Chemical Analysis Report

CEN-DIST-2020-03-31-01

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

Event Description: **SJR Above Puzzle x2**
Request ID: **RQ-2020-03-30-49**
Customer: **CEN-DIST**
Project ID: **SMP**

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Certified by: Colin Wright, Program Administrator

Date Certified: 16-APR-2020 16:01

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: SJR @ 250m NNW of Power line crossing **Collection Date/Time: 03/30/2020 11:41**

Field ID: G3CE0031 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2168796	EPA 300.0 Rev. 2.1	Chloride	290		mg Cl/L	P381947	
		Sulfate	88		mg SO4/L	P381951	
	SM 2320 B-2011	Total Alkalinity	90		mg CaCO3/L	P381936	RPD
	SM 2540 C-2011	TDS	742		mg/L	P381903	
	SM 2540 D-2011	TSS	9	I	mg/L	P381896	
	SM 4500 F-C-2011	Fluoride	0.17		mg F/L	P381847	
2168798	EPA 350.1 Rev. 2.0	Ammonia-N	0.042		mg N/L	P381761	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.7		mg N/L	P381705	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.059		mg N/L	P381668	
	EPA 365.1 Rev. 2.0	Total-P	0.075		mg P/L	P381685	
	SM 5310 B-2011	Organic Carbon	26		mg C/L	P381745	
2168812	EPA 200.7 Rev. 4.4	Barium	50.3		ug/L	P381775	
		Calcium	78.6		mg/L	P381775	
		Iron	500		ug/L	P381775	
		Magnesium	20.8		mg/L	P381775	
		Potassium	4.5		mg/L	P381775	
		Sodium	143		mg/L	P381775	
		Zinc	5.0	U	ug/L	P381775	
	EPA 200.8 Rev. 5.4	Aluminum	253		ug/L	P381775	
		Antimony	0.094	I	ug/L	P381775	
		Arsenic	0.93		ug/L	P381775	
		Boron**	54.3		ug/L	P381775	
		Cadmium	0.032	I	ug/L	P381775	
		Chromium	0.47	I	ug/L	P381775	
		Copper	1.10		ug/L	P381775	
		Lead	0.52		ug/L	P381775	
		Nickel	0.59	I	ug/L	P381775	
		Selenium	0.24	I	ug/L	P381775	
		Silver	0.010	U	ug/L	P381775	
		Thallium	0.10	U	ug/L	P381775	
	SM 2340B	Hardness	282		mg/L	P381775	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: SJR @ Power line crossing **Collection Date/Time: 03/30/2020 11:48**

Field ID: G3CE0015 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2168797	EPA 300.0 Rev. 2.1	Chloride	300		mg Cl/L	P381947	
		Sulfate	90		mg SO4/L	P381951	
	SM 2320 B-2011	Total Alkalinity	89		mg CaCO3/L	P381936	RPD
	SM 2540 C-2011	TDS	794		mg/L	P381903	
	SM 2540 D-2011	TSS	11		mg/L	P381896	
	SM 4500 F-C-2011	Fluoride	0.17		mg F/L	P381847	
2168799	EPA 350.1 Rev. 2.0	Ammonia-N	0.027		mg N/L	P381761	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.7		mg N/L	P381705	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.058		mg N/L	P381668	
	EPA 365.1 Rev. 2.0	Total-P	0.068		mg P/L	P381685	
	SM 5310 B-2011	Organic Carbon	26		mg C/L	P381745	
2168813	EPA 200.7 Rev. 4.4	Barium	51.6		ug/L	P381795	
		Calcium	81.1		mg/L	P381795	
		Iron	540		ug/L	P381795	
		Magnesium	21.8		mg/L	P381795	
		Potassium	4.6		mg/L	P381795	
		Sodium	143		mg/L	P381795	
		Zinc	5.0	U	ug/L	P381795	
	EPA 200.8 Rev. 5.4	Aluminum	289		ug/L	P381795	
		Antimony	0.12	I	ug/L	P381795	
		Arsenic	1.00		ug/L	P381795	
		Boron**	52.8		ug/L	P381795	
		Cadmium	0.020	U	ug/L	P381795	
		Chromium	0.56	I	ug/L	P381795	
		Copper	0.94		ug/L	P381795	
		Lead	0.54		ug/L	P381795	
		Nickel	0.50	U	ug/L	P381795	
		Selenium	0.27	I	ug/L	P381795	
		Silver	0.010	U	ug/L	P381795	
		Thallium	0.10	U	ug/L	P381795	
	SM 2340B	Hardness	292		mg/L	P381795	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381775

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381795

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381775

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	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 200.8 Rev. 5.4
Batch ID: P381795

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381795

Component	Result	Code	Units
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381947

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381951

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381761

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381705

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381668

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381685

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

Reference Method: SM 2320 B-2011
Batch ID: P381936

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

Reference Method: SM 2540 C-2011
Batch ID: P381903

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-2011
Batch ID: P381896

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P381847

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P381745

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: P381775

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	100		P	85 - 115
Calcium	103		P	85 - 115
Iron	102		P	85 - 115
Magnesium	101		P	85 - 115
Potassium	97.8		P	85 - 115
Sodium	101		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381795

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	100		P	85 - 115
Calcium	106		P	85 - 115
Iron	100		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	103		P	85 - 115
Sodium	103		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381775

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	95.4		P	85 - 115
Antimony	97.8		P	85 - 115
Arsenic	97.3		P	85 - 115
Boron	100		P	85 - 115
Cadmium	97.7		P	85 - 115
Chromium	100		P	85 - 115
Copper	97.4		P	85 - 115
Lead	93.8		P	85 - 115
Nickel	96.4		P	85 - 115
Selenium	96.0		P	85 - 115
Silver	97.2		P	85 - 115
Thallium	94.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381795

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.5		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	101		P	85 - 115
Boron	98.6		P	85 - 115
Cadmium	99.9		P	85 - 115
Chromium	106		P	85 - 115
Copper	99.4		P	85 - 115
Lead	96.6		P	85 - 115
Nickel	98.4		P	85 - 115
Selenium	101		P	85 - 115
Silver	101		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381795

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Thallium	96.2		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381947

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381951

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381761

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381705

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.4		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381668

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: P381685

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	102		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P381936

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.9		P	98 - 107

Reference Method: SM 4500 F-C-2011
Batch ID: P381847

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.2		P	92 - 104

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P381745

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.7		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381775

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168741	Barium	98.3	97.6	P/P	80 - 120
2168741	Calcium	105		P	80 - 120
2168741	Iron	98.7	100	P/P	80 - 120
2168741	Magnesium	102		P	80 - 120
2168741	Potassium	94.9	95.4	P/P	80 - 120
2168741	Sodium	93.7	93.7	P/P	80 - 120
2168741	Zinc	98.9	98.0	P/P	80 - 120
2168742	Barium	97.9		P	80 - 120
2168742	Calcium	99.3		P	80 - 120
2168742	Iron	99.8		P	80 - 120
2168742	Magnesium	98.2		P	80 - 120
2168742	Potassium	91.3		P	80 - 120
2168742	Sodium	100		P	80 - 120
2168742	Zinc	97.6		P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381795

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168957	Barium	101	100	P/P	80 - 120
2168957	Calcium	105		P	80 - 120
2168957	Iron	104	104	P/P	80 - 120
2168957	Magnesium	103		P	80 - 120
2168957	Potassium	107	106	P/P	80 - 120
2168957	Sodium	102	104	P/P	80 - 120
2168957	Zinc	104	103	P/P	80 - 120
2169016	Barium	99.5		P	80 - 120
2169016	Calcium	103		P	80 - 120
2169016	Iron	103		P	80 - 120
2169016	Magnesium	100		P	80 - 120
2169016	Potassium	103		P	80 - 120
2169016	Sodium	101		P	80 - 120
2169016	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381775

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168741	Aluminum	95.7	95.4	P/P	80 - 120
2168741	Antimony	99.9	99.6	P/P	80 - 120
2168741	Arsenic	98.8	99.0	P/P	80 - 120
2168741	Boron	101	99.3	P/P	80 - 120
2168741	Cadmium	102	99.9	P/P	80 - 120
2168741	Chromium	105	105	P/P	80 - 120
2168741	Copper	97.8	97.4	P/P	80 - 120
2168741	Lead	95.0	94.4	P/P	80 - 120
2168741	Nickel	96.2	96.7	P/P	80 - 120
2168741	Selenium	97.6	97.8	P/P	80 - 120
2168741	Silver	98.7	98.7	P/P	80 - 120
2168741	Thallium	97.1	98.0	P/P	80 - 120
2168742	Aluminum	94.7		P	80 - 120
2168742	Antimony	100		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381775

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168742	Arsenic	98.9		P	80 - 120
2168742	Boron	97.2		P	80 - 120
2168742	Cadmium	101		P	80 - 120
2168742	Chromium	102		P	80 - 120
2168742	Copper	96.1		P	80 - 120
2168742	Lead	95.2		P	80 - 120
2168742	Nickel	94.0		P	80 - 120
2168742	Selenium	96.8		P	80 - 120
2168742	Silver	98.9		P	80 - 120
2168742	Thallium	98.4		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381795

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168957	Aluminum	97.6	98.7	P/P	80 - 120
2168957	Antimony	103	103	P/P	80 - 120
2168957	Arsenic	100	101	P/P	80 - 120
2168957	Boron	96.0	99.9	P/P	80 - 120
2168957	Cadmium	102	101	P/P	80 - 120
2168957	Chromium	106	106	P/P	80 - 120
2168957	Copper	95.3	97.3	P/P	80 - 120
2168957	Lead	96.2	96.8	P/P	80 - 120
2168957	Nickel	95.4	97.0	P/P	80 - 120
2168957	Selenium	99.0	99.0	P/P	80 - 120
2168957	Silver	101	100	P/P	80 - 120
2168957	Thallium	105	96.6	P/P	80 - 120
2169016	Aluminum	96.2		P	80 - 120
2169016	Antimony	103		P	80 - 120
2169016	Arsenic	101		P	80 - 120
2169016	Boron	97.2		P	80 - 120
2169016	Cadmium	100		P	80 - 120
2169016	Chromium	106		P	80 - 120
2169016	Copper	98.6		P	80 - 120
2169016	Lead	96.2		P	80 - 120
2169016	Nickel	96.6		P	80 - 120
2169016	Selenium	97.7		P	80 - 120
2169016	Silver	100		P	80 - 120
2169016	Thallium	105		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381947

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168759	Chloride	102		P	90 - 110
2168774	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381951

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168759	Sulfate	101		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381761

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168776	Ammonia-N	98.7	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381705

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168823	Kjeldahl Nitrogen	98.0	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381668

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168780	NO2NO3-N	94.4	96.4	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P381847

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2167545	Fluoride	101	101	P/P	91 - 105

Reference Method: SM 5310 B-2011
Batch ID: P381745

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168776	Organic Carbon	98.9	98.1	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381775

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168741	Barium	0.701	Spike	P	0 - 20
2168741	Calcium	0.0339	Spike	P	0 - 20
2168741	Iron	1.53	Spike	P	0 - 20
2168741	Magnesium	1.36	Spike	P	0 - 20
2168741	Potassium	0.454	Spike	P	0 - 20
2168741	Sodium	0.0149	Spike	P	0 - 20
2168741	Zinc	0.878	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381795

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168957	Barium	0.507	Spike	P	0 - 20
2168957	Calcium	0.376	Spike	P	0 - 20
2168957	Iron	0.589	Spike	P	0 - 20
2168957	Magnesium	0.233	Spike	P	0 - 20
2168957	Potassium	0.688	Spike	P	0 - 20
2168957	Sodium	0.721	Spike	P	0 - 20
2168957	Zinc	1.17	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381775

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168741	Aluminum	0.267	Spike	P	0 - 20
2168741	Antimony	0.272	Spike	P	0 - 20
2168741	Arsenic	0.178	Spike	P	0 - 20
2168741	Boron	1.73	Spike	P	0 - 20
2168741	Cadmium	1.98	Spike	P	0 - 20
2168741	Chromium	0.215	Spike	P	0 - 20
2168741	Copper	0.406	Spike	P	0 - 20
2168741	Lead	0.673	Spike	P	0 - 20
2168741	Nickel	0.459	Spike	P	0 - 20
2168741	Selenium	0.105	Spike	P	0 - 20
2168741	Silver	0.0412	Spike	P	0 - 20
2168741	Thallium	0.837	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381795

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168957	Aluminum	0.921	Spike	P	0 - 20
2168957	Antimony	0.259	Spike	P	0 - 20
2168957	Arsenic	0.975	Spike	P	0 - 20
2168957	Boron	3.62	Spike	P	0 - 20
2168957	Cadmium	0.779	Spike	P	0 - 20
2168957	Chromium	0.393	Spike	P	0 - 20
2168957	Copper	2.08	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381795

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168957	Lead	0.591	Spike	P	0 - 20
2168957	Nickel	1.68	Spike	P	0 - 20
2168957	Selenium	0.0765	Spike	P	0 - 20
2168957	Silver	1.09	Spike	P	0 - 20
2168957	Thallium	8.37	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381947

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168759	Chloride	0.713	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381951

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168759	Sulfate	0.737	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381761

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168776	Ammonia-N	1.20	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381705

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168823	Kjeldahl Nitrogen	5.05	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381668

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168780	NO2NO3-N	1.95	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381685

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168776	Total-P	0.666	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-2011
Batch ID: P381936

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168861	Total Alkalinity	8.72	Sample	F	0 - 3.3

Reference Method: SM 2540 C-2011
Batch ID: P381903

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168774	TDS	8.70	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P381847

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2167545	Fluoride	0.477	Spike	P	0 - 2.0

Reference Method: SM 5310 B-2011
Batch ID: P381745

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168776	Organic Carbon	0.574	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A98582
Included Lab Sample IDs: 2168798, 2168799

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	98.0	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A98614
Included Lab Sample IDs: 2168798, 2168799

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.1	97.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A98616
Included Lab Sample IDs: 2168798, 2168799

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A98623
Included Lab Sample IDs: 2168798, 2168799

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A98637
Included Lab Sample IDs: 2168798, 2168799

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	103	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A98665
Included Lab Sample IDs: 2168796, 2168797

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.5	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A98686
Included Lab Sample IDs: 2168796, 2168797

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.9	98.2	P/P	90 - 110
Sulfate	101	99.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98700
Included Lab Sample IDs: 2168813

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.8	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98700
Included Lab Sample IDs: 2168813

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	101	101	P/P	90 - 110
Arsenic	102	102	P/P	90 - 110
Boron	98.3	101	P/P	90 - 110
Cadmium	101	100	P/P	90 - 110
Chromium	106	105	P/P	90 - 110
Copper	99.0	100	P/P	90 - 110
Lead	98.2	97.8	P/P	90 - 110
Nickel	100	101	P/P	90 - 110
Selenium	101	101	P/P	90 - 110
Silver	101	101	P/P	90 - 110
Thallium	93.0	92.8	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A98708
Included Lab Sample IDs: 2168796, 2168797

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	104	96.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A98711
Included Lab Sample IDs: 2168812

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	103	P/P	90 - 110
Calcium	105	101	P/P	90 - 110
Iron	104	101	P/P	90 - 110
Magnesium	103	100	P/P	90 - 110
Potassium	103	99.5	P/P	90 - 110
Sodium	104	100	P/P	90 - 110
Zinc	99.6	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98712
Included Lab Sample IDs: 2168812

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.7	99.4	P/P	90 - 110
Antimony	92.8	91.9	P/P	90 - 110
Arsenic	99.4	98.8	P/P	90 - 110
Boron	102	103	P/P	90 - 110
Cadmium	97.8	97.9	P/P	90 - 110
Chromium	95.8	95.7	P/P	90 - 110
Copper	96.9	96.2	P/P	90 - 110
Lead	98.4	97.9	P/P	90 - 110
Nickel	96.5	95.3	P/P	90 - 110
Selenium	98.3	97.7	P/P	90 - 110
Silver	94.8	94.9	P/P	90 - 110
Thallium	95.0	95.1	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A98713
Included Lab Sample IDs: 2168813

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	103	103	P/P	95 - 105
Calcium	101	102	P/P	95 - 105
Iron	103	101	P/P	95 - 105
Magnesium	104	102	P/P	95 - 105
Potassium	100	100	P/P	95 - 105
Sodium	100	101	P/P	95 - 105
Zinc	101	101	P/P	95 - 105

* 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		
						LCS	SMP	MS
EPA 200.7 Rev. 4.4	Barium	100	98.3	97.6	97.9			0.701
	Barium	100	101	100	99.5			0.507
	Calcium	103	105	99.3				0.0339
	Calcium	106	105	103				0.376
	Iron	102	98.7	100	99.8			1.53
	Iron	100	104	104	103			0.589
	Magnesium	101	102	98.2				1.36
	Magnesium	106	103	100				0.233
	Potassium	97.8	94.9	95.4	91.3			0.454
	Potassium	103	107	106	103			0.688
	Sodium	101	93.7	93.7	100			0.0149
	Sodium	103	102	104	101			0.721
	Zinc	100	98.9	98.0	97.6			0.878
	Zinc	102	104	103	101			1.17
EPA 200.8 Rev. 5.4	Aluminum	95.4	95.7	95.4	94.7			0.267
	Aluminum	96.5	97.6	98.7	96.2			0.921
	Antimony	97.8	99.9	99.6	100			0.272
	Antimony	102	103	103	103			0.259
	Arsenic	97.3	99.0	98.9	98.8			0.178
	Arsenic	101	100	101	101			0.975
	Boron	100	101	99.3	97.2			1.73
	Boron	98.6	96.0	99.9	97.2			3.62
	Cadmium	97.7	102	99.9	101			1.98
	Cadmium	99.9	102	101	100			0.779
	Chromium	100	105	105	102			0.215
	Chromium	106	106	106	106			0.393
	Copper	97.4	97.8	97.4	96.1			0.406
	Copper	99.4	95.3	97.3	98.6			2.08
	Lead	93.8	95.0	94.4	95.2			0.673
	Lead	96.6	96.2	96.8	96.2			0.591
	Nickel	96.4	96.2	96.7	94.0			0.459
	Nickel	98.4	95.4	97.0	96.6			1.68
	Selenium	96.0	97.6	97.8	96.8			0.105
	Selenium	101	99.0	99.0	97.7			0.0765
	Silver	97.2	98.7	98.7	98.9			0.0412
	Silver	101	101	100	100			1.09
	Thallium	94.4	97.1	98.0	98.4			0.837
	Thallium	96.2	105	96.6	105			8.37
EPA 300.0 Rev. 2.1	Chloride	102	102	101			0.713	
	Sulfate	103	101				0.737	
EPA 350.1 Rev. 2.0	Ammonia-N	104	98.7	100				1.20
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.4	98.0	105				5.05
EPA 353.2 Rev. 2.0	NO2NO3-N	97.5	94.4	96.4				1.95
EPA 365.1 Rev. 2.0	Total-P	102						0.666
SM 2320 B-2011	Total Alkalinity	98.9					8.72	
SM 2540 C-2011	TDS						8.70	
SM 4500 F-C-2011	Fluoride	97.2	101	101				0.477
SM 5310 B-2011	Organic Carbon	96.7	98.9	98.1				0.574

Reference Method Descriptions

Method	Description	Associated Samples

Reference Method Descriptions

Method	Description	Associated Samples
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2168812, 2168813
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2168812, 2168813
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2168796, 2168797
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2168796, 2168797
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2168798, 2168799
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2168798, 2168799
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2168798, 2168799
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2168798, 2168799
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2168796, 2168797
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2168812, 2168813
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2168796, 2168797
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2168796, 2168797
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2168796, 2168797
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2168798, 2168799

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 200.7 Rev. 4.4	03/31/2020	04/03/2020 13:56	Alexander Thompson	04/08/2020 17:25	Betina Topolski	2168812
	03/31/2020	04/03/2020 14:10	Alexander Thompson	04/08/2020 13:48	Betina Topolski	2168813
EPA 200.8 Rev. 5.4	03/31/2020	04/03/2020 13:56	Alexander Thompson	04/08/2020 17:50	Alexander Thompson	2168812
	03/31/2020	04/03/2020 14:10	Alexander Thompson	04/07/2020 20:34	Justin Cutchin	2168813
EPA 300.0 Rev. 2.1	03/31/2020			04/08/2020 12:30	Jhamieka S. Greenwood	2168796
	03/31/2020			04/08/2020 12:43	Jhamieka S. Greenwood	2168797
EPA 350.1 Rev. 2.0	03/31/2020			04/02/2020 16:34	Julia Storbeck	2168798
	03/31/2020			04/02/2020 16:36	Julia Storbeck	2168799
EPA 351.2 Rev. 2.0	03/31/2020	04/02/2020 10:15	Sima Feizi	04/03/2020 10:45	Jhamieka S. Greenwood	2168798
	03/31/2020	04/02/2020 10:15	Sima Feizi	04/03/2020 10:47	Jhamieka S. Greenwood	2168799
EPA 353.2 Rev. 2.0	03/31/2020			04/01/2020 18:26	Lauren Lees	2168798
	03/31/2020			04/01/2020 18:27	Lauren Lees	2168799
EPA 365.1 Rev. 2.0	03/31/2020	04/02/2020 10:05	Lipi Saha	04/02/2020 18:07	Benjamin T. Nordmann	2168798
	03/31/2020	04/02/2020 10:05	Lipi Saha	04/02/2020 18:08	Benjamin T. Nordmann	2168799
SM 2320 B-2011	03/31/2020			04/08/2020 11:17	Samantha Davila	2168796
	03/31/2020			04/08/2020 11:29	Samantha Davila	2168797
SM 2340B	03/31/2020			04/08/2020 13:48	Betina Topolski	2168813
	03/31/2020			04/08/2020 17:25	Betina Topolski	2168812
SM 2540 C-2011	03/31/2020			04/01/2020 16:21	Yijie Li	2168796, 2168797
SM 2540 D-2011	03/31/2020			04/01/2020 16:21	Yijie Li	2168796, 2168797
SM 4500 F-C-2011	03/31/2020			04/05/2020 10:39	Samantha Davila	2168796
	03/31/2020			04/05/2020 10:52	Samantha Davila	2168797
SM 5310 B-2011	03/31/2020			04/02/2020 02:55	Madeline Gruver	2168798
	03/31/2020			04/02/2020 03:09	Madeline Gruver	2168799