

Chemical Analysis Report

CEN-DIST-2020-03-25-01

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

Event Description: **Halifax Run**
Request ID: **RQ-2020-02-03-71**
Customer: **CEN-DIST**
Project ID: **SMP**

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Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 17-APR-2020 13:18



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 @ 200m NNE of Main St Bridge

Collection Date/Time: 03/24/2020 11:41

Field ID: G5CE0109

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2167663	EPA 180.1 Rev. 2.0	Turbidity	22		NTU	P381300	
	EPA 300.0 Rev. 2.1	Bromide	58		mg Br/L	P381517	
	SM 2320 B-2011	Total Alkalinity	132		mg CaCO3/L	P381659	
	SM 2540 D-2011	TSS	36		mg/L	P381713	
	SM 4500 F-C-2011	Fluoride	1.1		mg F/L	P381965	
2167667	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P381428	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P381381	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P381391	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P381355	
	SM 5310 B-2011	Organic Carbon	5.2		mg C/L	P381389	
2167671	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.038		mg P/L	P381296	
2167698	EPA 200.7 Rev. 4.4	Aluminum	1.41E+03		ug/L	P381283	
		Iron	1.53E+03		ug/L	P381283	
		Manganese	38		ug/L	P381283	
		Zinc	20	U	ug/L	P381283	
	EPA 200.8 Rev. 5.4	Antimony	0.23	I	ug/L	P381283	
		Arsenic	2.23		ug/L	P381283	
		Barium	16.7		ug/L	P381283	
		Beryllium	0.040	U	ug/L	P381283	
		Boron**	3.71E+03		ug/L	P381283	
		Cadmium	0.080	U	ug/L	P381283	
		Chromium	2.7	I	ug/L	P381283	
		Cobalt	0.26	I	ug/L	P381283	
		Copper	3.6		ug/L	P381283	
		Lead	2.2		ug/L	P381283	
		Molybdenum	10.5		ug/L	P381283	
		Nickel	2.0	U	ug/L	P381283	
		Selenium	0.80	U	ug/L	P381283	
		Silver	0.040	U	ug/L	P381283	
		Thallium	0.40	U	ug/L	P381283	

Sample Location: Halifax River @ 1km N of Bethune point Park Boat Ramp

Collection Date/Time: 03/24/2020 12:05

Field ID: G5CE0110

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2167664	EPA 180.1 Rev. 2.0	Turbidity	12		NTU	P381300	
	EPA 300.0 Rev. 2.1	Bromide	61		mg Br/L	P381517	
	SM 2320 B-2011	Total Alkalinity	132		mg CaCO3/L	P381659	
	SM 2540 D-2011	TSS	22		mg/L	P381713	
	SM 4500 F-C-2011	Fluoride	1.0		mg F/L	P381965	
2167668	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P381428	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.40	I	mg N/L	P381381	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P381391	
	EPA 365.1 Rev. 2.0	Total-P	0.086		mg P/L	P381368	
	SM 5310 B-2011	Organic Carbon	4.5		mg C/L	P381389	
2167672	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.031		mg P/L	P381296	
2167699	EPA 200.7 Rev. 4.4	Iron	740		ug/L	P381283	
		Manganese	22		ug/L	P381283	
		Zinc	20	U	ug/L	P381283	
	EPA 200.8 Rev. 5.4	Aluminum	890		ug/L	P381283	
		Antimony	0.22	I	ug/L	P381283	
		Arsenic	2.12		ug/L	P381283	
		Barium	16.1		ug/L	P381283	
		Beryllium	0.040	U	ug/L	P381283	
		Boron**	3.88E+03		ug/L	P381283	
		Cadmium	0.080	U	ug/L	P381283	
		Chromium	1.6	U	ug/L	P381283	
		Cobalt	0.16	I	ug/L	P381283	
		Copper	2.8	I	ug/L	P381283	
		Lead	1.2	I	ug/L	P381283	
		Molybdenum	9.7		ug/L	P381283	
		Nickel	2.0	U	ug/L	P381283	
		Selenium	0.80	U	ug/L	P381283	
		Silver	0.040	U	ug/L	P381283	
		Thallium	0.40	U	ug/L	P381283	

Sample Location: Halifax River @ 250m N of Bethune Point Park Boat Ramp **Collection Date/Time: 03/24/2020 12:24**

Field ID: G5CE0108

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2167665	EPA 180.1 Rev. 2.0	Turbidity	13		NTU	P381300	
	EPA 300.0 Rev. 2.1	Bromide	61		mg Br/L	P381517	
	SM 2320 B-2011	Total Alkalinity	132		mg CaCO3/L	P381659	
	SM 2540 D-2011	TSS	28		mg/L	P381713	
	SM 4500 F-C-2011	Fluoride	1.1		mg F/L	P381965	
2167669	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P381428	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.44		mg N/L	P381381	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P381615	
	EPA 365.1 Rev. 2.0	Total-P	0.091		mg P/L	P381368	
	SM 5310 B-2011	Organic Carbon	4.4		mg C/L	P381389	
2167673	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.030		mg P/L	P381296	
2167700	EPA 200.7 Rev. 4.4	Iron	800		ug/L	P381283	
		Manganese	23		ug/L	P381283	
		Zinc	20	U	ug/L	P381283	
	EPA 200.8 Rev. 5.4	Aluminum	900		ug/L	P381283	
		Antimony	0.22	I	ug/L	P381283	
		Arsenic	2.18		ug/L	P381283	
		Barium	15.7		ug/L	P381283	
		Beryllium	0.040	U	ug/L	P381283	
		Boron**	3.95E+03		ug/L	P381283	
		Cadmium	0.080	U	ug/L	P381283	
		Chromium	1.6	U	ug/L	P381283	
		Cobalt	0.18	I	ug/L	P381283	
		Copper	3.0	I	ug/L	P381283	
		Lead	1.4	I	ug/L	P381283	
		Molybdenum	9.7		ug/L	P381283	
		Nickel	2.0	U	ug/L	P381283	
		Selenium	0.80	U	ug/L	P381283	
		Silver	0.040	U	ug/L	P381283	
		Thallium	0.40	U	ug/L	P381283	

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

Collection Date/Time: 03/24/2020 13:33

Field ID: G5CE0107

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2167666	EPA 180.1 Rev. 2.0	Turbidity	3.5		NTU	P381300	
	EPA 300.0 Rev. 2.1	Bromide	64		mg Br/L	P381517	
	SM 2320 B-2011	Total Alkalinity	127		mg CaCO3/L	P381659	
	SM 2540 D-2011	TSS	6	I	mg/L	P381713	
	SM 4500 F-C-2011	Fluoride	1.2		mg F/L	P381965	
2167670	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P381446	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.29	I	mg N/L	P381381	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P381615	
	EPA 365.1 Rev. 2.0	Total-P	0.040		mg P/L	P381368	
	SM 5310 B-2011	Organic Carbon	2.6		mg C/L	P381389	
2167674	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.016		mg P/L	P381296	
2167701	EPA 200.7 Rev. 4.4	Iron	160	I	ug/L	P381283	
		Manganese	9.2	I	ug/L	P381283	
		Zinc	20	U	ug/L	P381283	
	EPA 200.8 Rev. 5.4	Aluminum	239		ug/L	P381283	
		Antimony	0.23	I	ug/L	P381283	
		Arsenic	2.07		ug/L	P381283	
		Barium	12.8		ug/L	P381283	
		Beryllium	0.040	U	ug/L	P381283	
		Boron**	4.48E+03		ug/L	P381283	
		Cadmium	0.080	U	ug/L	P381283	
		Chromium	1.6	U	ug/L	P381283	
		Cobalt	0.080	U	ug/L	P381283	
		Copper	1.6	U	ug/L	P381283	
		Lead	0.80	U	ug/L	P381283	
		Molybdenum	11.7		ug/L	P381283	
		Nickel	2.0	U	ug/L	P381283	
		Selenium	0.80	U	ug/L	P381283	
		Silver	0.040	U	ug/L	P381283	
		Thallium	0.40	U	ug/L	P381283	

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P381300

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381283

Component	Result	Code	Units
Aluminum	60	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: P381283

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Molybdenum	0.15	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: P381517

Component	Result	Code	Units
Bromide	0.013	U	mg Br/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381428

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381446

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: P381381

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381391

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381615

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381355

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381368

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P381296

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

Reference Method: SM 2320 B-2011
Batch ID: P381659

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO3/L

Reference Method: SM 2540 D-2011
Batch ID: P381713

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P381965

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: P381389

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: P381283

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	94.2		P	85 - 115
Iron	104		P	85 - 115
Manganese	106		P	85 - 115
Zinc	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381283

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	105		P	85 - 115
Barium	103		P	85 - 115
Beryllium	97.0		P	85 - 115
Boron	97.8		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	103		P	85 - 115
Cobalt	103		P	85 - 115
Copper	105		P	85 - 115
Lead	102		P	85 - 115
Molybdenum	104		P	85 - 115
Nickel	93.9		P	85 - 115
Selenium	97.7		P	85 - 115
Silver	106		P	85 - 115
Thallium	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381517

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Bromide	96.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381428

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381446

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381381

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381391

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381615

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	97.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381355

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381368

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P381296

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	101		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P381659

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 107

Reference Method: SM 4500 F-C-2011
Batch ID: P381965

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	93.9		P	92 - 104

Reference Method: SM 5310 B-2011
Batch ID: P381389

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: P381283

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167301	Aluminum	90.6		P	70 - 130
2167301	Iron	99.8		P	70 - 130
2167301	Manganese	98.5		P	70 - 130
2167301	Zinc	102		P	70 - 130
2167302	Aluminum	92.5	89.2	P/P	70 - 130
2167302	Iron	108	102	P/P	70 - 130
2167302	Manganese	106	101	P/P	70 - 130
2167302	Zinc	109	104	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381283

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167301	Aluminum	106		P	70 - 130
2167301	Antimony	99.2		P	70 - 130
2167301	Arsenic	105		P	70 - 130
2167301	Barium	102		P	70 - 130
2167301	Beryllium	99.0		P	70 - 130
2167301	Boron	80.5		P	70 - 130
2167301	Cadmium	94.2		P	70 - 130
2167301	Chromium	104		P	70 - 130
2167301	Cobalt	104		P	70 - 130
2167301	Copper	107		P	70 - 130
2167301	Lead	106		P	70 - 130
2167301	Molybdenum	111		P	70 - 130
2167301	Nickel	103		P	70 - 130
2167301	Selenium	93.5		P	70 - 130
2167301	Silver	99.4		P	70 - 130
2167301	Thallium	110		P	70 - 130
2167302	Aluminum	105	103	P/P	70 - 130
2167302	Antimony	100	97.7	P/P	70 - 130
2167302	Arsenic	107	104	P/P	70 - 130
2167302	Barium	105	102	P/P	70 - 130
2167302	Beryllium	103	102	P/P	70 - 130
2167302	Boron	114	116	P/P	70 - 130
2167302	Cadmium	93.8	94.6	P/P	70 - 130
2167302	Chromium	103	101	P/P	70 - 130
2167302	Cobalt	106	104	P/P	70 - 130
2167302	Copper	108	103	P/P	70 - 130
2167302	Lead	106	104	P/P	70 - 130
2167302	Molybdenum	113	110	P/P	70 - 130
2167302	Nickel	107	106	P/P	70 - 130
2167302	Selenium	98.2	95.4	P/P	70 - 130
2167302	Silver	101	99.1	P/P	70 - 130
2167302	Thallium	112	109	P/P	70 - 130

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381517

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167411	Bromide	99.0	98.8	P/P	90 - 110
2167589	Bromide	98.6		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381428

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167403	Ammonia-N	103	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381446

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167676	Ammonia-N	105	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381381

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167399	Kjeldahl Nitrogen	109	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381391

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167249	NO2NO3-N	97.4	98.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381615

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167669	NO2NO3-N	97.5	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381355

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167075	Total-P	99.1	98.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381368

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167668	Total-P	98.0	96.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P381296

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167672	O-Phosphate-P	97.6	99.1	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P381965

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167664	Fluoride	101	104	P/P	91 - 105

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P381389

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167682	Organic Carbon	95.4	95.2	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P381300

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167625	Turbidity	8.96	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P381283

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167302	Aluminum	3.61	Spike	P	0 - 20
2167302	Iron	5.14	Spike	P	0 - 20
2167302	Manganese	4.50	Spike	P	0 - 20
2167302	Zinc	4.85	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P381283

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167302	Aluminum	2.18	Spike	P	0 - 20
2167302	Antimony	2.58	Spike	P	0 - 20
2167302	Arsenic	3.04	Spike	P	0 - 20
2167302	Barium	2.00	Spike	P	0 - 20
2167302	Beryllium	0.568	Spike	P	0 - 20
2167302	Boron	0.283	Spike	P	0 - 20
2167302	Cadmium	0.887	Spike	P	0 - 20
2167302	Chromium	2.05	Spike	P	0 - 20
2167302	Cobalt	1.88	Spike	P	0 - 20
2167302	Copper	4.04	Spike	P	0 - 20
2167302	Lead	2.37	Spike	P	0 - 20
2167302	Molybdenum	2.12	Spike	P	0 - 20
2167302	Nickel	0.871	Spike	P	0 - 20
2167302	Selenium	2.94	Spike	P	0 - 20
2167302	Silver	2.17	Spike	P	0 - 20
2167302	Thallium	2.55	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P381517

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167411	Bromide	0.124	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P381428

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167403	Ammonia-N	2.09	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381446

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167676	Ammonia-N	0.768	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381381

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167399	Kjeldahl Nitrogen	4.52	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381391

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167249	NO2NO3-N	1.39	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381615

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167669	NO2NO3-N	3.03	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381355

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167075	Total-P	0.629	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381368

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167668	Total-P	1.19	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P381296

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167672	O-Phosphate-P	1.16	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P381659

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168652	Total Alkalinity	0.299	Sample	P	0 - 3.3

Quality Assurance Report Precision

Reference Method: SM 2540 D-2011
Batch ID: P381713

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167675	TSS	6.67	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P381965

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167664	Fluoride	1.88	Spike	P	0 - 2.0

Reference Method: SM 5310 B-2011
Batch ID: P381389

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167682	Organic Carbon	0.173	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A98406

Included Lab Sample IDs: 2167663, 2167664, 2167665, 2167666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Bromide	99.8	99.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A98436

Included Lab Sample IDs: 2167671, 2167672, 2167673, 2167674

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.0	99.1	P/P	90 - 110
O-Phosphate-P	99.1	99.4	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A98437

Included Lab Sample IDs: 2167663, 2167664, 2167665, 2167666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	100	P/P	95 - 105

Reference Method: SM 5310 B-2011

Run ID: A98483

Included Lab Sample IDs: 2167667, 2167668, 2167669, 2167670

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	91.6	92.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A98485

Included Lab Sample IDs: 2167667, 2167668

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A98491

Included Lab Sample IDs: 2167667, 2167668, 2167669

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A98492

Included Lab Sample IDs: 2167670

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	104	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A98506

Included Lab Sample IDs: 2167667, 2167668, 2167669, 2167670

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.6	98.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A98543

Included Lab Sample IDs: 2167698, 2167699, 2167700, 2167701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.9	97.7	P/P	90 - 110
Iron	104	102	P/P	90 - 110
Manganese	105	102	P/P	90 - 110
Zinc	101	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A98556

Included Lab Sample IDs: 2167669, 2167670

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

Reference Method: SM 2320 B-2011

Run ID: A98581

Included Lab Sample IDs: 2167663, 2167664, 2167665, 2167666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.9	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A98592

Included Lab Sample IDs: 2167698, 2167699, 2167700, 2167701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	105	102	P/P	90 - 110
Antimony	103	104	P/P	90 - 110
Arsenic	102	105	P/P	90 - 110
Barium	102	104	P/P	90 - 110
Cadmium	104	104	P/P	90 - 110
Chromium	99.3	100	P/P	90 - 110
Cobalt	101	101	P/P	90 - 110
Copper	106	106	P/P	90 - 110
Lead	99.7	99.2	P/P	90 - 110
Molybdenum	99.5	99.9	P/P	90 - 110
Silver	104	104	P/P	90 - 110
Thallium	93.5	92.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A98608

Included Lab Sample IDs: 2167667, 2167668, 2167669, 2167670

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	98.5	P/P	90 - 110
Total-P	99.2	99.8	P/P	90 - 110
Total-P	99.8	98.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A98631

Included Lab Sample IDs: 2167698, 2167699, 2167700, 2167701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A98631

Included Lab Sample IDs: 2167698, 2167699, 2167700, 2167701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Beryllium	98.8	97.9	P/P	90 - 110
Nickel	104	97.7	P/P	90 - 110
Selenium	100	97.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A98671

Included Lab Sample IDs: 2167698, 2167699, 2167700, 2167701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	96.4	96.5	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A98715

Included Lab Sample IDs: 2167663, 2167664, 2167665, 2167666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	95.0	100	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			Precision SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					8.96	
EPA 200.7 Rev. 4.4	Aluminum	94.2	89.2	90.6	92.5		3.61
	Iron	104	99.8	108	102		5.14
	Manganese	106	98.5	106	101		4.50
	Zinc	105	102	109	104		4.85
EPA 200.8 Rev. 5.4	Aluminum	103	105	103	106		2.18
	Antimony	102	100	97.7	99.2		2.58
	Arsenic	105	107	104	105		3.04
	Barium	103	105	102	102		2.00
	Beryllium	97.0	103	102	99.0		0.568
	Boron	97.8	114	116	80.5		0.283
	Cadmium	101	93.8	94.6	94.2		0.887
	Chromium	103	103	101	104		2.05
	Cobalt	103	106	104	104		1.88
	Copper	105	108	103	107		4.04
	Lead	102	106	104	106		2.37
	Molybdenum	104	113	110	111		2.12
	Nickel	93.9	107	106	103		0.871
	Selenium	97.7	98.2	95.4	93.5		2.94
	Silver	106	101	99.1	99.4		2.17
	Thallium	103	112	109	110		2.55
EPA 300.0 Rev. 2.1	Bromide	96.4	99.0	98.8	98.6		0.124
EPA 350.1 Rev. 2.0	Ammonia-N	100	103	101			2.09
	Ammonia-N	99.6	105	104			0.768
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	109	103			4.52
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.5	97.4	98.8			1.39
	NO ₂ NO ₃ -N	97.5	97.5	100			3.03
EPA 365.1 Rev. 2.0	Total-P	105	99.1	98.4			0.629
	Total-P	105	98.0	96.7			1.19
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	97.6	99.1			1.16
SM 2320 B-2011	Total Alkalinity	101				0.299	
SM 2540 D-2011	TSS					6.67	
SM 4500 F-C-2011	Fluoride	93.9	101	104			1.88
SM 5310 B-2011	Organic Carbon	102	95.4	95.2			0.173

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2167663, 2167664, 2167665, 2167666
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2167698, 2167699, 2167700, 2167701
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2167698, 2167699, 2167700, 2167701
EPA 300.0 Rev. 2.1	Bromide in aqueous matrices	2167663, 2167664, 2167665, 2167666
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2167667, 2167668, 2167669, 2167670
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2167667, 2167668, 2167669, 2167670
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2167667, 2167668, 2167669, 2167670
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2167667, 2167668, 2167669, 2167670
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2167671, 2167672, 2167673, 2167674
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2167663, 2167664, 2167665, 2167666
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2167663, 2167664, 2167665, 2167666
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2167663, 2167664, 2167665, 2167666

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2167667, 2167668, 2167669, 2167670

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	03/25/2020			03/25/2020 17:03	Yen Ta	2167663, 2167664, 2167665, 2167666
EPA 200.7 Rev. 4.4	03/25/2020	03/25/2020 14:30	Elliott D. Healy	03/30/2020 21:57	Vijayalakshmi Reddy	2167698
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	03/30/2020 22:05	Vijayalakshmi Reddy	2167699
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	03/30/2020 22:13	Vijayalakshmi Reddy	2167700
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	03/30/2020 22:21	Vijayalakshmi Reddy	2167701
EPA 200.8 Rev. 5.4	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/01/2020 20:17	Justin Cutchin	2167698
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/01/2020 20:24	Justin Cutchin	2167699
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/01/2020 20:31	Justin Cutchin	2167700
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/01/2020 20:37	Justin Cutchin	2167701
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/02/2020 23:12	Justin Cutchin	2167698
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/02/2020 23:18	Justin Cutchin	2167699
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/02/2020 23:25	Justin Cutchin	2167700
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/02/2020 23:32	Justin Cutchin	2167701
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/03/2020 19:58	Justin Cutchin	2167698
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/03/2020 20:12	Justin Cutchin	2167699
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/03/2020 20:33	Justin Cutchin	2167700
	03/25/2020	03/25/2020 14:30	Elliott D. Healy	04/03/2020 20:47	Justin Cutchin	2167701
EPA 300.0 Rev. 2.1	03/25/2020			03/27/2020 16:12	Elliott Rodriguez	2167663
	03/25/2020			03/27/2020 16:29	Elliott Rodriguez	2167664
	03/25/2020			03/27/2020 16:47	Elliott Rodriguez	2167665
	03/25/2020			03/27/2020 17:04	Elliott Rodriguez	2167666
EPA 350.1 Rev. 2.0	03/25/2020			03/28/2020 13:48	Ping Hua	2167667
	03/25/2020			03/28/2020 13:50	Ping Hua	2167668
	03/25/2020			03/28/2020 13:51	Ping Hua	2167669
	03/25/2020			03/29/2020 13:59	Ping Hua	2167670
EPA 351.2 Rev. 2.0	03/25/2020	03/27/2020 09:45	Sima Feizi	03/30/2020 09:01	Jhamieka S. Greenwood	2167667
	03/25/2020	03/27/2020 09:45	Sima Feizi	03/30/2020 09:02	Jhamieka S. Greenwood	2167668
	03/25/2020	03/27/2020 09:45	Sima Feizi	03/30/2020 09:04	Jhamieka S. Greenwood	2167669
	03/25/2020	03/27/2020 09:45	Sima Feizi	03/30/2020 09:05	Jhamieka S. Greenwood	2167670
EPA 353.2 Rev. 2.0	03/25/2020			03/27/2020 12:05	Beverly Y. Sanders	2167667
	03/25/2020			03/27/2020 12:06	Beverly Y. Sanders	2167668
	03/25/2020			03/31/2020 16:25	Lauren Lees	2167669
	03/25/2020			03/31/2020 16:32	Lauren Lees	2167670
EPA 365.1 Rev. 2.0	03/25/2020	03/26/2020 17:15	Yen Ta	04/01/2020 18:24	Benjamin T. Nordmann	2167667
	03/25/2020	03/26/2020 17:15	Yen Ta	04/01/2020 19:17	Benjamin T. Nordmann	2167668
	03/25/2020	03/26/2020 17:15	Yen Ta	04/01/2020 19:18	Benjamin T. Nordmann	2167669
	03/25/2020	03/26/2020 17:15	Yen Ta	04/01/2020 19:25	Benjamin T. Nordmann	2167670
EPA 365.1 Rev. 2.0 dissolved	03/25/2020			03/25/2020 17:35	Julia Storbeck	2167672
	03/25/2020			03/25/2020 17:38	Julia Storbeck	2167671
	03/25/2020			03/25/2020 17:46	Julia Storbeck	2167673

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 365.1 Rev. 2.0 dissolved SM 2320 B-2011	03/25/2020			03/25/2020 17:47	Julia Storbeck	2167674
	03/25/2020			04/01/2020 13:37	Dale L. Simmons	2167663
	03/25/2020			04/01/2020 13:47	Dale L. Simmons	2167664
	03/25/2020			04/01/2020 13:56	Dale L. Simmons	2167665
	03/25/2020			04/01/2020 14:06	Dale L. Simmons	2167666
SM 2540 D-2011	03/25/2020			03/27/2020 15:32	Yijie Li	2167663, 2167664, 2167665, 2167666
SM 4500 F-C-2011	03/25/2020			04/09/2020 02:34	Samantha Davila	2167664
	03/25/2020			04/09/2020 02:48	Samantha Davila	2167663
	03/25/2020			04/09/2020 02:53	Samantha Davila	2167665
	03/25/2020			04/09/2020 02:58	Samantha Davila	2167666
SM 5310 B-2011	03/25/2020			03/27/2020 02:56	Madeline Gruver	2167667
	03/25/2020			03/27/2020 03:08	Madeline Gruver	2167668
	03/25/2020			03/27/2020 03:32	Madeline Gruver	2167669
	03/25/2020			03/27/2020 03:47	Madeline Gruver	2167670