

Chemical Analysis Report

SO-DIST-2016-02-25-01

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

Event Description: **Algal Bloom Response - as needed**

Request ID: **RQ-2016-02-22-25**

Customer: **SO-DIST**

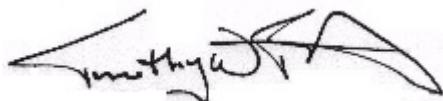
Project ID: **BLOOM-RESP**

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

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Certified by: Timothy Fitzpatrick, Program Administrator

Date Certified: 15-MAR-2016 11:04

A handwritten signature in black ink, appearing to read "Timothy Fitzpatrick", with a stylized flourish at the end.

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: Nutrients and Pesticides.

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: Lake Verona-Algae

Collection Date/Time: 02/24/2016 10:45

Field ID: G4SD022416-1

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1774544	DEP SOP LC-001-2 (based on EPA 8321B)	Microcystin LR**	1.0	U	ug/L	P299542	
		Microcystin LA**	1.0	UJ	ug/L	P299542	MS
		Microcystin RR**	1.0	U	ug/L	P299542	
		Microcystin YR**	1.0	U	ug/L	P299542	
		Anatoxin-a**	1.0	U	ug/L	P299542	
		Cylindrospermopsin**	1.0	U	ug/L	P299542	

Ref. Method and Comment:

DEP SOP LC-001-2 (based on EPA 8321B): Refer to the narrative for an explanation of QC Codes.

Sample Location: Lake Verona-Algae

Collection Date/Time: 02/24/2016 10:45

Field ID: G4SD022416-1

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1774545	EPA 350.1 Rev. 2.0	Ammonia-N	0.036		mg N/L	P299983	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P299675	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.15		mg N/L	P299705	
	EPA 365.1 Rev. 2.0	Total-P	0.077		mg P/L	P299672	
1774546	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.013		mg P/L	P299293	

Ref. Method and Comment:

EPA 365.1 Rev. 2.0: Total-P: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: DEP SOP LC-001-2 (based on EPA 8321B)

Batch ID: P299542

Component	Result	Code	Units
Anatoxin-a	1.0	U	ug/L
Cylindrospermopsin	1.0	U	ug/L
Microcystin LA	1.0	U	ug/L
Microcystin LR	1.0	U	ug/L
Microcystin RR	1.0	U	ug/L
Microcystin YR	1.0	U	ug/L

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P299983

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

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P299675

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: P299705

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P299672

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P299293

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: DEP SOP LC-001-2 (based on EPA 8321B)
Batch ID: P299542

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	79.2	78.4	P/P	40 - 140
Cylindrospermopsin	110	120	P/P	40 - 140
Microcystin LA	121	120	P/P	40 - 140
Microcystin LR	99.9	108	P/P	50 - 150
Microcystin RR	94.8	119	P/P	50 - 150
Microcystin YR	93.6	109	P/P	50 - 150

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299983

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299675

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299705

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: P299672

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P299293

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: DEP SOP LC-001-2 (based on EPA 8321B)
Batch ID: P299542

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774544	Anatoxin-a	50.8	63.5	P/P	40 - 140
1774544	Cylindrospermopsin	131	125	P/P	40 - 140
1774544	Microcystin LA	111	142	P/F	40 - 140
1774544	Microcystin LR	104	112	P/P	50 - 150
1774544	Microcystin RR	137	127	P/P	50 - 150
1774544	Microcystin YR	94.4	85.4	P/P	50 - 150

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299983

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774535	Ammonia-N	97.2	96.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299675

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774538	Kjeldahl Nitrogen	104	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299705

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774534	NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P299293

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1774539	O-Phosphate-P	101	102	P/P	90 - 110

Quality Assurance Report Precision

Reference Method: DEP SOP LC-001-2 (based on EPA 8321B)
Batch ID: P299542

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774544	Anatoxin-a	22.2	Spike	P	0 - 30
1774544	Cylindrospermopsin	4.69	Spike	P	0 - 30
1774544	Microcystin LA	24.5	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: DEP SOP LC-001-2 (based on EPA 8321B)
 Batch ID: P299542

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774544	Microcystin LR	7.41	Spike	P	0 - 30
1774544	Microcystin RR	7.58	Spike	P	0 - 30
1774544	Microcystin YR	10.0	Spike	P	0 - 30
LFB	Anatoxin-a	1.02	LCS	P	0 - 30
LFB	Cylindrospermopsin	8.70	LCS	P	0 - 30
LFB	Microcystin LA	0.830	LCS	P	0 - 30
LFB	Microcystin LR	7.79	LCS	P	0 - 30
LFB	Microcystin RR	22.6	LCS	P	0 - 30
LFB	Microcystin YR	15.2	LCS	P	0 - 30

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P299983

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774535	Ammonia-N	0.437	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P299675

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774538	Kjeldahl Nitrogen	1.66	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P299705

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774534	NO2NO3-N	0.482	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P299672

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774427	Total-P	2.08	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P299293

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1774539	O-Phosphate-P	0.787	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 Surrogates

Quality Assurance Report Surrogates

Lab Sample ID: 1774544
Field Sample ID: G4SD022416-1

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
DEP SOP LC-001-2 (based on EPA 8321B)	Carbamazepine-d10	102	P	40 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A67843
Included Lab Sample IDs: 1774546

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	98.0	P/P	90 - 110

Reference Method: DEP SOP LC-001-2 (based on EPA 8321B)
Run ID: A67968
Included Lab Sample IDs: 1774544

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	100	94.9	P/P	60 - 160
Cylindrospermopsin	108	99.1	P/P	60 - 160
Microcystin LA	93.2	112	P/P	60 - 160
Microcystin LR	74.0	84.5	P/P	60 - 160
Microcystin RR	118	134	P/P	60 - 160
Microcystin YR	112	115	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A67984
Included Lab Sample IDs: 1774545

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A67992
Included Lab Sample IDs: 1774545

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.5	99.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A68075
Included Lab Sample IDs: 1774545

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A68091
Included Lab Sample IDs: 1774545

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.5	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

* 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
DEP SOP LC-001-2 (based on EPA 8321B)	Anatoxin-a	79.2	78.4	50.8	63.5	1.02		22.2
	Cylindrospermopsin	110	120	131	125	8.70		4.69
	Microcystin LA	121	120	111	142	0.830		24.5
	Microcystin LR	99.9	108	104	112	7.79		7.41
	Microcystin RR	94.8	119	137	127	22.6		7.58
	Microcystin YR	93.6	109	94.4	85.4	15.2		10.0
EPA 350.1 Rev. 2.0	Ammonia-N	98.8		97.2	96.7			0.437
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.0		104	102			1.66
EPA 353.2 Rev. 2.0	NO2NO3-N	104		100	101			0.482
EPA 365.1 Rev. 2.0	Total-P	99.8						2.08
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101		101	102			0.787

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
DEP SOP LC-001-2 (based on EPA 8321B) / E31780	Microcystins in water matrices by HPLC/MS/MS	1774544
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1774545
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1774545
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1774545
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1774545
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1774546

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP LC-001-2 (based on EPA 8321B)	02/25/2016	03/02/2016	Juyoung Kim	03/02/2016	Juyoung Kim	1774544
EPA 350.1 Rev. 2.0	02/25/2016			03/08/2016	Diana M. Turner	1774545
EPA 351.2 Rev. 2.0	02/25/2016	03/03/2016	Sofia Elnemr	03/08/2016	Rochelle Y Jackson	1774545
EPA 353.2 Rev. 2.0	02/25/2016			03/03/2016	Peter D. Kaus	1774545
EPA 365.1 Rev. 2.0	02/25/2016	03/03/2016	Christopher Armour	03/03/2016	Lipi Saha	1774545
EPA 365.1 Rev. 2.0 dissolved	02/25/2016			02/25/2016 14:35	Bryan A. Werth	1774546