

Chemical Analysis Report

CEN-DIST-2020-12-03-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

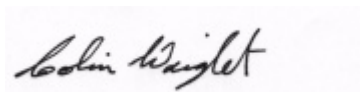
Event Description: **Halifax River (x2)**
Request ID: **RQ-2020-11-23-19**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Kalina Warren

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Colin Wright, Program Administrator

Date Certified: 22-DEC-2020 10:23

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular background.

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Halifax River @ 1 Km NNE of Dunlawton Ave

Collection Date/Time: 12/02/2020 13:47

Field ID: G5CE0107

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2210278	EPA 180.1 Rev. 2.0	Turbidity	6.2		NTU	P390669	
	EPA 300.0 Rev. 2.1	Bromide	35		mg Br/L	P390929	
	SM 2320 B-2011	Total Alkalinity	118		mg CaCO3/L	P390811	
	SM 2540 D-2011	TSS	6	I	mg/L	P390958	
	SM 4500 F-C-2011	Fluoride	0.72		mg F/L	P390807	
2210282	EPA 350.1 Rev. 2.0	Ammonia-N	0.016		mg N/L	P391074	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.63		mg N/L	P390833	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.11		mg N/L	P390762	
	EPA 365.1 Rev. 2.0	Total-P	0.090		mg P/L	P390862	
	SM 5310 B-2011	Organic Carbon	12		mg C/L	P390898	
2210286	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.062		mg P/L	P390663	
2210301	EPA 200.7 Rev. 4.4	Chromium	7.3	I	ug/L	P390919	
		Iron	290	I	ug/L	P390919	
		Manganese	7.9	I	ug/L	P390919	
		Zinc	15	U	ug/L	P390919	
	EPA 200.8 Rev. 5.4	Aluminum	202		ug/L	P390919	
		Antimony	0.20	U	ug/L	P390919	
		Arsenic	2.04		ug/L	P390919	
		Cadmium	0.080	U	ug/L	P390919	
		Copper	2.0	I	ug/L	P390919	
		Lead	2.0	U	ug/L	P390919	
		Nickel	2.0	U	ug/L	P390919	
		Selenium	0.80	U	ug/L	P390919	
		Silver	0.040	U	ug/L	P390919	
		Thallium	1.0	U	ug/L	P390919	

Sample Location: Halifax River @ 250m N of Bethune Point Park Boat Ramp **Collection Date/Time: 12/02/2020 14:14**

Field ID: G5CE0108

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2210279	EPA 180.1 Rev. 2.0	Turbidity	8.8	A	NTU	P390670	
	EPA 300.0 Rev. 2.1	Bromide	25		mg Br/L	P390929	
	SM 2320 B-2011	Total Alkalinity	115		mg CaCO3/L	P390811	
	SM 2540 D-2011	TSS	10		mg/L	P390958	
	SM 4500 F-C-2011	Fluoride	0.54		mg F/L	P390971	
2210283	EPA 350.1 Rev. 2.0	Ammonia-N	0.021		mg N/L	P391074	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.65		mg N/L	P390833	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.12		mg N/L	P390762	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P390862	
	SM 5310 B-2011	Organic Carbon	15		mg C/L	P390898	
2210287	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.074		mg P/L	P390663	
2210302	EPA 200.7 Rev. 4.4	Chromium	7.1	I	ug/L	P390919	
		Iron	650		ug/L	P390919	
		Manganese	14		ug/L	P390919	
		Zinc	15	U	ug/L	P390919	
	EPA 200.8 Rev. 5.4	Aluminum	427		ug/L	P390919	
		Antimony	0.20	U	ug/L	P390919	
		Arsenic	2.00		ug/L	P390919	
		Cadmium	0.080	U	ug/L	P390919	
		Copper	2.4	I	ug/L	P390919	
		Lead	0.87	I	ug/L	P390919	
		Nickel	2.0	U	ug/L	P390919	
		Selenium	0.80	U	ug/L	P390919	
		Silver	0.040	U	ug/L	P390919	
		Thallium	0.40	U	ug/L	P390919	

Sample Location: Halifax River @ 200m NNE of Main St Bridge

Collection Date/Time: 12/02/2020 12:54

Field ID: G5CE0109

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2210280	EPA 180.1 Rev. 2.0	Turbidity	10		NTU	P390670	
	EPA 300.0 Rev. 2.1	Bromide	22		mg Br/L	P390929	
	SM 2320 B-2011	Total Alkalinity	118		mg CaCO3/L	P390811	
	SM 2540 D-2011	TSS	13		mg/L	P390958	
	SM 4500 F-C-2011	Fluoride	0.46		mg F/L	P390807	
2210284	EPA 350.1 Rev. 2.0	Ammonia-N	0.022		mg N/L	P391074	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.72	J	mg N/L	P390833	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.093		mg N/L	P390762	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P390862	
	SM 5310 B-2011	Organic Carbon	17		mg C/L	P390898	
2210288	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.063		mg P/L	P390663	
2210303	EPA 200.7 Rev. 4.4	Chromium	7.2	I	ug/L	P390919	
		Iron	840		ug/L	P390919	
		Manganese	16		ug/L	P390919	
		Zinc	15	U	ug/L	P390919	
	EPA 200.8 Rev. 5.4	Aluminum	479		ug/L	P390919	
		Antimony	0.20	U	ug/L	P390919	
		Arsenic	1.81		ug/L	P390919	
		Cadmium	0.080	U	ug/L	P390919	
		Copper	1.9	I	ug/L	P390919	
		Lead	0.98	I	ug/L	P390919	
		Nickel	2.0	U	ug/L	P390919	
		Selenium	0.80	U	ug/L	P390919	
		Silver	0.040	U	ug/L	P390919	
		Thallium	0.40	U	ug/L	P390919	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: Refer to the Lab Analysis Report for an explanation of QC Codes.

Sample Location: Halifax River @ 1 Km N of Bethune Point Park Boat Ramp **Collection Date/Time: 12/02/2020 13:17**

Field ID: G5CE0110

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2210281	EPA 180.1 Rev. 2.0	Turbidity	9.7		NTU	P390670	
	EPA 300.0 Rev. 2.1	Bromide	25		mg Br/L	P391044	
	SM 2320 B-2011	Total Alkalinity	110		mg CaCO3/L	P390811	
	SM 2540 D-2011	TSS	14		mg/L	P390957	
	SM 4500 F-C-2011	Fluoride	0.53		mg F/L	P390971	
2210285	EPA 350.1 Rev. 2.0	Ammonia-N	0.024		mg N/L	P391074	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.74		mg N/L	P390833	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.11		mg N/L	P390762	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P390862	
	SM 5310 B-2011	Organic Carbon	15		mg C/L	P390898	
2210289	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.070		mg P/L	P390663	
2210304	EPA 200.7 Rev. 4.4	Chromium	6.9	I	ug/L	P390919	
		Iron	940		ug/L	P390919	
		Manganese	18		ug/L	P390919	
		Zinc	15	U	ug/L	P390919	
	EPA 200.8 Rev. 5.4	Aluminum	577		ug/L	P390919	
		Antimony	0.20	U	ug/L	P390919	
		Arsenic	1.96		ug/L	P390919	
		Cadmium	0.080	U	ug/L	P390919	
		Copper	2.4	I	ug/L	P390919	
		Lead	1.2	I	ug/L	P390919	
		Nickel	2.0	U	ug/L	P390919	
		Selenium	0.80	U	ug/L	P390919	
		Silver	0.040	U	ug/L	P390919	
		Thallium	0.40	U	ug/L	P390919	

Ref. Method and Comment:

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P390669

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P390670

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P390919

Component	Result	Code	Units
Chromium	1.0	U	ug/L
Iron	30	U	ug/L
Manganese	1.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P390919

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P390929

Component	Result	Code	Units
Bromide	0.013	U	mg Br/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391044

Component	Result	Code	Units
Bromide	0.013	U	mg Br/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391074

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390833

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390762

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390862

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390663

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: SM 2320 B-2011
Batch ID: P390811

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 D-2011
Batch ID: P390957

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P390958

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P390807

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-2011
Batch ID: P390971

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P390898

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P390919

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chromium	103		P	85 - 115
Iron	104		P	85 - 115
Manganese	105		P	85 - 115
Zinc	107		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P390919

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.6		P	85 - 115
Antimony	105		P	85 - 115
Arsenic	98.5		P	85 - 115
Cadmium	96.1		P	85 - 115
Copper	101		P	85 - 115
Lead	103		P	85 - 115
Nickel	94.2		P	85 - 115
Selenium	96.8		P	85 - 115
Silver	108		P	85 - 115
Thallium	106		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P390929

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Bromide	99.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391044

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Bromide	99.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391074

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390833

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	105		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390762

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	100		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390862

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	106		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390663

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.9		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P390811

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P390807

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.0		P	90 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P390971

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.3		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P390898

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	102		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P390919

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2209592	Chromium	103	103	P/P	70 - 130
2209592	Iron	104	102	P/P	70 - 130
2209592	Manganese	101	101	P/P	70 - 130
2209592	Zinc	108	109	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P390919

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2209592	Aluminum	107	108	P/P	70 - 130
2209592	Antimony	113	113	P/P	70 - 130
2209592	Arsenic	104	105	P/P	70 - 130
2209592	Cadmium	97.3	97.8	P/P	70 - 130
2209592	Copper	111	112	P/P	70 - 130
2209592	Lead	110	112	P/P	70 - 130
2209592	Nickel	94.6	95.9	P/P	70 - 130
2209592	Selenium	104	105	P/P	70 - 130
2209592	Silver	101	101	P/P	70 - 130
2209592	Thallium	107	109	P/P	70 - 130

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P390929

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210358	Bromide	97.2	99.5	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391044

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211714	Bromide	96.3	95.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391074

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210255	Ammonia-N	102	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390833

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210284	Kjeldahl Nitrogen	115	112	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390762

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210282	NO2NO3-N	99.5	99.5	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390862

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2209878	Total-P	105	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390663

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210247	O-Phosphate-P	99.9	99.6	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P390807

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210280	Fluoride	99.6	102	P/P	94 - 107

Reference Method: SM 4500 F-C-2011
Batch ID: P390971

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211425	Fluoride	97.8	99.3	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P390898

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210942	Organic Carbon	99.4	98.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P390669

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210203	Turbidity	0.697	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P390670

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210279	Turbidity	3.74	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P390919

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2209592	Chromium	0.544	Spike	P	0 - 20
2209592	Iron	1.31	Spike	P	0 - 20
2209592	Manganese	0.0487	Spike	P	0 - 20
2209592	Zinc	1.49	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P390919

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2209592	Aluminum	1.06	Spike	P	0 - 20
2209592	Antimony	0.0461	Spike	P	0 - 20
2209592	Arsenic	1.25	Spike	P	0 - 20
2209592	Cadmium	0.524	Spike	P	0 - 20
2209592	Copper	0.734	Spike	P	0 - 20
2209592	Lead	1.82	Spike	P	0 - 20
2209592	Nickel	1.32	Spike	P	0 - 20
2209592	Selenium	0.550	Spike	P	0 - 20
2209592	Silver	0.202	Spike	P	0 - 20
2209592	Thallium	2.25	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P390929

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210358	Bromide	2.28	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391044

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211714	Bromide	0.596	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391074

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210255	Ammonia-N	0.130	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390833

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210284	Kjeldahl Nitrogen	2.02	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390762

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210282	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390862

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2209878	Total-P	1.42	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390663

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210247	O-Phosphate-P	0.227	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P390811

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210941	Total Alkalinity	0.271	Sample	P	0 - 8.1

Reference Method: SM 2540 D-2011
Batch ID: P390958

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210254	TSS	9.01	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P390807

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210280	Fluoride	1.39	Spike	P	0 - 2.8

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-2011
Batch ID: P390971

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211425	Fluoride	0.959	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P390898

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210942	Organic Carbon	0.753	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A102399

Included Lab Sample IDs: 2210286, 2210287, 2210288, 2210289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	98.9	P/P	90 - 110
O-Phosphate-P	99.0	100	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A102402

Included Lab Sample IDs: 2210278, 2210279, 2210280, 2210281

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	104	P/P	95 - 105
Turbidity	104	104	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A102442

Included Lab Sample IDs: 2210282, 2210283, 2210284, 2210285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A102456

Included Lab Sample IDs: 2210278, 2210279, 2210280, 2210281

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Bromide	101	102	P/P	90 - 110
Bromide	98.0	102	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A102458

Included Lab Sample IDs: 2210278, 2210280

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	100	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A102461

Included Lab Sample IDs: 2210278, 2210279, 2210280, 2210281

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.8	104	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A102488

Included Lab Sample IDs: 2210282, 2210283, 2210284, 2210285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	100	97.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A102516

Included Lab Sample IDs: 2210283, 2210284, 2210285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	104	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A102518

Included Lab Sample IDs: 2210279, 2210281

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A102529

Included Lab Sample IDs: 2210301, 2210302, 2210303, 2210304

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	102	99.1	P/P	90 - 110
Iron	98.9	101	P/P	90 - 110
Manganese	101	101	P/P	90 - 110
Zinc	105	105	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A102538

Included Lab Sample IDs: 2210302

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	98.9	99.1	P/P	95 - 105
Manganese	102	102	P/P	95 - 105
Zinc	99.1	99.5	P/P	95 - 105

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A102547

Included Lab Sample IDs: 2210282, 2210283, 2210284, 2210285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.2	98.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A102553

Included Lab Sample IDs: 2210282, 2210283, 2210284, 2210285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.2	97.2	P/P	90 - 110
Ammonia-N	97.5	97.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A102570

Included Lab Sample IDs: 2210282

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.5	96.8	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A102600

Included Lab Sample IDs: 2210301, 2210302, 2210303, 2210304

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	96.5	98.0	P/P	90 - 110
Aluminum	98.0	98.5	P/P	90 - 110
Antimony	103	105	P/P	90 - 110
Antimony	99.6	103	P/P	90 - 110
Arsenic	96.6	97.2	P/P	90 - 110
Arsenic	97.2	95.9	P/P	90 - 110
Cadmium	94.8	96.6	P/P	90 - 110
Cadmium	96.6	96.5	P/P	90 - 110
Copper	102	106	P/P	90 - 110
Copper	106	106	P/P	90 - 110
Lead	100	99.9	P/P	90 - 110
Lead	99.0	98.6	P/P	90 - 110
Nickel	94.0	94.4	P/P	90 - 110
Nickel	94.4	91.8	P/P	90 - 110
Selenium	97.1	99.7	P/P	90 - 110
Selenium	99.7	100	P/P	90 - 110
Silver	102	102	P/P	90 - 110
Silver	102	102	P/P	90 - 110
Thallium	101	100	P/P	90 - 110
Thallium	103	102	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		LCS	Precision	MS
						SMP	
EPA 180.1 Rev. 2.0	Turbidity					0.697	
	Turbidity					3.74	
EPA 200.7 Rev. 4.4	Chromium	103	103	103			0.544
	Iron	104	104	102			1.31
	Manganese	105	101	101			0.0487
	Zinc	107	108	109			1.49
EPA 200.8 Rev. 5.4	Aluminum	97.6	107	108			1.06
	Antimony	105	113	113			0.0461
	Arsenic	98.5	104	105			1.25
	Cadmium	96.1	97.3	97.8			0.524
	Copper	101	111	112			0.734
	Lead	103	110	112			1.82
	Nickel	94.2	94.6	95.9			1.32
	Selenium	96.8	104	105			0.550
	Silver	108	101	101			0.202
	Thallium	106	107	109			2.25
EPA 300.0 Rev. 2.1	Bromide	99.2	97.2	99.5			2.28
	Bromide	99.0	96.3	95.4			0.596
EPA 350.1 Rev. 2.0	Ammonia-N	97.0	102	102			0.130
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	115	112			2.02
EPA 353.2 Rev. 2.0	NO2NO3-N	100	99.5	99.5			0.0
EPA 365.1 Rev. 2.0	Total-P	106	105	103			1.42
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.9	99.9	99.6			0.227
SM 2320 B-2011	Total Alkalinity	102				0.271	
SM 2540 D-2011	TSS					9.01	
SM 4500 F-C-2011	Fluoride	95.0	99.6	102			1.39
	Fluoride	98.3	97.8	99.3			0.959
SM 5310 B-2011	Organic Carbon	102	99.4	98.6			0.753

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2210278, 2210279, 2210280, 2210281
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2210301, 2210302, 2210303, 2210304
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2210301, 2210302, 2210303, 2210304
EPA 300.0 Rev. 2.1	Bromide in aqueous matrices	2210278, 2210279, 2210280, 2210281
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2210282, 2210283, 2210284, 2210285
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2210282, 2210283, 2210284, 2210285
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2210282, 2210283, 2210284, 2210285
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2210282, 2210283, 2210284, 2210285
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2210286, 2210287, 2210288, 2210289
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2210278, 2210279, 2210280, 2210281
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2210278, 2210279, 2210280, 2210281
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2210278, 2210279, 2210280, 2210281
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2210282, 2210283, 2210284, 2210285

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	12/03/2020			12/03/2020 15:58	Yen Ta	2210278, 2210279, 2210280, 2210281
EPA 200.7 Rev. 4.4	12/03/2020	12/09/2020 14:55	Elliott D. Healy	12/10/2020 15:49	Betina Topolski	2210301
	12/03/2020	12/09/2020 14:55	Elliott D. Healy	12/10/2020 15:57	Betina Topolski	2210302
	12/03/2020	12/09/2020 14:55	Elliott D. Healy	12/10/2020 16:05	Betina Topolski	2210303
	12/03/2020	12/09/2020 14:55	Elliott D. Healy	12/10/2020 16:13	Betina Topolski	2210304
	12/03/2020	12/09/2020 14:55	Elliott D. Healy	12/11/2020 11:26	Betina Topolski	2210302
EPA 200.8 Rev. 5.4	12/03/2020	12/09/2020 14:55	Elliott D. Healy	12/15/2020 14:02	Alexander Thompson	2210301
	12/03/2020	12/09/2020 14:55	Elliott D. Healy	12/15/2020 15:53	Alexander Thompson	2210301
	12/03/2020	12/09/2020 14:55	Elliott D. Healy	12/15/2020 16:45	Alexander Thompson	2210302
	12/03/2020	12/09/2020 14:55	Elliott D. Healy	12/15/2020 16:52	Alexander Thompson	2210303
	12/03/2020	12/09/2020 14:55	Elliott D. Healy	12/15/2020 17:00	Alexander Thompson	2210304
EPA 300.0 Rev. 2.1	12/03/2020			12/08/2020 17:08	Lipi Saha	2210278
	12/03/2020			12/08/2020 17:27	Lipi Saha	2210279
	12/03/2020			12/08/2020 17:45	Lipi Saha	2210280
	12/03/2020			12/10/2020 16:21	Lipi Saha	2210281
EPA 350.1 Rev. 2.0	12/03/2020			12/13/2020 10:53	Ping Hua	2210282
	12/03/2020			12/13/2020 10:55	Ping Hua	2210283
	12/03/2020			12/13/2020 10:56	Ping Hua	2210284
	12/03/2020			12/13/2020 11:04	Ping Hua	2210285
EPA 351.2 Rev. 2.0	12/03/2020	12/07/2020 15:00	David Boose	12/11/2020 16:53	Julia Storbeck	2210284
	12/03/2020	12/07/2020 15:00	David Boose	12/11/2020 17:00	Julia Storbeck	2210282
	12/03/2020	12/07/2020 15:00	David Boose	12/11/2020 17:01	Julia Storbeck	2210283
	12/03/2020	12/07/2020 15:00	David Boose	12/11/2020 17:03	Julia Storbeck	2210285
EPA 353.2 Rev. 2.0	12/03/2020			12/07/2020 11:08	Beverly Y. Sanders	2210282
	12/03/2020			12/07/2020 11:14	Beverly Y. Sanders	2210283
	12/03/2020			12/07/2020 11:16	Beverly Y. Sanders	2210284
	12/03/2020			12/07/2020 11:17	Beverly Y. Sanders	2210285
EPA 365.1 Rev. 2.0	12/03/2020	12/08/2020 17:16	Yen Ta	12/10/2020 10:23	Benjamin T. Nordmann	2210283
	12/03/2020	12/08/2020 17:16	Yen Ta	12/10/2020 10:24	Benjamin T. Nordmann	2210284
	12/03/2020	12/08/2020 17:16	Yen Ta	12/10/2020 10:25	Benjamin T. Nordmann	2210285
	12/03/2020	12/08/2020 17:16	Yen Ta	12/14/2020 11:55	Lipi Saha	2210282
EPA 365.1 Rev. 2.0 dissolved	12/03/2020			12/03/2020 15:40	Samantha Davila	2210286
	12/03/2020			12/03/2020 15:41	Samantha Davila	2210287
	12/03/2020			12/03/2020 15:47	Samantha Davila	2210288
	12/03/2020			12/03/2020 15:48	Samantha Davila	2210289
SM 2320 B-2011	12/03/2020			12/08/2020 01:23	Dale L. Simmons	2210279
	12/03/2020			12/08/2020 01:33	Dale L. Simmons	2210281
	12/03/2020			12/08/2020 01:53	Dale L. Simmons	2210278
	12/03/2020			12/08/2020 02:10	Dale L. Simmons	2210280
SM 2540 D-2011	12/03/2020			12/04/2020 15:10	Yijie Li	2210278, 2210279, 2210280, 2210281

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 4500 F-C-2011	12/03/2020			12/04/2020 21:06	Dale L. Simmons	2210280
	12/03/2020			12/04/2020 21:35	Dale L. Simmons	2210278
	12/03/2020			12/09/2020 21:29	Dale L. Simmons	2210279
	12/03/2020			12/09/2020 21:34	Dale L. Simmons	2210281
SM 5310 B-2011	12/03/2020			12/09/2020 06:07	David Boose	2210282
	12/03/2020			12/09/2020 06:34	David Boose	2210283
	12/03/2020			12/09/2020 06:46	David Boose	2210284
	12/03/2020			12/09/2020 06:58	David Boose	2210285