Chemical Analysis Report

CEN-DIST-2021-03-12-04

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

Event Description: **Apopka Spring**
Request ID: **RQ-2021-03-15-09**
Customer: **CEN-DIST**
Project ID: **SMP**

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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 group are included in this report: 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: Apopka Spring near boil **Collection Date/Time: 03/11/2021 10:57**

Field ID: G1CE0113 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2231391	EPA 180.1 Rev. 2.0	Turbidity	4.0		NTU	P394922	
	EPA 300.0 Rev. 2.1	Chloride	22		mg Cl/L	P395192	
		Sulfate	13		mg SO4/L	P395195	
	SM 2120 B-2011	Color (true)	6.1		PCU	P394919	
	SM 2320 B-2011	Total Alkalinity	104	A	mg CaCO3/L	P395081	
	SM 2540 C-2011	TDS	180		mg/L	P395368	
	SM 2540 D-2011	TSS	12	I	mg/L	P395374	
	SM 4500 F-C-2011	Fluoride	0.12		mg F/L	P395084	
2231392	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P395252	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.81		mg N/L	P395282	
	EPA 353.2 Rev. 2.0	NO2NO3-N	1.8		mg N/L	P395075	
	EPA 365.1 Rev. 2.0	Total-P	0.048		mg P/L	P395102	
	SM 5310 B-2011	Organic Carbon	7.1		mg C/L	P395519	
2231393	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P394914	

Ref. Method and Comment:
SM 2540 D-2011: The PQL was elevated because of sample matrix interference.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P394922

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395192

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395195

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395252

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395282

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395075

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395102

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394914

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

Reference Method: SM 2120 B-2011
Batch ID: P394919

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-2011
Batch ID: P395081

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

Reference Method: SM 2540 C-2011
Batch ID: P395368

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P395374

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P395084

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P395519

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395192

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395195

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395252

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395282

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395075

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395102

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: P394914

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.8		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P394919

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	101		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P395081

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	93 - 104

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P395084

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.2		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P395519

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395192

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231384	Chloride	104	104	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395195

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231384	Sulfate	102	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395252

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231296	Ammonia-N	98.2	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395282

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231326	Kjeldahl Nitrogen	108	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395075

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231413	NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395102

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231296	Total-P	105	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231117	O-Phosphate-P	97.3	97.5	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P395084

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231391	Fluoride	100	99.0	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P395519

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231591	Organic Carbon	95.5	97.5	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P394922

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231372	Turbidity	1.66	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395192

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231384	Chloride	0.159	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395195

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231384	Sulfate	0.671	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395252

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231296	Ammonia-N	1.01	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395282

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231326	Kjeldahl Nitrogen	3.10	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395075

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231413	NO2NO3-N	0.418	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395102

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231296	Total-P	4.07	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231117	O-Phosphate-P	0.172	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2120 B-2011
Batch ID: P394919

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231400	Color (true)	0.793	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P395081

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231391	Total Alkalinity	0.245	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P395368

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231115	TDS	2.45	Sample	P	0 - 10

Reference Method: SM 2540 D-2011
Batch ID: P395374

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231115	TSS	8.96	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P395084

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231391	Fluoride	0.946	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P395519

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231591	Organic Carbon	1.80	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: A104041
Included Lab Sample IDs: 2231393

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.7	98.8	P/P	90 - 110

Reference Method: SM 2120 B-2011
Run ID: A104042
Included Lab Sample IDs: 2231391

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	103	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A104045
Included Lab Sample IDs: 2231391

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A104102
Included Lab Sample IDs: 2231392

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	106	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A104103
Included Lab Sample IDs: 2231391

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	98.5	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A104103
Included Lab Sample IDs: 2231391

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	101	100	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A104153
Included Lab Sample IDs: 2231391

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104154
Included Lab Sample IDs: 2231392

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A104179
Included Lab Sample IDs: 2231392

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.4	97.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A104250
Included Lab Sample IDs: 2231392

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	106	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A104292
Included Lab Sample IDs: 2231392

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.6	96.4	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 180.1 Rev. 2.0	Turbidity					1.66	
EPA 300.0 Rev. 2.1	Chloride	103	104	104			0.159
	Sulfate	101	102	102			0.671
EPA 350.1 Rev. 2.0	Ammonia-N	95.8	98.2	99.2			1.01
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	108	105			3.10
EPA 353.2 Rev. 2.0	NO2NO3-N	101	101	102			0.418
EPA 365.1 Rev. 2.0	Total-P	103	105	109			4.07
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.8	97.3	97.5			0.172
SM 2120 B-2011	Color (true)	101				0.793	
SM 2320 B-2011	Total Alkalinity	101				0.245	
SM 2540 C-2011	TDS					2.45	
SM 2540 D-2011	TSS					8.96	
SM 4500 F-C-2011	Fluoride	99.2	100	99.0			0.946
SM 5310 B-2011	Organic Carbon	95.2	95.5	97.5			1.80

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2231391
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2231391
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2231391
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2231392
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2231392
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2231392
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2231392
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2231393
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2231391
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2231391
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2231391
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2231391
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2231391
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2231392

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	03/12/2021			03/12/2021 14:31	Yen Ta	2231391
EPA 300.0 Rev. 2.1	03/12/2021			03/16/2021 08:19	Lipi Saha	2231391
EPA 350.1 Rev. 2.0	03/12/2021			03/20/2021 11:44	Ping Hua	2231392
EPA 351.2 Rev. 2.0	03/12/2021	03/22/2021 13:25	Benjamin T. Nordmann	03/23/2021 22:05	Julia Storbeck	2231392
EPA 353.2 Rev. 2.0	03/12/2021			03/17/2021 11:04	Beverly Y. Sanders	2231392
EPA 365.1 Rev. 2.0	03/12/2021	03/17/2021 13:18	Yen Ta	03/18/2021 15:57	Shengyu Ding	2231392
EPA 365.1 Rev. 2.0 dissolved	03/12/2021			03/12/2021 14:57	Patrick M. Roche	2231393
SM 2120 B-2011	03/12/2021			03/12/2021 16:25	Benjamin T. Nordmann	2231391
SM 2320 B-2011	03/12/2021			03/17/2021 02:20	Dale L. Simmons	2231391
SM 2540 C-2011	03/12/2021			03/15/2021 15:01	Yijie Li	2231391
SM 2540 D-2011	03/12/2021			03/15/2021 15:01	Yijie Li	2231391
SM 4500 F-C-2011	03/12/2021			03/17/2021 02:08	Dale L. Simmons	2231391
SM 5310 B-2011	03/12/2021			03/25/2021 22:51	Madeline Gruver	2231392