>15 10 5 4 3 2 24 hrs.</b> (For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)							
Report To: Tim Puls		Contract/PO:				Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N (If yes, please contact PM)							
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Invoice To: Client				EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N							
Phone: (603) 436-6192 Fax:		Address:		QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High									
E-mail: tpuls@underwoodengineers.com		Phone: Fax:											
E-mail:													
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Total Metals (TM)	Dissolved Metals (DM)	Dissolved Hg (DHg)	Total Cyanide (TCn)	Comments
1	B182586	RIVER_01_TM	1	SB	10:30	JSL	N	N	X				Total Metals include: Sb, Be, Cr, Fe, Ti
2	B182572	RIVER_02_TM	1	SB	10:31		N		X				
3	B182573	RIVER_EB_TM	1	RW			N		X				Dissolved Metals include: As, Cd, Cu, Pb, Ni, Se, Ag, Zn
4	B182587	RIVER_MS_TM	1	SB	10:33		N		X				
5	D2889	RIVER_01_DM	1	SB	10:28		Y			X			RW - Reagent Water
6	D2886	RIVER_02_DM	1	SB	10:28		Y			X			
7	D2888	RIVER_EB_DM	1	RW			Y			X			
8	D2887	RIVER_MS_DM	1	SB	10:28		Y			X			
9	B182574	RIVER_01_DHg	1	SB	10:26		Y				X		
10	B182575	RIVER_02_DHg	1	SB	10:27		Y				X		
11	B182576	RIVER_EB_DHg	1	RW			Y				X		
12	B182577	RIVER_MS_DHg	1	SB	10:28		Y				X		
For Laboratory Use Only		Matrix Codes:		Relinquished By:		Received By:		Received By:					
COC Seal: NA		FW: Fresh Water		Name: Steve J. LRS		SMM		Name: Sean M. Liorio					
Cooler Temp: 5.3°C		WW: Waste Water		Organization: UNH				Organization: EFGS					
Carrier: UPS		SB: Sea and Brackish Water		Date & Time: 12/13/18 4:30 PM		Date & Time: 10/4/12-14-18		Date & Time:					
VTSR: 1040		SS: Soil and Sediment		Tracking number: 54524968356									
# of Coolers: 2		TS: Plant and Animal Tissue											
		HC: Hydrocarbons											
		TR: Trap											
		OT: Other											
Sample Disposal:						By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.							
<input type="checkbox"/> Return (shipping fees may apply)						Customer Approval: [Signature]							
<input checked="" type="checkbox"/> Standard Disposal - 30 Days after report						Date: 12/13/18							
<input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)													



Frontier Global Sciences

# Chain of Custody Record & Laboratory Analysis Request:

Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

Page 2 of 2

8 L00519

Client: UNDERWOOD ENGINEERS, INC.		Contact: Tim Puls		Analyses Requested Total Metals (TM) Dissolved Metals (DM) Dissolved Hg (DHg) Total Cyanide (TCn)		EFGS PM:							
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Phone: (603) 436-6192 Fax:				Date:							
Project Name: Anti-Degradation - RIVER		E-mail: tpuls@underwoodengineers.com				TAT (business days): <u>20</u> (std) 15 10 5 4 3 2 24 hrs. (For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)							
Report To: Tim Puls		Contract/PO:				Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N (If yes, please contact PM)							
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Invoice To: Client				EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N							
Phone: (603) 436-6192 Fax:		Address:		QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High									
E-mail: tpuls@underwoodengineers.com		Phone: Fax:											
E-mail:													
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl	Total Metals (TM)	Dissolved Metals (DM)	Dissolved Hg (DHg)	Total Cyanide (TCn)	Comments
✓ 1	008545	RIVER_01_TcN	1	SB	10-25	JEL	N	Y				X	Total Metals include: Sb, Be, Cr, Fe, Tl
✓ 2	008492	RIVER_TB_TcN	1	RW			N	Y				X	
3													Dissolved Metals include: As, Cd, Cu, Pb, Ni, Se, Ag, Zn  RW – Reagent Water
4													
5													
6													
7													
8													
9													
10													
11													
12													
For Laboratory Use Only			Matrix Codes:		Relinquished By:		Received By:		Received By:				
COC Seal: 1/A		Comments:		FW: Fresh Water WW: Waste Water SB: Sea and Brackish Water SS: Soil and Sediment TS: Plant and Animal Tissue HC: Hydrocarbons TR: Trap OT: Other		Name:		Name: Sean McCord		Name:			
Cooler Temp: 5.3°C		#2				Organization:		Organization: EFGS		Organization:			
Carrier: WFS				Date & Time:		Date & Time: 10/12/14		Date & Time:					
VTSR: 10/10						Tracking number:		5452 446 835 6					
# of Coolers: 2													
Sample Disposal:						By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.							
<input type="checkbox"/> Return (shipping fees may apply)						Customer Approval: _____ Date: _____							
<input checked="" type="checkbox"/> Standard Disposal – 30 Days after report													
<input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)													



Frontier Global Sciences

Chain of Custody Record & Laboratory Analysis Request:  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
Phone: 425-686-1996  
Fax: 425-686-3096  
info@FrontierGS.com  
http://www.FrontierGS.com

Page 1 of 2

8206519

Client: UNDERWOOD ENGINEERS, INC.		Contact: Tim Puls						Analyses Requested		EFGS PM:			
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Phone: (603) 436-6192 Fax:								Date:			
Project Name: Anti-Degradation - RIVER		E-mail: tpuls@underwoodengineers.com								TAT (business days) <u>20</u> (std)			
Report To: Tim Puls		Contract/PO:								15 10 5 4 3 2 24 hrs.			
Address: 25 VAUGHAN MALL, PORTSMOUTH, NH 03801		Invoice To: Client								(For TAT < 10 days, contact PM. Surcharges apply for expedited TAT)			
Phone: (603) 436-6192 Fax:		Address:								Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N			
E-mail: tpuls@underwoodengineers.com		Phone: Fax:								(If yes, please contact PM)			
		E-mail:								EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N			
										QA <input checked="" type="checkbox"/> Standard <input type="checkbox"/> High			
No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	Sampled By	Field Filtered (Y/N)	Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)	Total Metals (TM)	Dissolved Metals (DM)	Dissolved Hg (DHg)	Total Cyanide (TCn)	Comments
1	B182586	RIVER_01_TM	1	SB	10:30	JSL	N	N	X				Total Metals include: Sb, Be, Cr, Fe, Ti
2	B182572	RIVER_02_TM	1	SB	10:31		N		X				
3	B182573	RIVER_EB_TM	1	RW			N		X				Dissolved Metals include: As, Cd, Cu, Pb, Ni, Se, Ag, Zn
4	B182587	RIVER_MS_TM	1	SB	10:33		N		X				
5	D2889	RIVER_01_DM	1	SB	10:28		Y			X			RW - Reagent Water
6	D2886	RIVER_02_DM	1	SB	10:28		Y			X			
7	D2888	RIVER_EB_DM	1	RW			Y			X			
8	D2887	RIVER_MS_DM	1	SB	10:28		Y			X			
9	B182574	RIVER_01_DHg	1	SB	10:26		Y				X		
10	B182575	RIVER_02_DHg	1	SB	10:27		Y				X		
11	B182576	RIVER_EB_DHg	1	RW			Y				X		
12	B182577	RIVER_MS_DHg	1	SB	10:28		Y				X		
For Laboratory Use Only		Matrix Codes:		Relinquished By:		Received By:		Received By:					
COC Seal: NA		FW: Fresh Water		Name: Steve Jones		SMM		Name: Steve Jones					
Cooler Temp: 10.4		WW: Waste Water		Organization: UNH		Organization: EFGS		Organization: EFGS					
Carrier: ugs		SB: Sea and Brackish Water		Date & Time: 12/13/18 4:30 PM		Date & Time: 10/10/12-14		Date & Time: 10/10/12-14					
VTSR: 1040		SS: Soil and Sediment		Tracking number: 5452496 833 8									
# of Coolers: 2		TS: Plant and Animal Tissue											
		HC: Hydrocarbons											
		TR: Trap											
		OT: Other											
Sample Disposal:						By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.							
<input type="checkbox"/> Return (shipping fees may apply)						Customer Approval: _____						Date: _____	
<input checked="" type="checkbox"/> Standard Disposal - 30 Days after report													
<input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)													

**SUBCONTRACT ORDER**  
**Eurofins Frontier Global Sciences, Inc.**  
**8L00519**

**SENDING LABORATORY:**

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

**RECEIVING LABORATORY:**

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

**Analysis**

**Comments**

Sample ID: 008545 River\_01\_TCn

EFGS Lab ID: 8L00519-13      Matrix: Water

Sampled: 12-Dec-18 10:25 (GMT-05:00) Eastern Time (US &

Due: 16-Jan-19 19:00

**Misc. Subcontract 1**

EPA SM4500 CN E

*Containers Supplied:*

04\_1000 ml HDPE Bottle

Sample ID: 008492 River\_TB\_TCn

EFGS Lab ID: 8L00519-14      Matrix: Water

Sampled: 12-Dec-18 10:25 (GMT-05:00) Eastern Time (US &

Due: 16-Jan-19 19:00


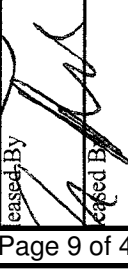
**Misc. Subcontract 1**

EPA SM4500 CN E

*Containers Supplied:*

04\_1000 ml HDPE Bottle

172 86w 0500151661727

  
Received By  
  
Received By

12/18/18

Date

Received By

Date

12/18/18

Date

Received By

Date





Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

**B182586 River\_01\_TM**

**8L00519-01**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
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**Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion**

Antimony	ND	0.227	0.505	µg/L	25	F812432	27-Dec-18	9A04007	03-Jan-19	EPA 200.8	U, R-05
Beryllium	ND	0.101	1.51	µg/L	25	F812432	27-Dec-18	9A04007	03-Jan-19	EPA 200.8	U, R-05
<b>Chromium</b>	<b>0.93</b>	0.20	1.01	µg/L	10	F812432	27-Dec-18	9A02014	31-Dec-18	EPA 200.8	R-05, J
<b>Iron</b>	<b>145</b>	11	101	µg/L	10	F812432	27-Dec-18	9A02014	31-Dec-18	EPA 200.8	R-05
Thallium	ND	0.061	0.202	µg/L	10	F812432	27-Dec-18	9A02014	31-Dec-18	EPA 200.8	U, R-05

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Amy Goodall, Project Manager



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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

**B182572 River\_02\_TM**  
**8L00519-02**

Analyte	Detection		Reporting	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
	Result	Limit	Limit								
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	ND	0.227	0.505	µg/L	25	F812432	27-Dec-18	9A04007	03-Jan-19	EPA 200.8	U, R-05
Beryllium	ND	0.040	0.606	µg/L	10	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	U, R-05
Chromium	0.37	0.20	1.01	µg/L	10	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	R-05, J
Iron	154	11	101	µg/L	10	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	R-05
Thallium	ND	0.061	0.202	µg/L	10	F812432	27-Dec-18	9A02014	01-Jan-19	EPA 200.8	U, R-05

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25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

**B182573 River\_EB\_TM**  
**8L00519-03**

Analyte	Detection		Reporting	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
	Result	Limit	Limit								
Sample Preparation: EFGS SOP2836 Closed Vessel Water Oven Digestion											
Antimony	ND	0.009	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U, QB-02
Beryllium	ND	0.004	0.061	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U, QM-12
Chromium	ND	0.02	0.10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Iron	ND	1	10	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U
Thallium	ND	0.006	0.020	µg/L	1	F812432	27-Dec-18	8L28010	29-Dec-18	EPA 200.8	U

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

**D2889 River\_01\_DM Dissolved**  
**8L00519-05**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2820 Reductive Precipitation</b>											
Arsenic	0.85	0.04	0.38	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Cadmium	0.040	0.020	0.100	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Copper	0.44	0.08	0.25	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Lead	0.030	0.020	0.100	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Nickel	0.54	-	0.25	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Selenium	ND	0.16	1.50	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640 Mod.	U
Silver	0.03	0.01	0.10	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Zinc	1.80	0.14	0.50	µg/L	5	F812487	02-Jan-19	9A07016	07-Jan-19	EPA 1640	

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25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

**D2886 River\_02\_DM Dissolved**  
**8L00519-06**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2820 Reductive Precipitation</b>											
Arsenic	0.96	0.04	0.38	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Cadmium	0.053	0.020	0.100	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Copper	0.55	0.08	0.25	µg/L	5	F812487	02-Jan-19	9A08016	08-Jan-19	EPA 1640	
Lead	0.045	0.020	0.100	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Nickel	0.65	-	0.25	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	
Selenium	ND	0.16	1.50	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640 Mod.	U
Silver	0.04	0.01	0.10	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Zinc	1.90	0.14	0.50	µg/L	5	F812487	02-Jan-19	9A07016	07-Jan-19	EPA 1640	

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

**D2887 River\_EB\_DM Dissolved**  
**8L00519-08**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2820 Reductive Precipitation</b>											
Arsenic	ND	0.04	0.38	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	U
<b>Cadmium</b>	<b>0.020</b>	0.020	0.100	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
Copper	ND	0.08	0.25	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	U
Lead	ND	0.020	0.100	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	U
Nickel	ND	-	0.25	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	U
Selenium	ND	0.16	1.50	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640 Mod.	U
<b>Silver</b>	<b>0.03</b>	0.01	0.10	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	J
<b>Zinc</b>	<b>0.31</b>	0.14	0.50	µg/L	5	F812487	02-Jan-19	9A04012	04-Jan-19	EPA 1640	QB-02, J

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:45

**B182574 River\_01\_DHgf Dissolved**  
**8L00519-09**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Mercury</b>	<b>0.59</b>	0.08	0.50	ng/L	1	F812497	17-Dec-18	8L31004	30-Dec-18	EPA 1631E	

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:45

**B182575 River\_02\_DHg Dissolved**  
**8L00519-10**

Analyte	Detection		Reporting	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
	Result	Limit	Limit								
Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation											
Mercury	0.59	0.08	0.50	ng/L	1	F812497	17-Dec-18	8L31004	30-Dec-18	EPA 1631E	

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Amy Goodall, Project Manager





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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

**Reported:**  
16-Jan-19 16:45

**B182576 River\_EB\_DHg Dissolved**  
**8L00519-11**

Analyte	Detection		Reporting	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
	Result	Limit	Limit								
Sample Preparation: EFGS SOP2796 EPA 1631 Oxidation											
Mercury	ND	0.08	0.50	ng/L	1	F812497	17-Dec-18	8L31004	30-Dec-18	EPA 1631E	U

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Amy Goodall, Project Manager



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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

#### Batch F812487 - EFGS SOP2820 Reductive Precipitation

##### Blank (F812487-BLK1)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Nickel	ND	-	0.25	µg/L							U
Copper	ND	0.08	0.25	µg/L							U
Zinc	0.27	0.14	0.50	µg/L							J, QB-02
Arsenic	ND	0.04	0.38	µg/L							U
Selenium	ND	0.16	1.50	µg/L							U
Silver	0.02	0.01	0.10	µg/L							J
Cadmium	0.020	0.020	0.100	µg/L							J
Lead	ND	0.020	0.100	µg/L							U

##### Blank (F812487-BLK2)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Nickel	ND	-	0.25	µg/L							U
Copper	0.19	0.08	0.25	µg/L							J
Zinc	0.51	0.14	0.50	µg/L							QB-10
Arsenic	ND	0.04	0.38	µg/L							U
Selenium	ND	0.16	1.50	µg/L							U
Silver	0.03	0.01	0.10	µg/L							J
Cadmium	ND	0.020	0.100	µg/L							U
Lead	ND	0.020	0.100	µg/L							U

##### Blank (F812487-BLK3)

Prepared: 02-Jan-19 Analyzed: 07-Jan-19

Zinc	0.27	0.14	0.50	µg/L							J
------	------	------	------	------	--	--	--	--	--	--	---

##### LCS (F812487-BS1)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Nickel	9.95	-	1.25	µg/L	12.502	79.6	71-130
Silver	6.61	0.05	0.50	µg/L	6.2500	106	30-151
Cadmium	9.197	0.101	0.500	µg/L	10.002	91.9	73-105

##### LCS (F812487-BS2)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Copper	11.65	0.08	0.25	µg/L	12.500	93.2	77-109	
Zinc	10.45	0.14	0.50	µg/L	12.502	83.6	75-95	QB-01
Arsenic	10.73	0.04	0.38	µg/L	12.500	85.8	58-110	
Selenium	10.83	0.16	1.50	µg/L	12.498	86.7	70-120	
Lead	11.13	0.020	0.100	µg/L	12.502	89.0	62-129	

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Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812487 - EFGS SOP2820 Reductive Precipitation

##### LCS Dup (F812487-BSD1)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Nickel	11.68	-	1.25	µg/L	12.502		93.5	71-130	16.0	20
Silver	6.22	0.05	0.50	µg/L	6.2500		99.6	30-151	6.04	20
Cadmium	8.938	0.101	0.500	µg/L	10.002		89.4	73-105	2.86	20

##### LCS Dup (F812487-BSD2)

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Copper	12.21	0.08	0.25	µg/L	12.500		97.7	77-109	4.67	20
Zinc	11.23	0.14	0.50	µg/L	12.502		89.8	75-95	7.22	20
Arsenic	9.69	0.04	0.38	µg/L	12.500		77.6	58-110	10.1	20
Selenium	11.17	0.16	1.50	µg/L	12.498		89.4	70-120	3.04	25
Lead	11.59	0.020	0.100	µg/L	12.502		92.7	62-129	4.04	20

##### Matrix Spike (F812487-MS1)

Source: 8L00425-03

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Silver	4.55	0.05	0.50	µg/L	6.2500	ND	72.8	30-151		
Cadmium	9.008	0.101	0.500	µg/L	10.002	ND	90.1	73-105		

##### Matrix Spike (F812487-MS2)

Source: 8L00519-05

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Silver	5.80	0.05	0.50	µg/L	6.2500	ND	92.8	30-151		
Cadmium	9.598	0.101	0.500	µg/L	10.002	ND	96.0	73-105		

##### Matrix Spike (F812487-MS3)

Source: 8L00425-03

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Nickel	6.29	-	0.25	µg/L	12.502	0.30	47.9	71-130		QM-05
Copper	11.80	0.08	0.25	µg/L	12.500	1.10	85.6	77-109		
Zinc	10.69	0.14	0.50	µg/L	12.502	0.62	80.5	75-95		QB-01
Arsenic	11.74	0.04	0.38	µg/L	12.500	1.59	81.2	58-110		
Selenium	9.46	0.16	1.50	µg/L	12.498	ND	75.7	42-131		
Lead	11.47	0.020	0.100	µg/L	12.502	ND	91.7	62-129		

##### Matrix Spike (F812487-MS4)

Source: 8L00519-05

Prepared: 02-Jan-19 Analyzed: 04-Jan-19

Nickel	11.36	-	0.25	µg/L	12.502	0.54	86.5	71-130		
Copper	12.20	0.08	0.25	µg/L	12.500	0.44	94.0	77-109		
Zinc	13.47	0.14	0.50	µg/L	12.502	1.64	94.6	75-95		QB-01
Arsenic	12.37	0.04	0.38	µg/L	12.500	0.85	92.2	58-110		
Selenium	10.16	0.16	1.50	µg/L	12.498	ND	81.3	42-131		
Lead	12.23	0.020	0.100	µg/L	12.502	0.030	97.6	62-129		

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812487 - EFGS SOP2820 Reductive Precipitation

<b>Matrix Spike Dup (F812487-MSD1)</b>		<b>Source: 8L00425-03</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Silver	4.28	0.05	0.50	µg/L	6.2500	ND	68.4	30-151	6.26	20	
Cadmium	7.595	0.101	0.500	µg/L	10.002	ND	75.9	73-105	17.0	20	
<b>Matrix Spike Dup (F812487-MSD2)</b>		<b>Source: 8L00519-05</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Silver	5.29	0.05	0.50	µg/L	6.2500	ND	84.6	30-151	9.24	20	
Cadmium	9.570	0.101	0.500	µg/L	10.002	ND	95.7	73-105	0.297	20	
<b>Matrix Spike Dup (F812487-MSD3)</b>		<b>Source: 8L00425-03</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Nickel	5.04	-	0.25	µg/L	12.502	0.30	37.9	71-130	22.0	20	QM-05, QR-08
Copper	10.05	0.08	0.25	µg/L	12.500	1.10	71.6	77-109	16.1	20	QM-05
Zinc	9.49	0.14	0.50	µg/L	12.502	0.62	71.0	75-95	11.9	20	QB-01, QM-05
Arsenic	11.69	0.04	0.38	µg/L	12.500	1.59	80.8	58-110	0.428	20	
Selenium	9.69	0.16	1.50	µg/L	12.498	ND	77.5	42-131	2.42	25	
Lead	11.76	0.020	0.100	µg/L	12.502	ND	94.0	62-129	2.48	20	
<b>Matrix Spike Dup (F812487-MSD4)</b>		<b>Source: 8L00519-05</b>			Prepared: 02-Jan-19 Analyzed: 04-Jan-19						
Nickel	10.88	-	0.25	µg/L	12.502	0.54	82.7	71-130	4.27	20	
Copper	11.64	0.08	0.25	µg/L	12.500	0.44	89.6	77-109	4.65	20	
Zinc	12.81	0.14	0.50	µg/L	12.502	1.64	89.4	75-95	5.02	20	QB-01
Arsenic	11.86	0.04	0.38	µg/L	12.500	0.85	88.0	58-110	4.25	20	
Selenium	9.69	0.16	1.50	µg/L	12.498	ND	77.5	42-131	4.75	25	
Lead	11.79	0.020	0.100	µg/L	12.502	0.030	94.0	62-129	3.68	20	

#### Batch F812497 - EFGS SOP2796 EPA 1631 Oxidation

<b>Blank (F812497-BLK1)</b>		Prepared & Analyzed: 30-Dec-18									
Mercury	ND	0.08	0.50	ng/L							U

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### Quality Control Data

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<b>Batch F812497 - EFGS SOP2796 EPA 1631 Oxidation</b>											
<b>Blank (F812497-BLK2)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812497-BLK3)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	ND	0.08	0.50	ng/L							U
<b>Blank (F812497-BLK4)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	ND	0.09	0.52	ng/L							U, QB-06
<b>LCS (F812497-BS1)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	14.67	0.08	0.50	ng/L	14.688		99.9	80-120			
<b>LCS Dup (F812497-BSD1)</b>					Prepared & Analyzed: 30-Dec-18						
Mercury	14.57	0.08	0.50	ng/L	14.688		99.2	80-120	0.665	24	
<b>Duplicate (F812497-DUP1)</b>					Source: 8L00059-14 Prepared & Analyzed: 30-Dec-18						
Mercury	8.11	0.08	0.50	ng/L		8.20			1.07	24	AD
<b>Matrix Spike (F812497-MS1)</b>					Source: 8L00519-09 Prepared & Analyzed: 30-Dec-18						
Mercury	2.82	0.08	0.50	ng/L	2.5250	0.59	88.5	71-125			AS
<b>Matrix Spike (F812497-MS2)</b>					Source: 8L00520-06 Prepared & Analyzed: 30-Dec-18						
Mercury	23.71	0.08	0.50	ng/L	20.200	6.82	83.6	71-125			AS
<b>Matrix Spike (F812497-MS3)</b>					Source: 8L00520-15 Prepared & Analyzed: 30-Dec-18						
Mercury	22.91	0.08	0.50	ng/L	20.200	6.49	81.3	71-125			AS
<b>Matrix Spike Dup (F812497-MSD1)</b>					Source: 8L00519-09 Prepared & Analyzed: 30-Dec-18						
Mercury	2.86	0.08	0.50	ng/L	2.5250	0.59	90.1	71-125	1.39	24	AS

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812497 - EFGS SOP2796 EPA 1631 Oxidation

<b>Matrix Spike Dup (F812497-MSD2)</b>		<b>Source: 8L00520-06</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	23.29	0.08	0.50	ng/L	20.200	6.82	81.5	71-125	1.78	24	AS
<b>Matrix Spike Dup (F812497-MSD3)</b>		<b>Source: 8L00520-15</b>			Prepared & Analyzed: 30-Dec-18						
Mercury	22.96	0.08	0.50	ng/L	20.200	6.49	81.5	71-125	0.217	24	AS

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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### Blank (F812432-BLK1)

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Beryllium	ND	0.004	0.060	µg/L							U, QM-12
Chromium	ND	0.02	0.10	µg/L							U
Iron	ND	1	10	µg/L							U
Antimony	0.030	0.009	0.020	µg/L							QB-10
Thallium	ND	0.006	0.020	µg/L							U

##### Blank (F812432-BLK2)

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Beryllium	ND	0.004	0.060	µg/L							U, QM-12
Chromium	ND	0.02	0.10	µg/L							U
Iron	ND	1	10	µg/L							U
Antimony	ND	0.009	0.020	µg/L							U, QB-02
Thallium	ND	0.006	0.020	µg/L							U

##### Blank (F812432-BLK3)

Prepared: 27-Dec-18 Analyzed: 31-Dec-18

Antimony	0.011	0.009	0.020	µg/L							J
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##### LCS (F812432-BS1)

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Beryllium	51.58	0.020	0.301	µg/L	40.010		129	85-115			QM-12
Chromium	47.07	0.10	0.50	µg/L	49.990		94.2	85-115			
Iron	1179	6	50	µg/L	1250.0		94.3	85-115			
Thallium	37.47	0.030	0.100	µg/L	39.990		93.7	85-115			

##### LCS (F812432-BS3)

Prepared: 27-Dec-18 Analyzed: 31-Dec-18

Antimony	35.53	0.045	0.100	µg/L	40.030		88.8	85-115			
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##### LCS Dup (F812432-BSD1)

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Beryllium	39.74	0.020	0.301	µg/L	40.010		99.3	85-115	25.9	20	QR-06
Chromium	54.93	0.10	0.50	µg/L	49.990		110	85-115	15.4	20	
Iron	1313	6	50	µg/L	1250.0		105	85-115	10.8	20	
Thallium	40.64	0.030	0.100	µg/L	39.990		102	85-115	8.11	20	

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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

##### LCS Dup (F812432-BSD3)

Prepared: 27-Dec-18 Analyzed: 31-Dec-18

Antimony	36.98	0.045	0.100	µg/L	40.030		92.4	85-115	4.00	20	
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##### Matrix Spike (F812432-MS2)

Source: 8L00520-01

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Beryllium	38.36	0.040	0.607	µg/L	40.010	ND	95.9	70-130			
Chromium	52.38	0.20	1.01	µg/L	49.990	0.26	104	70-130			
Iron	1371	11	101	µg/L	1250.0	159	97.0	70-130			
Thallium	40.52	0.061	0.202	µg/L	39.990	ND	101	70-130			

##### Matrix Spike (F812432-MS3)

Source: 8L00520-10

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Beryllium	40.70	0.040	0.607	µg/L	40.010	ND	102	70-130			
Chromium	53.05	0.20	1.01	µg/L	49.990	0.49	105	70-130			
Iron	1447	11	101	µg/L	1250.0	227	97.6	70-130			
Thallium	41.77	0.061	0.202	µg/L	39.990	ND	104	70-130			

##### Matrix Spike (F812432-MS5)

Source: 8L00520-01

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Beryllium	21.22	0.040	0.606	µg/L	20.500	ND	104	70-130			AS
Chromium	438.8	0.20	1.01	µg/L	410.00	0.26	107	70-130			AS
Iron	2334	11	101	µg/L	2050.0	159	106	70-130			AS
Thallium	21.54	0.061	0.202	µg/L	20.500	ND	105	70-130			AS

##### Matrix Spike (F812432-MS6)

Source: 8L00520-10

Prepared: 27-Dec-18 Analyzed: 29-Dec-18

Beryllium	21.51	0.040	0.606	µg/L	20.500	ND	105	70-130			AS
Chromium	437.3	0.20	1.01	µg/L	410.00	0.49	107	70-130			AS
Iron	2350	11	101	µg/L	2050.0	227	104	70-130			AS
Thallium	21.94	0.061	0.202	µg/L	20.500	ND	107	70-130			AS

##### Matrix Spike (F812432-MS7)

Source: 8L00519-01

Prepared: 27-Dec-18 Analyzed: 31-Dec-18

Beryllium	40.00	0.101	1.52	µg/L	40.010	ND	100	70-130			
Chromium	53.35	0.51	2.53	µg/L	49.990	0.97	105	70-130			
Iron	1372	28	253	µg/L	1250.0	105	101	70-130			
Thallium	37.31	0.152	0.506	µg/L	39.990	ND	93.3	70-130			

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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike (F812432-MS8)</b>		<b>Source: 8L00520-01</b>		Prepared: 27-Dec-18 Analyzed: 31-Dec-18							
Antimony	41.19	0.228	0.506	µg/L	40.030	ND	103	70-130			
<b>Matrix Spike (F812432-MS9)</b>		<b>Source: 8L00520-10</b>		Prepared: 27-Dec-18 Analyzed: 01-Jan-19							
Antimony	43.01	0.228	0.506	µg/L	40.030	ND	107	70-130			
<b>Matrix Spike (F812432-MSA)</b>		<b>Source: 8L00519-01</b>		Prepared: 27-Dec-18 Analyzed: 31-Dec-18							
Beryllium	54.11	0.101	1.51	µg/L	51.250	ND	106	70-130			AS
Chromium	1088	0.50	2.52	µg/L	1025.0	0.97	106	70-130			AS
Iron	5313	28	252	µg/L	5125.0	105	102	70-130			AS
Antimony	56.12	0.227	0.505	µg/L	51.250	ND	109	70-130			AS
Thallium	47.29	0.151	0.505	µg/L	51.250	ND	92.3	70-130			AS
<b>Matrix Spike (F812432-MSB)</b>		<b>Source: 8L00520-01</b>		Prepared: 27-Dec-18 Analyzed: 01-Jan-19							
Antimony	53.48	0.227	0.505	µg/L	51.250	ND	104	70-130			AS
<b>Matrix Spike (F812432-MSC)</b>		<b>Source: 8L00520-10</b>		Prepared: 27-Dec-18 Analyzed: 01-Jan-19							
Antimony	52.54	0.227	0.505	µg/L	51.250	ND	103	70-130			AS
<b>Matrix Spike (F812432-MSD)</b>		<b>Source: 8L00519-01</b>		Prepared: 27-Dec-18 Analyzed: 03-Jan-19							
Antimony	40.68	0.455	1.01	µg/L	40.030	ND	102	70-130			
<b>Matrix Spike Dup (F812432-MSD2)</b>		<b>Source: 8L00520-01</b>		Prepared: 27-Dec-18 Analyzed: 29-Dec-18							
Beryllium	40.14	0.040	0.607	µg/L	40.010	ND	100	70-130	4.54	20	
Chromium	53.11	0.20	1.01	µg/L	49.990	0.26	106	70-130	1.37	20	
Iron	1410	11	101	µg/L	1250.0	159	100	70-130	2.79	20	
Thallium	41.46	0.061	0.202	µg/L	39.990	ND	104	70-130	2.29	20	
<b>Matrix Spike Dup (F812432-MSD3)</b>		<b>Source: 8L00520-10</b>		Prepared: 27-Dec-18 Analyzed: 29-Dec-18							
Beryllium	41.71	0.040	0.607	µg/L	40.010	ND	104	70-130	2.46	20	
Chromium	53.68	0.20	1.01	µg/L	49.990	0.49	106	70-130	1.17	20	
Iron	1481	11	101	µg/L	1250.0	227	100	70-130	2.36	20	
Thallium	41.57	0.061	0.202	µg/L	39.990	ND	104	70-130	0.496	20	

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Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F812432-MSD5)</b>		<b>Source: 8L00520-01</b>			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Beryllium	20.99	0.040	0.606	µg/L	20.500	ND	102	70-130	1.10	20	AS
Chromium	434.2	0.20	1.01	µg/L	410.00	0.26	106	70-130	1.06	20	AS
Iron	2275	11	101	µg/L	2050.0	159	103	70-130	2.53	20	AS
Thallium	21.38	0.061	0.202	µg/L	20.500	ND	104	70-130	0.730	20	AS
<b>Matrix Spike Dup (F812432-MSD6)</b>		<b>Source: 8L00520-10</b>			Prepared: 27-Dec-18 Analyzed: 29-Dec-18						
Beryllium	21.70	0.040	0.606	µg/L	20.500	ND	106	70-130	0.902	20	AS
Chromium	435.2	0.20	1.01	µg/L	410.00	0.49	106	70-130	0.490	20	AS
Iron	2340	11	101	µg/L	2050.0	227	103	70-130	0.411	20	AS
Thallium	21.74	0.061	0.202	µg/L	20.500	ND	106	70-130	0.910	20	AS
<b>Matrix Spike Dup (F812432-MSD7)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Beryllium	40.34	0.101	1.52	µg/L	40.010	ND	101	70-130	0.846	20	
Chromium	52.05	0.51	2.53	µg/L	49.990	0.97	102	70-130	2.47	20	
Iron	1353	28	253	µg/L	1250.0	105	99.8	70-130	1.44	20	
Thallium	36.16	0.152	0.506	µg/L	39.990	ND	90.4	70-130	3.12	20	
<b>Matrix Spike Dup (F812432-MSD8)</b>		<b>Source: 8L00520-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Antimony	41.94	0.228	0.506	µg/L	40.030	ND	105	70-130	1.80	20	
<b>Matrix Spike Dup (F812432-MSD9)</b>		<b>Source: 8L00520-10</b>			Prepared: 27-Dec-18 Analyzed: 01-Jan-19						
Antimony	43.78	0.228	0.506	µg/L	40.030	ND	109	70-130	1.77	20	
<b>Matrix Spike Dup (F812432-MSDA)</b>		<b>Source: 8L00519-01</b>			Prepared: 27-Dec-18 Analyzed: 31-Dec-18						
Beryllium	57.08	0.101	1.51	µg/L	51.250	ND	111	70-130	5.35	20	AS
Chromium	1081	0.50	2.52	µg/L	1025.0	0.97	105	70-130	0.661	20	AS
Iron	5310	28	252	µg/L	5125.0	105	102	70-130	0.0680	20	AS
Antimony	55.26	0.227	0.505	µg/L	51.250	ND	108	70-130	1.54	20	AS
Thallium	47.30	0.151	0.505	µg/L	51.250	ND	92.3	70-130	0.0195	20	AS

Eurofins Frontier Global Sciences, LLC

*Amy Goodall*

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amy Goodall, Project Manager



Frontier Global Sciences

11720 Northcreek Pkwy N, Suite 400  
Bothell, WA 98011  
425.686.1996 Phone  
425.686.3096 Fax

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F812432 - EFGS SOP2836 Closed Vessel Water Oven Digestion

<b>Matrix Spike Dup (F812432-MSDB)</b>		<b>Source: 8L00520-01</b>		Prepared: 27-Dec-18 Analyzed: 01-Jan-19							
Antimony	53.79	0.227	0.505	µg/L	51.250	ND	105	70-130	0.585	20	AS
<b>Matrix Spike Dup (F812432-MSDC)</b>		<b>Source: 8L00520-10</b>		Prepared: 27-Dec-18 Analyzed: 01-Jan-19							
Antimony	53.82	0.227	0.505	µg/L	51.250	ND	105	70-130	2.39	20	AS
<b>Matrix Spike Dup (F812432-MSDD)</b>		<b>Source: 8L00519-01</b>		Prepared: 27-Dec-18 Analyzed: 03-Jan-19							
Antimony	41.32	0.455	1.01	µg/L	40.030	ND	103	70-130	1.56	20	

Eurofins Frontier Global Sciences, LLC

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amy Goodall, Project Manager

Page 28 of 40

Underwood Engineers  
25 Vaughan Mall  
Portsmouth NH, 03801

Project: Trace Metals In Wastewater - River  
Project Number: Anti-Degradation - River  
Project Manager: Tim Puls

Reported:  
16-Jan-19 16:45

### Notes and Definitions

U	Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
R-05	The sample was diluted due to the presence of high levels of non-target analytes or particulates resulting in elevated reporting limits.
QR-08	The RPD value for the MS/MSD was outside of acceptance limits. Batch QC acceptable based on matrix duplicate and/or LCS/LCSD RPD values within control limits.
QR-06	The RPD value for the LCS/LCSD was outside of acceptance limits. Batch QC acceptable based on MS/MSD, and where applicable, matrix duplicate RPD value(s) within control limits.
QM-12	Continuing calibration verification (CCV) and/or blank spike/blank spike duplicate (BS/BSD) recoveries above upper control limits. All reported sample concentrations were below the reporting limit.
QM-05	The spike recovery was outside acceptance limits for the MS/MSD and or AS/ASD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QB-10	The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. Only report sample results greater than 10 times the contamination value (QB-01), or samples less than the MRL (QB-02).
QB-06	The blank was preserved to 5% BrCl rather than 1%. The control limit for blanks preserved to greater than 1% BrCl is the preservation percentage multiplied by the MRL.
QB-02	The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the sample concentrations are less than the MRL.
QB-01	The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the blank concentration(s) are less than 10% of the sample result.
J	The result is an estimated concentration.
AS	This MS and/or MSD is an analytical spike and/or an analytical spike duplicate.
AD	This matrix duplicate is an analytical duplicate.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the method detection limit if reported to the MDL or above the reporting limit if reported to the MRL.
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference



**WORK ORDER NUMBER: 18-12-1710**

*The difference is service*



AIR | SOIL | WATER | MARINE CHEMISTRY

**Analytical Report For**

**Client:** Eurofins Frontier Global Sciences, Inc.

**Client Project Name:** 8L00519

**Attention:** Amy Goodall  
11720 North Creek Parkway North  
Suite 4  
Bothell, WA 98011-8244

Approved for release on 01/06/2019 by:  
Carla Hollowell  
Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience (Calscience) certifies that the test results provided in this report meet all NELAC Institute requirements for parameters for which accreditation is required or available. Any exceptions to NELAC Institute requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

Client Project Name: 8L00519  
 Work Order Number: 18-12-1710

1	Work Order Narrative. . . . .	3
2	Sample Summary. . . . .	4
3	Client Sample Data. . . . .	5
	3.1 SM 4500-CN E Total Cyanide (Aqueous). . . . .	5
4	Quality Control Sample Data. . . . .	6
	4.1 MS/MSD. . . . .	6
	4.2 LCS/LCSD. . . . .	7
5	Glossary of Terms and Qualifiers. . . . .	8
6	Chain-of-Custody/Sample Receipt Form. . . . .	9

**Condition Upon Receipt:**

Samples were received under Chain-of-Custody (COC) on 12/19/18. They were assigned to Work Order 18-12-1710.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

**Holding Times:**

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of  $\leq 15$  minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

**Quality Control:**

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

**Subcontractor Information:**

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

**Additional Comments:**

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

**DoD Projects:**

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

## Sample Summary

Client: Eurofins Frontier Global Sciences, Inc.	Work Order: 18-12-1710
11720 North Creek Parkway North, Suite 4	Project Name: 8L00519
Bothell, WA 98011-8244	PO Number:
	Date/Time Received: 12/19/18 11:00
	Number of Containers: 2
Attn: Amy Goodall	

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
008545 River_01_TCn	18-12-1710-1	12/12/18 10:25	1	Aqueous
008492 River_TB_TCn	18-12-1710-2	12/12/18 10:25	1	Aqueous



# Analytical Report

Eurofins Frontier Global Sciences, Inc.  
 11720 North Creek Parkway North, Suite 4  
 Bothell, WA 98011-8244

Date Received: 12/19/18  
 Work Order: 18-12-1710  
 Preparation: N/A  
 Method: SM 4500-CN E  
 Units: mg/L

Project: 8L00519

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
008545 River_01_TCn	18-12-1710-1-A	12/12/18 10:25	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CNL1

Parameter	Result	RL	DF	Qualifiers
Cyanide, Total	ND	0.020	1.00	

008492 River_TB_TCn	18-12-1710-2-A	12/12/18 10:25	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CNL1
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Parameter	Result	RL	DF	Qualifiers
Cyanide, Total	ND	0.020	1.00	

Method Blank	099-05-061-4319	N/A	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CNL1
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Parameter	Result	RL	DF	Qualifiers
Cyanide, Total	ND	0.020	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

## Quality Control - Spike/Spike Duplicate

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 12/19/18  
Work Order: 18-12-1710  
Preparation: N/A  
Method: SM 4500-CN E

Project: 8L00519

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
18-12-1739-6	Sample	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CHS1
18-12-1739-6	Matrix Spike	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CHS1
18-12-1739-6	Matrix Spike Duplicate	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CHS1

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Cyanide, Total	ND	0.2000	0.1856	93	0.1868	93	70-130	1	0-25	

## Quality Control - LCS/LCSD

Eurofins Frontier Global Sciences, Inc.  
11720 North Creek Parkway North, Suite 4  
Bothell, WA 98011-8244

Date Received: 12/19/18  
Work Order: 18-12-1710  
Preparation: N/A  
Method: SM 4500-CN E

Project: 8L00519

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-05-061-4319	LCS	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CNL1			
099-05-061-4319	LCSD	Aqueous	UV 9	12/24/18	12/24/18 14:01	I1224CNL1			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Cyanide, Total	0.2000	0.1621	81	0.1640	82	80-120	1	0-20	

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDS or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

SUBCONTRACT ORDER

Eurofins Frontier Global Sciences, Inc.

8L00519

18-12-1710

SENDING LABORATORY:

Eurofins Frontier Global Sciences, LLC  
11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Phone: (425) 686-1996  
Fax: (425) 686-3096  
Project Manager: Amy Goodall

RECEIVING LABORATORY:

Eurofins Calscience, LLC  
7440 Lincoln Way  
Garden Grove, CA 92841  
Phone :7148955494  
Fax: x

Analysis

Comments

Sample ID: 008545 River\_01\_TCn

①

EFGS Lab ID: 8L00519-13

Matrix: Water

Sampled: 12-Dec-18 10:25 (GMT-05:00) Eastern Time (US &

Due: 16-Jan-19 19:00

Misc. Subcontract 1

EPA SW4500 CN E

Containers Supplied:

04\_1000 ml HDPE Bottle

Sample ID: 008492 River\_TB\_TCn

②

EFGS Lab ID: 8L00519-14

Matrix: Water

Sampled: 12-Dec-18 10:25 (GMT-05:00) Eastern Time (US &

Due: 16-Jan-19 19:00

Misc. Subcontract 1

EPA SW4500 CN E

Containers Supplied:

04\_1000 ml HDPE Bottle

Released By

Date

Received By

Date

Released By

Date

Received By

Date

1710

FRONT DESK  
4251 686 - 1996  
FRONTIER GLOBAL SCIENCES  
11720 N CREEK PKWY N  
BOTHELL WA 98011 - 8244

34 LBS

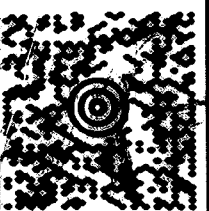
DWT: 24, 13, 14

1 OF 1

**SHIP TO:**

**SAMPLE RECEIVING**

7141 895 - 6494  
EUROFINS CALSCIENCE, INC.  
7440 LINCOLN WAY  
GARDEN GROVE CA 92841

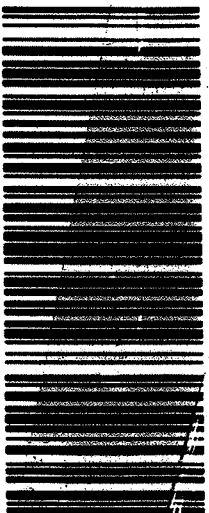


**CA 927 9-09**



**UPS NEXT DAY AIR 1**

TRACKING #: 1Z 86W 060 01 5166 1727



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**Dept No.: OVERHEAD**  
**REF#:SubeoMraol**

WS 81.0.53 Zebra ZP 450 06.0A.10.0718

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## SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1CLIENT: EFCSDATE: 12/19/2018

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: 0.0°C); Temperature (w/o CF): 3.6 °C (w/ CF): 3.6 °C; ☐ Blank ☒ Sample☐ Sample(s) outside temperature criteria (PM/APM contacted by: \_\_\_\_\_)☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling☐ Sample(s) received at ambient temperature; placed on ice for transport by courierAmbient Temperature: ☐ Air ☐ FilterChecked by: VJ68

## CUSTODY SEAL:

Cooler ☒ Present and Intact☐ Present but Not Intact☐ Not Present☐ N/AChecked by: VJ68Sample(s) ☐ Present and Intact☐ Present but Not Intact☒ Not Present☐ N/AChecked by: VJ68

## SAMPLE CONDITION:

Chain-of-Custody (COC) document(s) received with samples

Yes	No	N/A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

COC document(s) received complete

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time

Sampler's name indicated on COC

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

Sample container label(s) consistent with COC

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

Sample container(s) intact and in good condition

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

Proper containers for analyses requested

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

Sufficient volume/mass for analyses requested

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

Samples received within holding time

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

Aqueous samples for certain analyses received within 15-minute holding time

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

Proper preservation chemical(s) noted on COC and/or sample container

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

Unpreserved aqueous sample(s) received for certain analyses

☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

Acid/base preserved samples - pH within acceptable range

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

Container(s) for certain analysis free of headspace

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

Tedlar™ bag(s) free of condensation

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

## CONTAINER TYPE:

(Trip Blank Lot Number: \_\_\_\_\_)

Aqueous: ☐ VOA ☐ VOAh ☐ VOAna<sub>2</sub> ☐ 100PJ ☐ 100PJna<sub>2</sub> ☐ 125AGB ☐ 125AGBh ☐ 125AGBp ☐ 125PB ☐ 125PBzma (pH\_\_2)☐ 250AGB ☐ 250CCGB ☐ 250CCGBs (pH\_\_2) ☐ 250PB ☐ 250PBn (pH\_\_2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJs (pH\_\_2) ☐ 500PB☐ 1AGB ☐ 1AGBna<sub>2</sub> ☐ 1AGBs (pH\_\_2) ☐ 1AGBs (O&G) ☐ 1PB ☒ 1PBna (pH\_\_12) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_Solid: ☐ 40ZCGJ ☐ 80ZCGJ ☐ 160ZCGJ ☐ Sleeve (\_\_\_\_) ☐ EnCores® (\_\_\_\_) ☐ TerraCores® (\_\_\_\_) ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ \_\_\_\_\_ Other Matrix (\_\_\_\_); ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_

Container: A = Amber, B = Bottle, C = Clear, E = Envelope, G = Glass, J = Jar, P = Plastic, and Z = Ziploc/Resealable Bag

Preservative: b = buffered, f = filtered, h = HCl, n = HNO<sub>3</sub>, na = NaOH, na<sub>2</sub> = Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, p = H<sub>3</sub>PO<sub>4</sub>, Labeled/Checked by: VJ68s = H<sub>2</sub>SO<sub>4</sub>, u = ultra-pure, x = Na<sub>2</sub>SO<sub>3</sub>+NaHSO<sub>4</sub>.H<sub>2</sub>O, zma = Zn (CH<sub>3</sub>CO<sub>2</sub>)<sub>2</sub> + NaOH Reviewed by: VJ68