Chemical Analysis Report

SO-DIST-2020-04-01-01

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

Event Description: **2020 SMP : Charlotte Cricks**
Request ID: **RQ-2020-03-30-48**
Customer: **SO-DIST**
Project ID: **SMP**

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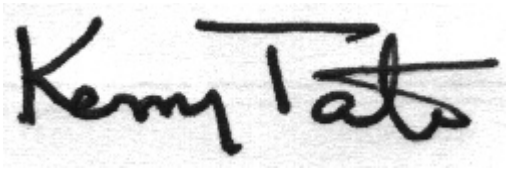
Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 20-APR-2020 11:53



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: Shell Cr. @HathawayPark **Collection Date/Time: 03/31/2020 08:25**

Field ID: G3SD0120 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2169047	EPA 300.0 Rev. 2.1	Chloride	160		mg Cl/L	P381992	
		Sulfate	75		mg SO4/L	P381998	
	SM 2320 B-2011	Total Alkalinity	194		mg CaCO3/L	P381935	
	SM 2540 C-2011	TDS	570		mg/L	P382030	
	SM 2540 D-2011	TSS	2	I	mg/L	P382024	
	SM 4500 F-C-2011	Fluoride	0.25		mg F/L	P381937	
2169049	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P381754	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.80		mg N/L	P381886	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P381662	
	EPA 365.1 Rev. 2.0	Total-P	0.064		mg P/L	P381738	
	SM 5310 B-2011	Organic Carbon	13		mg C/L	P381808	
2169051	EPA 200.7 Rev. 4.4	Barium	42.7		ug/L	P381934	
		Calcium	113		mg/L	P381934	
		Iron	49	I	ug/L	P381934	
		Magnesium	14.9		mg/L	P381934	
		Potassium	8.1		mg/L	P381934	
		Sodium	73.4		mg/L	P381934	
		Zinc	5.0	U	ug/L	P381934	
	EPA 200.8 Rev. 5.4	Aluminum	11	I	ug/L	P381934	
		Antimony	0.23		ug/L	P381934	
		Arsenic	0.94		ug/L	P381934	
		Boron**	65.4		ug/L	P381934	
		Cadmium	0.020	U	ug/L	P381934	
		Chromium	0.40	U	ug/L	P381934	
		Copper	0.83		ug/L	P381934	
		Lead	0.20	U	ug/L	P381934	
		Nickel	1.3	I	ug/L	P381934	
		Selenium	0.33	I	ug/L	P381934	
		Silver	0.010	U	ug/L	P381934	
		Thallium	0.10	U	ug/L	P381934	
	SM 2340B	Hardness	343		mg/L	P381934	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Big Slough @ ButlerPark **Collection Date/Time: 03/31/2020 09:25**

Field ID: G3SD0168 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2169048	EPA 300.0 Rev. 2.1	Chloride	99		mg Cl/L	P381992	
		Sulfate	57		mg SO4/L	P381998	
	SM 2320 B-2011	Total Alkalinity	223		mg CaCO3/L	P381987	
	SM 2540 C-2011	TDS	501		mg/L	P382030	
	SM 2540 D-2011	TSS	3	I	mg/L	P382024	
	SM 4500 F-C-2011	Fluoride	0.42		mg F/L	P381924	
2169050	EPA 350.1 Rev. 2.0	Ammonia-N	0.021		mg N/L	P381754	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.91		mg N/L	P381886	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.035		mg N/L	P381662	
	EPA 365.1 Rev. 2.0	Total-P	0.19		mg P/L	P381738	
	SM 5310 B-2011	Organic Carbon	14		mg C/L	P381808	
2169052	EPA 200.7 Rev. 4.4	Barium	13.1		ug/L	P381934	
		Calcium	113		mg/L	P381934	
		Iron	480		ug/L	P381934	
		Magnesium	13.0		mg/L	P381934	
		Potassium	1.7		mg/L	P381934	
		Sodium	52.1		mg/L	P381934	
		Zinc	5.0	U	ug/L	P381934	
	EPA 200.8 Rev. 5.4	Aluminum	20	I	ug/L	P381934	
		Antimony	0.094	I	ug/L	P381934	
		Arsenic	1.57		ug/L	P381934	
		Boron**	47.7		ug/L	P381934	
		Cadmium	0.020	U	ug/L	P381934	
		Chromium	0.61	I	ug/L	P381934	
		Copper	0.40	U	ug/L	P381934	
		Lead	0.20	U	ug/L	P381934	
		Nickel	0.77	I	ug/L	P381934	
		Selenium	0.22	I	ug/L	P381934	
		Silver	0.010	U	ug/L	P381934	
		Thallium	0.10	U	ug/L	P381934	
	SM 2340B	Hardness	335		mg/L	P381934	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: 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: P381934

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: P381934

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 300.0 Rev. 2.1
Batch ID: P381992

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381998

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381754

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381886

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381662

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381738

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

Reference Method: SM 2320 B-2011
Batch ID: P381935

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

Reference Method: SM 2320 B-2011
Batch ID: P381987

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

Reference Method: SM 2540 C-2011
Batch ID: P382030

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P382024

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P381924

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-2011
Batch ID: P381937

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P381808

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: P381934

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	97.5		P	85 - 115
Calcium	103		P	85 - 115
Iron	102		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	97.4		P	85 - 115
Sodium	102		P	85 - 115
Zinc	98.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381934

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.1		P	85 - 115
Antimony	97.1		P	85 - 115
Arsenic	98.8		P	85 - 115
Boron	101		P	85 - 115
Cadmium	96.3		P	85 - 115
Chromium	97.2		P	85 - 115
Copper	97.6		P	85 - 115
Lead	96.7		P	85 - 115
Nickel	96.2		P	85 - 115
Selenium	95.3		P	85 - 115
Silver	98.1		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381992

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381998

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381754

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381886

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381662

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381738

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

Reference Method: SM 2320 B-2011
Batch ID: P381935

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.4		P	98 - 107

Reference Method: SM 2320 B-2011
Batch ID: P381987

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

Reference Method: SM 4500 F-C-2011
Batch ID: P381924

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	102		P	92 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P381937

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	92 - 104

Reference Method: SM 5310 B-2011
Batch ID: P381808

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.5		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381934

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2169189	Barium	97.4	97.6	P/P	80 - 120
2169189	Calcium	101		P	80 - 120
2169189	Iron	105	105	P/P	80 - 120
2169189	Magnesium	104	104	P/P	80 - 120
2169189	Potassium	96.8	97.3	P/P	80 - 120
2169189	Sodium	99.7		P	80 - 120
2169189	Zinc	100	101	P/P	80 - 120
2169190	Barium	95.2		P	80 - 120
2169190	Calcium	98.8		P	80 - 120
2169190	Iron	102		P	80 - 120
2169190	Magnesium	103		P	80 - 120
2169190	Potassium	99.9		P	80 - 120
2169190	Sodium	93.3		P	80 - 120
2169190	Zinc	95.6		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381934

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2169189	Aluminum	94.8	93.0	P/P	80 - 120
2169189	Antimony	96.8	95.2	P/P	80 - 120
2169189	Arsenic	96.6	96.4	P/P	80 - 120
2169189	Boron	101	98.8	P/P	80 - 120
2169189	Cadmium	97.8	96.5	P/P	80 - 120
2169189	Chromium	96.1	95.9	P/P	80 - 120
2169189	Copper	95.8	95.0	P/P	80 - 120
2169189	Lead	96.2	96.0	P/P	80 - 120
2169189	Nickel	94.8	94.4	P/P	80 - 120
2169189	Selenium	91.3	92.3	P/P	80 - 120
2169189	Silver	96.9	94.9	P/P	80 - 120
2169189	Thallium	102	101	P/P	80 - 120
2169190	Aluminum	94.7		P	80 - 120
2169190	Antimony	95.1		P	80 - 120
2169190	Arsenic	97.1		P	80 - 120
2169190	Boron	100		P	80 - 120
2169190	Cadmium	96.0		P	80 - 120
2169190	Chromium	95.5		P	80 - 120
2169190	Copper	94.9		P	80 - 120
2169190	Lead	96.5		P	80 - 120
2169190	Nickel	93.5		P	80 - 120
2169190	Selenium	91.9		P	80 - 120
2169190	Silver	95.7		P	80 - 120
2169190	Thallium	101		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381992

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168976	Chloride	100		P	90 - 110
2169075	Chloride	99.4		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381998

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168976	Sulfate	101		P	90 - 110
2169075	Sulfate	98.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381754

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2169038	Ammonia-N	96.4	98.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381662

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168985	NO2NO3-N	96.5	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381738

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168985	Total-P	106	104	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P381924

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2169306	Fluoride	100	99.5	P/P	91 - 105

Reference Method: SM 4500 F-C-2011
Batch ID: P381937

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168962	Fluoride	100	100	P/P	91 - 105

Reference Method: SM 5310 B-2011
Batch ID: P381808

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2169030	Organic Carbon	97.2	99.2	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381934

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2169189	Barium	0.180	Spike	P	0 - 20
2169189	Calcium	0.112	Spike	P	0 - 20
2169189	Iron	0.419	Spike	P	0 - 20
2169189	Magnesium	0.417	Spike	P	0 - 20
2169189	Potassium	0.401	Spike	P	0 - 20
2169189	Sodium	0.333	Spike	P	0 - 20
2169189	Zinc	0.186	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381934

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2169189	Aluminum	1.60	Spike	P	0 - 20
2169189	Antimony	1.70	Spike	P	0 - 20
2169189	Arsenic	0.221	Spike	P	0 - 20
2169189	Boron	1.69	Spike	P	0 - 20
2169189	Cadmium	1.26	Spike	P	0 - 20
2169189	Chromium	0.240	Spike	P	0 - 20
2169189	Copper	0.780	Spike	P	0 - 20
2169189	Lead	0.207	Spike	P	0 - 20
2169189	Nickel	0.405	Spike	P	0 - 20
2169189	Selenium	1.07	Spike	P	0 - 20
2169189	Silver	2.03	Spike	P	0 - 20
2169189	Thallium	0.302	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381992

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2169075	Chloride	0.335	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381998

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2169075	Sulfate	0.479	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381754

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2169038	Ammonia-N	1.40	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381886

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2169029	Kjeldahl Nitrogen	1.25	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381662

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168985	NO2NO3-N	1.32	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381738

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168985	Total-P	1.55	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P381935

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168962	Total Alkalinity	0.556	Sample	P	0 - 3.3

Reference Method: SM 2320 B-2011
Batch ID: P381987

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2169075	Total Alkalinity	2.10	Sample	P	0 - 3.3

Reference Method: SM 2540 C-2011
Batch ID: P382030

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2169035	TDS	5.56	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P381924

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2169306	Fluoride	0.508	Spike	P	0 - 2.0

Reference Method: SM 4500 F-C-2011
Batch ID: P381937

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168962	Fluoride	0.0	Spike	P	0 - 2.0

Quality Assurance Report
Precision

Reference Method: SM 5310 B-2011
Batch ID: P381808

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2169030	Organic Carbon	1.09	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: 2169049, 2169050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.0	97.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A98623
Included Lab Sample IDs: 2169049, 2169050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	103	P/P	90 - 110
Ammonia-N	103	102	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A98644
Included Lab Sample IDs: 2169049, 2169050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.8	95.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A98647
Included Lab Sample IDs: 2169049, 2169050

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A98686
Included Lab Sample IDs: 2169047, 2169048

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.6	99.8	P/P	90 - 110
Sulfate	99.7	101	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A98694
Included Lab Sample IDs: 2169048

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	104	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A98705
Included Lab Sample IDs: 2169049, 2169050

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

Reference Method: SM 2320 B-2011
Run ID: A98708
Included Lab Sample IDs: 2169047

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-2011
Run ID: A98708
Included Lab Sample IDs: 2169047

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	95.4	104	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A98708
Included Lab Sample IDs: 2169047

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	103	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98721
Included Lab Sample IDs: 2169051, 2169052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.9	97.9	P/P	90 - 110
Arsenic	98.9	98.5	P/P	90 - 110
Boron	106	101	P/P	90 - 110
Cadmium	99.4	96.7	P/P	90 - 110
Chromium	95.7	93.3	P/P	90 - 110
Copper	95.2	94.1	P/P	90 - 110
Lead	99.0	98.0	P/P	90 - 110
Nickel	96.4	94.0	P/P	90 - 110
Selenium	97.9	96.3	P/P	90 - 110
Silver	94.8	93.8	P/P	90 - 110
Thallium	96.2	94.7	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A98727
Included Lab Sample IDs: 2169048

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.3	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98738
Included Lab Sample IDs: 2169051, 2169052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	94.1	94.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A98761
Included Lab Sample IDs: 2169051, 2169052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	103	P/P	90 - 110
Barium	103	100	P/P	90 - 110
Calcium	102	100	P/P	90 - 110
Calcium	102	102	P/P	90 - 110
Iron	105	105	P/P	90 - 110
Iron	105	105	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A98761
Included Lab Sample IDs: 2169051, 2169052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Magnesium	103	102	P/P	90 - 110
Magnesium	104	103	P/P	90 - 110
Potassium	101	100	P/P	90 - 110
Potassium	102	101	P/P	90 - 110
Sodium	100	98.9	P/P	90 - 110
Sodium	101	100	P/P	90 - 110
Zinc	100	96.9	P/P	90 - 110
Zinc	101	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		
						LCS	SMP	MS
EPA 200.7 Rev. 4.4	Barium	97.5	97.4	97.6	95.2			0.180
	Calcium	103	101	98.8				0.112
	Iron	102	105	105	102			0.419
	Magnesium	104	104	104	103			0.417
	Potassium	97.4	96.8	97.3	99.9			0.401
	Sodium	102	99.7	93.3				0.333
	Zinc	98.9	100	101	95.6			0.186
EPA 200.8 Rev. 5.4	Aluminum	97.1	94.8	93.0	94.7			1.60
	Antimony	97.1	96.8	95.2	95.1			1.70
	Arsenic	98.8	96.6	96.4	97.1			0.221
	Boron	101	101	98.8	100			1.69
	Cadmium	96.3	97.8	96.5	96.0			1.26
	Chromium	97.2	96.1	95.9	95.5			0.240
	Copper	97.6	95.8	95.0	94.9			0.780
	Lead	96.7	96.2	96.0	96.5			0.207
	Nickel	96.2	94.8	94.4	93.5			0.405
	Selenium	95.3	91.3	92.3	91.9			1.07
	Silver	98.1	96.9	94.9	95.7			2.03
	Thallium	102	102	101	101			0.302
EPA 300.0 Rev. 2.1	Chloride	99.7	99.4	100			0.335	
	Sulfate	100	98.5	101			0.479	
EPA 350.1 Rev. 2.0	Ammonia-N	102	96.4	98.1				1.40
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100						1.25
EPA 353.2 Rev. 2.0	NO2NO3-N	98.0	96.5	98.5				1.32
EPA 365.1 Rev. 2.0	Total-P	106	106	104				1.55
SM 2320 B-2011	Total Alkalinity	98.4					0.556	
	Total Alkalinity	99.0					2.10	
SM 2540 C-2011	TDS						5.56	
SM 4500 F-C-2011	Fluoride	102	100	99.5				0.508
	Fluoride	100	100	100				0.0
SM 5310 B-2011	Organic Carbon	94.5	97.2	99.2				1.09

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	2169051, 2169052
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2169051, 2169052
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2169047, 2169048
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2169047, 2169048
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2169049, 2169050
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2169049, 2169050
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2169049, 2169050
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2169049, 2169050
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2169047, 2169048
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2169051, 2169052
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2169047, 2169048
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2169047, 2169048
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2169047, 2169048
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2169049, 2169050

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	04/01/2020	04/08/2020 14:50	Alexander Thompson	04/13/2020 18:22	Betina Topolski	2169051
	04/01/2020	04/08/2020 14:50	Alexander Thompson	04/13/2020 18:58	Betina Topolski	2169052
EPA 200.8 Rev. 5.4	04/01/2020	04/08/2020 14:50	Alexander Thompson	04/09/2020 18:15	Alexander Thompson	2169051
	04/01/2020	04/08/2020 14:50	Alexander Thompson	04/09/2020 18:25	Alexander Thompson	2169052
	04/01/2020	04/08/2020 14:50	Alexander Thompson	04/10/2020 15:51	Alexander Thompson	2169051
	04/01/2020	04/08/2020 14:50	Alexander Thompson	04/10/2020 15:58	Alexander Thompson	2169052
EPA 300.0 Rev. 2.1	04/01/2020			04/09/2020 04:23	Jhamieka S. Greenwood	2169047
	04/01/2020			04/09/2020 04:36	Jhamieka S. Greenwood	2169048
EPA 350.1 Rev. 2.0	04/01/2020			04/02/2020 13:31	Julia Storbeck	2169049
	04/01/2020			04/02/2020 13:38	Julia Storbeck	2169050
EPA 351.2 Rev. 2.0	04/01/2020	04/07/2020 11:00	Jhamieka S. Greenwood	04/08/2020 10:45	Jhamieka S. Greenwood	2169049
	04/01/2020	04/07/2020 11:00	Jhamieka S. Greenwood	04/08/2020 10:47	Jhamieka S. Greenwood	2169050
EPA 353.2 Rev. 2.0	04/01/2020			04/01/2020 16:15	Lauren Lees	2169049
	04/01/2020			04/01/2020 16:16	Lauren Lees	2169050
EPA 365.1 Rev. 2.0	04/01/2020	04/02/2020 15:18	Yen Ta	04/03/2020 15:09	Benjamin T. Nordmann	2169049
	04/01/2020	04/02/2020 15:18	Yen Ta	04/03/2020 15:10	Benjamin T. Nordmann	2169050
SM 2320 B-2011	04/01/2020			04/08/2020 06:45	Samantha Davila	2169047
	04/01/2020			04/09/2020 22:55	Samantha Davila	2169048
SM 2340B	04/01/2020			04/13/2020 18:22	Betina Topolski	2169051
	04/01/2020			04/13/2020 18:58	Betina Topolski	2169052
SM 2540 C-2011	04/01/2020			04/03/2020 14:49	Yijie Li	2169047, 2169048
SM 2540 D-2011	04/01/2020			04/03/2020 14:49	Yijie Li	2169047, 2169048
SM 4500 F-C-2011	04/01/2020			04/07/2020 02:54	Samantha Davila	2169048
	04/01/2020			04/08/2020 06:45	Samantha Davila	2169047
SM 5310 B-2011	04/01/2020			04/03/2020 01:39	Madeline Gruver	2169049
	04/01/2020			04/03/2020 01:52	Madeline Gruver	2169050