

Chemical Analysis Report

SO-DIST-2020-03-12-01

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

Event Description: **2020 SMP : Highlands Cricks**
Request ID: **RQ-2020-03-09-61**
Customer: **SO-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901-3381
Attn: Nicole Reistad

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

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

Date Certified: 02-APR-2020 11:42

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the first name.

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: JacksonCreek@SkipperRd

Collection Date/Time: 03/11/2020 10:40

Field ID: G4SD0182

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2164856	EPA 180.1 Rev. 2.0	Turbidity	7.4		NTU	P380573	
	EPA 300.0 Rev. 2.1	Chloride	11		mg Cl/L	P380935	
		Sulfate	15		mg SO4/L	P380937	
		Color (true)	76		PCU	P380580	
	SM 2120 B-2011	Total Alkalinity	1.9	I	mg CaCO3/L	P381067	
	SM 2540 C-2011	TDS	71		mg/L	P381119	
	SM 2540 D-2011	TSS	11		mg/L	P381187	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P381263	
2164857	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P381039	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.65		mg N/L	P380956	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.089		mg N/L	P381199	
	EPA 365.1 Rev. 2.0	Total-P	0.031		mg P/L	P381143	
	SM 5310 B-2011	Organic Carbon	14		mg C/L	P380752	
2164858	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P380568	
2164875	EPA 200.7 Rev. 4.4	Barium	13.3		ug/L	P380736	
		Calcium	5.11		mg/L	P380736	
		Iron	270		ug/L	P380736	
		Magnesium	2.92		mg/L	P380736	
		Potassium	2.1		mg/L	P380736	
		Sodium	5.8		mg/L	P380736	
		Zinc	5.0	U	ug/L	P380736	
	EPA 200.8 Rev. 5.4	Aluminum	401		ug/L	P380736	
		Antimony	0.050	U	ug/L	P380736	
		Arsenic	0.54		ug/L	P380736	
		Boron**	27.8		ug/L	P380736	
		Cadmium	0.020	U	ug/L	P380736	
		Chromium	0.55	I	ug/L	P380736	
		Copper	0.42	I	ug/L	P380736	
		Lead	0.20	U	ug/L	P380736	
		Nickel	0.50	U	ug/L	P380736	
		Selenium	0.20	U	ug/L	P380736	
		Silver	0.010	U	ug/L	P380736	
		Thallium	0.10	U	ug/L	P380736	
		Hardness	24.8		mg/L	P380736	

Ref. Method and Comment:

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P380573

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P380736

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: P380736

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: P380935

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380937

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381039

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: P380956

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381199

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381143

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380568

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

Reference Method: SM 2120 B-2011
Batch ID: P380580

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P381067

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

Reference Method: SM 2540 C-2011
Batch ID: P381119

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P381187

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P381263

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: P380752

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: P380736

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	103		P	85 - 115
Iron	106		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	101		P	85 - 115
Sodium	101		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P380736

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	94.5		P	85 - 115
Antimony	98.4		P	85 - 115
Arsenic	97.5		P	85 - 115
Boron	95.6		P	85 - 115
Cadmium	96.5		P	85 - 115
Chromium	100		P	85 - 115
Copper	96.5		P	85 - 115
Lead	92.7		P	85 - 115
Nickel	95.5		P	85 - 115
Selenium	96.7		P	85 - 115
Silver	98.1		P	85 - 115
Thallium	104		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380935

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380937

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381039

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380956

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.2		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381199

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381143

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380568

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	95.3		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P380580

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	100		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P381067

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	105		P	98 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P381263

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.7		P	92 - 103

Reference Method: SM 5310 B-2011
Batch ID: P380752

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	101		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P380736

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2164511	Barium	99.1	100	P/P	80 - 120
2164511	Calcium	101		P	80 - 120
2164511	Iron	104	103	P/P	80 - 120
2164511	Magnesium	102	101	P/P	80 - 120
2164511	Potassium	101	101	P/P	80 - 120
2164511	Sodium	100	105	P/P	80 - 120
2164511	Zinc	100	101	P/P	80 - 120
2164731	Barium	102		P	80 - 120
2164731	Calcium	102		P	80 - 120
2164731	Iron	104		P	80 - 120
2164731	Magnesium	99.2		P	80 - 120
2164731	Potassium	101		P	80 - 120
2164731	Sodium	99.4		P	80 - 120
2164731	Zinc	103		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P380736

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2164511	Aluminum	96.3	95.5	P/P	80 - 120
2164511	Antimony	100	101	P/P	80 - 120
2164511	Arsenic	97.2	98.7	P/P	80 - 120
2164511	Boron	95.5	96.4	P/P	80 - 120
2164511	Cadmium	102	101	P/P	80 - 120
2164511	Chromium	98.4	99.0	P/P	80 - 120
2164511	Copper	95.4	97.0	P/P	80 - 120
2164511	Lead	92.5	93.2	P/P	80 - 120
2164511	Nickel	95.6	96.1	P/P	80 - 120
2164511	Selenium	92.1	95.6	P/P	80 - 120
2164511	Silver	99.1	99.2	P/P	80 - 120
2164511	Thallium	106	108	P/P	80 - 120
2164731	Aluminum	95.9		P	80 - 120
2164731	Antimony	103		P	80 - 120
2164731	Arsenic	105		P	80 - 120
2164731	Boron	101		P	80 - 120
2164731	Cadmium	99.4		P	80 - 120
2164731	Chromium	104		P	80 - 120
2164731	Copper	98.6		P	80 - 120
2164731	Lead	96.3		P	80 - 120
2164731	Nickel	97.1		P	80 - 120
2164731	Selenium	100		P	80 - 120
2164731	Silver	96.9		P	80 - 120
2164731	Thallium	109		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380935

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2164634	Chloride	97.3		P	90 - 110
2164788	Chloride	98.9		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380937

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2164634	Sulfate	96.8		P	90 - 110
2164788	Sulfate	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381039

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2164815	Ammonia-N	98.5	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380956

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2165003	Kjeldahl Nitrogen	97.6	99.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381199

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2164815	NO2NO3-N	96.9	97.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381143

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2164857	Total-P	106	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380568

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2164678	O-Phosphate-P	94.6	98.7	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P381263

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2164633	Fluoride	101	101	P/P	89 - 106

Reference Method: SM 5310 B-2011
Batch ID: P380752

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2164807	Organic Carbon	98.7	99.7	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P380573

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164839	Turbidity	0.778	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P380736

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164511	Barium	1.12	Spike	P	0 - 20
2164511	Calcium	4.08	Spike	P	0 - 20
2164511	Iron	0.779	Spike	P	0 - 20
2164511	Magnesium	0.909	Spike	P	0 - 20
2164511	Potassium	0.400	Spike	P	0 - 20
2164511	Sodium	3.23	Spike	P	0 - 20
2164511	Zinc	0.775	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P380736

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164511	Aluminum	0.848	Spike	P	0 - 20
2164511	Antimony	0.764	Spike	P	0 - 20
2164511	Arsenic	1.46	Spike	P	0 - 20
2164511	Boron	0.905	Spike	P	0 - 20
2164511	Cadmium	1.63	Spike	P	0 - 20
2164511	Chromium	0.552	Spike	P	0 - 20
2164511	Copper	1.68	Spike	P	0 - 20
2164511	Lead	0.724	Spike	P	0 - 20
2164511	Nickel	0.474	Spike	P	0 - 20
2164511	Selenium	3.62	Spike	P	0 - 20
2164511	Silver	0.0635	Spike	P	0 - 20
2164511	Thallium	1.39	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380935

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164634	Chloride	0.0148	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380937

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164634	Sulfate	0.241	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381039

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164815	Ammonia-N	0.429	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380956

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2165003	Kjeldahl Nitrogen	1.09	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381199

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164815	NO2NO3-N	1.01	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381143

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164857	Total-P	2.39	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380568

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164678	O-Phosphate-P	2.82	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P380580

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164789	Color (true)	1.62	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P381067

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164633	Total Alkalinity	0.408	Sample	P	0 - 2.8

Reference Method: SM 2540 C-2011
Batch ID: P381119

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164811	TDS	5.22	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-2011
Batch ID: P381263

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164633	Fluoride	0.0	Spike	P	0 - 2.5

Reference Method: SM 5310 B-2011
Batch ID: P380752

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2164807	Organic Carbon	0.989	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A98165

Included Lab Sample IDs: 2164858

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	95.3	96.8	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A98166

Included Lab Sample IDs: 2164856

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	99.5	P/P	95 - 105

Reference Method: SM 2120 B-2011

Run ID: A98169

Included Lab Sample IDs: 2164856

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	101	P/P	90 - 115

Reference Method: SM 5310 B-2011

Run ID: A98233

Included Lab Sample IDs: 2164857

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A98252

Included Lab Sample IDs: 2164875

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	104	106	P/P	90 - 110
Calcium	108	109	P/P	90 - 110
Magnesium	109	110	P/P	90 - 110
Potassium	101	102	P/P	90 - 110
Sodium	106	106	P/P	90 - 110
Zinc	102	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A98256

Included Lab Sample IDs: 2164875

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.9	102	P/P	90 - 110
Antimony	92.3	94.0	P/P	90 - 110
Arsenic	93.7	94.7	P/P	90 - 110
Boron	98.9	98.2	P/P	90 - 110
Cadmium	94.2	94.0	P/P	90 - 110
Chromium	95.2	94.3	P/P	90 - 110
Copper	94.8	95.4	P/P	90 - 110
Nickel	95.3	96.3	P/P	90 - 110
Selenium	93.6	92.8	P/P	90 - 110
Silver	95.9	95.6	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A98259

Included Lab Sample IDs: 2164856

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	98.9	P/P	90 - 110
Sulfate	100	99.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A98280

Included Lab Sample IDs: 2164875

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	102	103	P/P	90 - 110
Thallium	98.2	97.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A98283

Included Lab Sample IDs: 2164875

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	97.6	96.4	P/P	95 - 105

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A98337

Included Lab Sample IDs: 2164857

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

Reference Method: SM 2320 B-2011

Run ID: A98350

Included Lab Sample IDs: 2164856

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	105	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A98369

Included Lab Sample IDs: 2164857

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.8	96.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A98402

Included Lab Sample IDs: 2164857

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	99.5	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A98428

Included Lab Sample IDs: 2164856

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

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-2011

Run ID: A98428

Included Lab Sample IDs: 2164856

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	97.0	98.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A98545

Included Lab Sample IDs: 2164857

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	102	P/P	90 - 110

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

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

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					0.778	
EPA 200.7 Rev. 4.4	Barium	102	99.1	100	102		1.12
	Calcium	103	101	102			4.08
	Iron	106	104	104	103		0.779
	Magnesium	106	102	101	99.2		0.909
	Potassium	101	101	101	101		0.400
	Sodium	101	100	105	99.4		3.23
	Zinc	103	100	101	103		0.775
EPA 200.8 Rev. 5.4	Aluminum	94.5	96.3	95.5	95.9		0.848
	Antimony	98.4	103	100	101		0.764
	Arsenic	97.5	97.2	98.7	105		1.46
	Boron	95.6	95.5	96.4	101		0.905
	Cadmium	96.5	102	101	99.4		1.63
	Chromium	100	98.4	99.0	104		0.552
	Copper	96.5	95.4	97.0	98.6		1.68
	Lead	92.7	92.5	93.2	96.3		0.724
	Nickel	95.5	95.6	96.1	97.1		0.474
	Selenium	96.7	92.1	95.6	100		3.62
	Silver	98.1	99.1	99.2	96.9		0.0635
	Thallium	104	106	108	109		1.39
EPA 300.0 Rev. 2.1	Chloride	100	97.3	98.9		0.0148	
	Sulfate	100	96.8	100		0.241	
EPA 350.1 Rev. 2.0	Ammonia-N	101	98.5	99.0			0.429
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.2	97.6	99.6			1.09
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	96.9	97.9			1.01
EPA 365.1 Rev. 2.0	Total-P	103	106	109			2.39
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	95.3	94.6	98.7			2.82
SM 2120 B-2011	Color (true)	100				1.62	
SM 2320 B-2011	Total Alkalinity	105				0.408	
SM 2540 C-2011	TDS					5.22	
SM 4500 F-C-2011	Fluoride	94.7	101	101			0.0
SM 5310 B-2011	Organic Carbon	101	98.7	99.7			0.989

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2164856
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2164875
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2164875
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2164856
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2164856
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2164857
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2164857
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2164857
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2164857
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2164858
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2164856
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2164856
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2164875
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2164856

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2164856
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2164856
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2164857

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	03/12/2020			03/12/2020 16:01	Yen Ta	2164856
EPA 200.7 Rev. 4.4	03/12/2020	03/16/2020 17:15	Elliott D. Healy	03/18/2020 03:00	Betina Topolski	2164875
	03/12/2020	03/16/2020 17:15	Elliott D. Healy	03/18/2020 14:50	Justin Cutchin	2164875
EPA 200.8 Rev. 5.4	03/12/2020	03/16/2020 17:15	Elliott D. Healy	03/17/2020 23:05	Justin Cutchin	2164875
	03/12/2020	03/16/2020 17:15	Elliott D. Healy	03/18/2020 19:46	Alexander Thompson	2164875
EPA 300.0 Rev. 2.1	03/12/2020			03/18/2020 20:20	Lipi Saha	2164856
EPA 350.1 Rev. 2.0	03/12/2020			03/20/2020 13:04	Ping Hua	2164857
EPA 351.2 Rev. 2.0	03/12/2020	03/19/2020 11:35	Sima Feizi	03/23/2020 08:38	Jhamieka S. Greenwood	2164857
EPA 353.2 Rev. 2.0	03/12/2020			03/24/2020 11:56	Beverly Y. Sanders	2164857
EPA 365.1 Rev. 2.0	03/12/2020	03/23/2020 15:45	Lipi Saha	03/30/2020 19:16	Benjamin T. Nordmann	2164857
EPA 365.1 Rev. 2.0 dissolved	03/12/2020			03/12/2020 16:24	Carlos Miranda	2164858
SM 2120 B-2011	03/12/2020			03/12/2020 17:35	Madeline Gruver	2164856
SM 2320 B-2011	03/12/2020			03/21/2020 06:11	Dale L. Simmons	2164856
SM 2340B	03/12/2020			03/18/2020 03:00	Betina Topolski	2164875
SM 2540 C-2011	03/12/2020			03/16/2020 15:52	Yijie Li	2164856
SM 2540 D-2011	03/12/2020			03/16/2020 15:52	Yijie Li	2164856
SM 4500 F-C-2011	03/12/2020			03/24/2020 21:45	Dale L. Simmons	2164856
SM 5310 B-2011	03/12/2020			03/16/2020 19:54	Lauren Lees	2164857