

Chemical Analysis Report

CEN-DIST-2017-08-02-01

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

Event Description: **Starke Lake LVI**
Request ID: **RQ-2017-06-12-48**
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: Mike Linger

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Colin Wright, Program Administrator

Date Certified: 17-AUG-2017 13:51

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular background.

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 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: G1CE0003

Collection Date/Time: 08/01/2017 13:47

Field ID: G1CE0003

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1918089	EPA 180.1 Rev. 2.0	Turbidity	1.2		NTU	P329565	
	EPA 300.0 Rev. 2.1	Chloride	20		mg Cl/L	P329708	
		Sulfate	6.1		mg SO4/L	P329712	
	SM 2120 B	Color (true)	64	A	PCU	P329575	
	SM 2320 B-97	Total Alkalinity	3.6		mg CaCO3/L	P329761	
	SM 2540 C-97	TDS	101		mg/L	P329918	
	SM 2540 D-97	TSS	2	I	mg/L	P330147	
	SM 4500 F-C-97	Fluoride	0.086	I	mg F/L	P329765	
1918090	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P329674	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.82		mg N/L	P329617	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P329694	
	EPA 365.1 Rev. 2.0	Total-P	0.012		mg P/L	P329632	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P329794	
1918091	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P329589	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

SM 2540 D-97: 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: P329565

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P329708

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P329712

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P329674

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

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P329617

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: P329694

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P329632

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P329589

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

Reference Method: SM 2120 B
Batch ID: P329575

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P329761

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

Reference Method: SM 2540 C-97
Batch ID: P329918

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P330147

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P329765

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P329794

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: P329708

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329712

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P329674

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P329617

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329694

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P329632

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	93.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P329589

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.4		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P329761

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P329765

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.3		P	92 - 103

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P329794

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329708

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918108	Chloride	101		P	90 - 110
1918163	Chloride	106		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329712

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918108	Sulfate	103		P	90 - 110
1918163	Sulfate	102		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P329674

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918061	Ammonia-N	101	98.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P329617

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918061	Kjeldahl Nitrogen	106	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329694

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918062	NO2NO3-N	96.8	95.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P329632

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918067	Total-P	98.4	98.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P329589

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918068	O-Phosphate-P	93.4	93.3	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P329765

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918058	Fluoride	99.2	99.2	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P329794

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1917819	Organic Carbon	96.3	96.3	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P329565

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918046	Turbidity	4.35	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329708

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918163	Chloride	2.65	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P329674

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918061	Ammonia-N	2.47	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P329617

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918061	Kjeldahl Nitrogen	2.37	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329694

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918062	NO2NO3-N	0.743	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P329632

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
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Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P329632

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918067	Total-P	0.164	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P329589

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918068	O-Phosphate-P	0.0806	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P329575

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918089	Color (true)	0.250	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P329761

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918058	Total Alkalinity	0.0506	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P329918

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918066	TDS	8.04	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P329765

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918058	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P329794

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1917819	Organic Carbon	0.0	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B
Run ID: A78128
Included Lab Sample IDs: 1918089

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.3	103	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A78130
Included Lab Sample IDs: 1918089

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A78141
Included Lab Sample IDs: 1918091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.1	98.5	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A78163
Included Lab Sample IDs: 1918089

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.4	98.1	P/P	90 - 110
Sulfate	103	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A78181
Included Lab Sample IDs: 1918090

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A78187
Included Lab Sample IDs: 1918090

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A78192
Included Lab Sample IDs: 1918090

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.8	97.5	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A78219
Included Lab Sample IDs: 1918089

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	104	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-97
 Run ID: A78219
 Included Lab Sample IDs: 1918089

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.0	97.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Run ID: A78224
 Included Lab Sample IDs: 1918090

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.6	102	P/P	90 - 110

Reference Method: SM 5310 B-00
 Run ID: A78233
 Included Lab Sample IDs: 1918090

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.2	98.0	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	LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity				4.35	
EPA 300.0 Rev. 2.1	Chloride	101	106	101	2.65	
	Sulfate	103	102	103		
EPA 350.1 Rev. 2.0	Ammonia-N	97.8	101	98.4		2.47
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	106	103		2.37
EPA 353.2 Rev. 2.0	NO2NO3-N	104	96.8	95.8		0.743
EPA 365.1 Rev. 2.0	Total-P	93.2	98.4	98.6		0.164
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	93.4	93.3		0.0806
SM 2120 B	Color (true)				0.250	
SM 2320 B-97	Total Alkalinity	103			0.0506	
SM 2540 C-97	TDS				8.04	
SM 4500 F-C-97	Fluoride	95.3	99.2	99.2		0.0
SM 5310 B-00	Organic Carbon	97.2	96.3	96.3		0.0

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1918089
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1918089
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1918089
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1918090

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1918090
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1918090
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1918090
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1918091
SM 2120 B / E31780	True Color measured at 450 nm	1918089
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1918089
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1918089
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1918089
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1918089
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1918090

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	08/02/2017			08/02/2017 16:29	DeAsia Armster	1918089
EPA 300.0 Rev. 2.1	08/02/2017			08/03/2017	Julia Storbeck	1918089
EPA 350.1 Rev. 2.0	08/02/2017			08/03/2017	Sofia Elnemr	1918090
EPA 351.2 Rev. 2.0	08/02/2017	08/03/2017	Adrian Shelby	08/07/2017	Joseph Suarez	1918090
EPA 353.2 Rev. 2.0	08/02/2017			08/04/2017	Beverly Y. Sanders	1918090
EPA 365.1 Rev. 2.0	08/02/2017	08/03/2017	Sima Feizi	08/04/2017	Lipi Saha	1918090
EPA 365.1 Rev. 2.0 dissolved	08/02/2017			08/02/2017 15:18	Ping Hua	1918091
SM 2120 B	08/02/2017			08/02/2017 15:25	Tanya Welborn	1918089
SM 2320 B-97	08/02/2017			08/05/2017	Dale L. Simmons	1918089
SM 2540 C-97	08/02/2017			08/04/2017	Yijie Li	1918089
SM 2540 D-97	08/02/2017			08/04/2017	Yijie Li	1918089
SM 4500 F-C-97	08/02/2017			08/05/2017	Dale L. Simmons	1918089
SM 5310 B-00	08/02/2017			08/05/2017	Sofia Elnemr	1918090