Chemical Analysis Report

TLH-ROC-2019-12-12-01

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

Event Description: **Run 6**
Request ID: **RQ-2019-08-19-25**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
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Date Certified: 30-DEC-2019 14:37

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: BLUE HOLE SPRING @ CAVERN **Collection Date/Time: 12/12/2019 11:00**

Field ID: G2TLHR0009 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2143664	EPA 180.1 Rev. 2.0	Turbidity	1.2		NTU	P376185	
	EPA 300.0 Rev. 2.1	Chloride	3.3		mg Cl/L	P376425	
		Sulfate	1.2		mg SO4/L	P376427	
	SM 2120 B	Color (true)	2.5	U	PCU	P375987	
	SM 2320 B-97	Total Alkalinity	165		mg CaCO3/L	P376259	
	SM 2540 C-97	TDS	154		mg/L	P376419	
	SM 2540 D-97	TSS	2	I	mg/L	P376359	
	SM 4500 F-C-97	Fluoride	0.075	I	mg F/L	P376262	
2143665	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P376277	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.12	I	mg N/L	P375913	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.40		mg N/L	P375965	
	EPA 365.1 Rev. 2.0	Total-P	0.022		mg P/L	P375925	
	SM 5310 B-00	Organic Carbon	0.56	I	mg C/L	P375978	
2143666	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.014		mg P/L	P375861	

Ref. Method and Comment:
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: P376185

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P376425

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P376427

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P376277

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P375913

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P375965

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P375925

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P375861

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

Reference Method: SM 2120 B
Batch ID: P375987

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P376259

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

Reference Method: SM 2540 C-97
Batch ID: P376419

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P376359

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P376262

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P375978

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: P376425

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P376427

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P376277

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P375913

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P375965

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P375925

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P375861

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

Reference Method: SM 2120 B
Batch ID: P375987

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.6		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P376259

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	98 - 106

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P376262

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.8		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P375978

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.9		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P376425

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2143399	Chloride	98.1		P	90 - 110
2143669	Chloride	98.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P376427

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2143399	Sulfate	98.6		P	90 - 110
2143669	Sulfate	98.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P376277

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2143665	Ammonia-N	97.4	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P375913

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2143460	Kjeldahl Nitrogen	104	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P375965

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2143696	NO2NO3-N	98.3	98.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P375925

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2143461	Total-P	101	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P375861

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2143666	O-Phosphate-P	94.9	95.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P376262

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2143923	Fluoride	98.0	99.1	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P375978

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2143453	Organic Carbon	97.0	93.7	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P376185

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143832	Turbidity	4.79	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P376425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143399	Chloride	0.308	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P376427

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143399	Sulfate	0.403	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P376277

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143665	Ammonia-N	1.11	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P375913

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143460	Kjeldahl Nitrogen	3.18	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P375965

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143696	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P375925

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143461	Total-P	5.52	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P375861

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143666	O-Phosphate-P	0.827	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2120 B
Batch ID: P375987

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143669	Color (true)	1.79	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P376259

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143923	Total Alkalinity	0.576	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P376419

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143452	TDS	3.45	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P376262

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143923	Fluoride	0.963	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P375978

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2143453	Organic Carbon	2.96	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: A96350
Included Lab Sample IDs: 2143666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.8	99.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A96387
Included Lab Sample IDs: 2143665

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

Reference Method: SM 5310 B-00
Run ID: A96393
Included Lab Sample IDs: 2143665

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.3	95.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A96395
Included Lab Sample IDs: 2143665

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

Reference Method: SM 2120 B
Run ID: A96397
Included Lab Sample IDs: 2143664

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.8	98.8	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A96441
Included Lab Sample IDs: 2143665

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	98.0	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A96479
Included Lab Sample IDs: 2143664

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

Reference Method: SM 2320 B-97
Run ID: A96510
Included Lab Sample IDs: 2143664

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	104	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 4500 F-C-97
Run ID: A96510
Included Lab Sample IDs: 2143664

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A96515
Included Lab Sample IDs: 2143665

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A96574
Included Lab Sample IDs: 2143664

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.5	99.8	P/P	90 - 110
Sulfate	99.9	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 180.1 Rev. 2.0	Turbidity					4.79	
EPA 300.0 Rev. 2.1	Chloride	97.7	98.1	98.6		0.308	
	Sulfate	97.8	98.6	98.2		0.403	
EPA 350.1 Rev. 2.0	Ammonia-N	99.7	97.4	98.8			1.11
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	104	108			3.18
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	98.3	98.3			0.0
EPA 365.1 Rev. 2.0	Total-P	106	101	108			5.52
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	94.9	95.8			0.827
SM 2120 B	Color (true)	99.6				1.79	
SM 2320 B-97	Total Alkalinity	103				0.576	
SM 2540 C-97	TDS					3.45	
SM 4500 F-C-97	Fluoride	98.8	98.0	99.1			0.963
SM 5310 B-00	Organic Carbon	94.9	97.0	93.7			2.96

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2143664
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2143664
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2143664
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2143665
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2143665
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2143665
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2143665
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2143666
SM 2120 B / E31780	True Color measured at 450 nm	2143664
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2143664
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2143664
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2143664
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2143664
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2143665

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	12/12/2019			12/13/2019 17:27	Yen Ta	2143664
EPA 300.0 Rev. 2.1	12/12/2019			12/24/2019 03:20	Jhamieka S. Greenwood	2143664
EPA 350.1 Rev. 2.0	12/12/2019			12/18/2019 12:06	Ping Hua	2143665
EPA 351.2 Rev. 2.0	12/12/2019	12/16/2019 12:58	Sima Feizi	12/17/2019 13:46	Jhamieka S. Greenwood	2143665
EPA 353.2 Rev. 2.0	12/12/2019			12/17/2019 11:10	Beverly Y. Sanders	2143665
EPA 365.1 Rev. 2.0	12/12/2019	12/16/2019 14:17	Yen Ta	12/18/2019 15:38	Benjamin T. Nordmann	2143665
EPA 365.1 Rev. 2.0 dissolved	12/12/2019			12/13/2019 18:13	Samantha Davila	2143666
SM 2120 B	12/12/2019			12/13/2019 18:28	Madeline Funaro	2143664
SM 2320 B-97	12/12/2019			12/19/2019 03:48	Dale L. Simmons	2143664
SM 2540 C-97	12/12/2019			12/17/2019 16:36	Yijie Li	2143664
SM 2540 D-97	12/12/2019			12/17/2019 16:36	Yijie Li	2143664
SM 4500 F-C-97	12/12/2019			12/19/2019 03:48	Dale L. Simmons	2143664
SM 5310 B-00	12/12/2019			12/17/2019 02:57	Madeline Funaro	2143665