

Chemical Analysis Report

CEN-DIST-2022-03-23-02

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-2022-03-21-21**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Matthew Bearden

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: Thekkekalathil Chandrasekhar, Environmental Consultant

Date Certified: 11-APR-2022 09:41



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: 03/22/2022 10:08

Field ID: G1CE0113

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2314162	DEP SOP: NU-094-1	Color (true)**	4.7	I	PCU	P411503	
	EPA 180.1 Rev. 2.0	Turbidity	1.1		NTU	P411501	
	EPA 300.0 Rev. 2.1	Chloride	17		mg Cl/L	P411778	
		Sulfate	13		mg SO4/L	P411781	
	SM 2320 B-2011	Total Alkalinity	92		mg CaCO3/L	P411654	
	SM 2540 C-2011	TDS	165	A	mg/L	P411802	
	SM 2540 D-2011	TSS	3	IA	mg/L	P411688	
	SM 4500 F-C-2011	Fluoride	0.076	I	mg F/L	P411660	
2314163	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P411553	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.41		mg N/L	P411769	
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.6		mg N/L	P411613	
	EPA 365.1 Rev. 2.0	Total-P	0.037		mg P/L	P411682	
	SM 5310 B-2011	Organic Carbon	2.6		mg C/L	P411676	

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: DEP SOP: NU-094-1
Batch ID: P411503

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P411501

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411778

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411781

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411553

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411769

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411613

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411682

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

Reference Method: SM 2320 B-2011
Batch ID: P411654

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-2011
Batch ID: P411802

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P411688

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P411660

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P411676

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: DEP SOP: NU-094-1
Batch ID: P411503

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.1		P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P411501

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	96.1		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411778

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411781

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411553

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: P411769

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	94.2		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411613

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: P411682

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

Reference Method: SM 2320 B-2011
Batch ID: P411654

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.7		P	94 - 106

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P411660

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.4		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P411676

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.4		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411778

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2314101	Chloride	97.3		P	90 - 110
2314130	Chloride	95.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411781

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2314101	Sulfate	97.9		P	90 - 110
2314130	Sulfate	96.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411553

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2313374	Ammonia-N	97.2	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411769

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2313441	Kjeldahl Nitrogen	105	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411613

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2314108	NO2NO3-N	98.4	98.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411682

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2314163	Total-P	105	105	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P411660

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2314296	Fluoride	98.0	98.0	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P411676

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2313887	Organic Carbon	99.4	103	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P411503

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314155	Color (true)	0.678	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P411501

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314155	Turbidity	12.9	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411778

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314101	Chloride	0.255	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411781

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314101	Sulfate	0.784	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411553

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2313374	Ammonia-N	6.37	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411769

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2313441	Kjeldahl Nitrogen	2.40	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411613

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314108	NO2NO3-N	0.399	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411682

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314163	Total-P	0.0441	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-2011
Batch ID: P411654

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314296	Total Alkalinity	1.54	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P411802

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314162	TDS	2.42	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P411660

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314296	Fluoride	0.0	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P411676

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2313887	Organic Carbon	2.14	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A111119

Included Lab Sample IDs: 2314162

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	100	P/P	95 - 105

Reference Method: DEP SOP: NU-094-1

Run ID: A111121

Included Lab Sample IDs: 2314162

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.3	99.8	P/P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A111133

Included Lab Sample IDs: 2314163

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.2	98.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A111159

Included Lab Sample IDs: 2314163

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

Reference Method: SM 2320 B-2011

Run ID: A111184

Included Lab Sample IDs: 2314162

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.6	97.0	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A111184

Included Lab Sample IDs: 2314162

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

Reference Method: SM 5310 B-2011

Run ID: A111201

Included Lab Sample IDs: 2314163

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	101	99.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A111208

Included Lab Sample IDs: 2314162

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.9	98.8	P/P	90 - 110
Sulfate	99.1	99.7	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A111251

Included Lab Sample IDs: 2314163

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A111296

Included Lab Sample IDs: 2314163

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.0	103	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	MS
DEP SOP: NU-094-1	Color (true)	98.1			0.678	
EPA 180.1 Rev. 2.0	Turbidity	96.1			12.9	
EPA 300.0 Rev. 2.1	Chloride	98.0	97.3	95.8	0.255	
	Sulfate	98.0	97.9	96.2	0.784	
EPA 350.1 Rev. 2.0	Ammonia-N	95.8	97.2	105		6.37
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	94.2	105	108		2.40
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101	98.4	98.9		0.399
EPA 365.1 Rev. 2.0	Total-P	101	105	105		0.0441
SM 2320 B-2011	Total Alkalinity	99.7			1.54	
SM 2540 C-2011	TDS				2.42	
SM 4500 F-C-2011	Fluoride	98.4	98.0	98.0		0.0
SM 5310 B-2011	Organic Carbon	94.4	99.4	103		2.14

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2314162
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2314162
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2314162
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2314162
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2314163
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2314163
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2314163
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2314163
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2314162
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2314162
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2314162
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2314162
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2314163

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP: NU-094-1	03/23/2022			03/23/2022 15:22	Samantha L Bates	2314162
EPA 180.1 Rev. 2.0	03/23/2022			03/23/2022 14:16	Anna M. Plaviak	2314162
EPA 300.0 Rev. 2.1	03/23/2022			03/29/2022 14:04	Anna M. Plaviak	2314162
EPA 350.1 Rev. 2.0	03/23/2022			03/24/2022 13:06	Judith K. Clark	2314163
EPA 351.2 Rev. 2.0	03/23/2022	03/31/2022 11:24	Samantha L Bates	04/04/2022 14:21	Alexandra J Mattheus	2314163
EPA 353.2 Rev. 2.0	03/23/2022			03/24/2022 19:01	Nathaniel J Jones	2314163
EPA 365.1 Rev. 2.0	03/23/2022	03/29/2022 16:02	Simonne.V. Calhoun	03/31/2022 12:25	James L Waggerby	2314163
SM 2320 B-2011	03/23/2022			03/25/2022 19:58	Dale L. Simmons	2314162
SM 2540 C-2011	03/23/2022			03/25/2022 16:08	Yijie Li	2314162
SM 2540 D-2011	03/23/2022			03/25/2022 16:08	Yijie Li	2314162
SM 4500 F-C-2011	03/23/2022			03/25/2022 19:58	Dale L. Simmons	2314162
SM 5310 B-2011	03/23/2022			03/25/2022 22:55	Khloe J Berg	2314163