

Chemical Analysis Report

WAS-SECT-2018-06-12-01

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

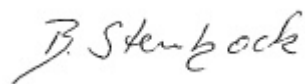
Event Description: **CDD, Godby, 3Pole, Ocklock, Harbinwood**
Request ID: **RQ-2018-06-04-38**
Customer: **WAS-SECT**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
Attn: Curtis Musson

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: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 09-JUL-2018 11:58



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: Metals and 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: OCHLOCKONEE RIVER UPSTREAM OF OLD BRAINBRIDGE

Collection Date/Time: 06/12/2018 10:50

Field ID: G1WA0071

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1999902	EPA 180.1 Rev. 2.0	Turbidity	14	A	NTU	P346785	
	EPA 300.0 Rev. 2.1	Chloride	11		mg Cl/L	P347315	
		Sulfate	4.7		mg SO4/L	P347317	
	SM 2120 B	Color (true)	170		PCU	P346779	
	SM 2320 B-97	Total Alkalinity	23		mg CaCO3/L	P347035	RPD
	SM 2540 C-97	TDS	84		mg/L	P347408	
	SM 2540 D-97	TSS	9	I	mg/L	P347416	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P347039	
1999906	EPA 350.1 Rev. 2.0	Ammonia-N	0.063		mg N/L	P347164	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.73		mg N/L	P347334	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.40		mg N/L	P347298	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P347115	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P347066	
1999910	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P346781	
1999922	EPA 200.7 Rev. 4.4	Calcium	8.20		mg/L	P346923	
		Iron	2.73E+03		ug/L	P346923	
		Magnesium	3.87		mg/L	P346923	
		Potassium	3.5		mg/L	P346923	
		Sodium	6.0		mg/L	P347261	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P346923	
		Arsenic	1.80		ug/L	P346923	
		Cadmium	0.020	U	ug/L	P346923	
		Chromium	1.2	I	ug/L	P346923	
		Copper	0.95		ug/L	P346923	
		Lead	0.71		ug/L	P346923	
		Nickel	0.62	I	ug/L	P346923	
		Silver	0.010	U	ug/L	P346923	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

**Sample Location: OCHLOCKONEE RIVER UPSTREAM OF
TOWER RD**

Collection Date/Time: 06/12/2018 12:00

Field ID: G1WA0069

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1999903	EPA 180.1 Rev. 2.0	Turbidity	14	A	NTU	P346786	
	EPA 300.0 Rev. 2.1	Chloride	10		mg Cl/L	P347315	
		Sulfate	4.3		mg SO4/L	P347317	
	SM 2120 B	Color (true)	110	A	PCU	P346780	
	SM 2320 B-97	Total Alkalinity	23		mg CaCO3/L	P347035	RPD
	SM 2540 C-97	TDS	90		mg/L	P347408	
	SM 2540 D-97	TSS	10		mg/L	P347416	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P347039	
1999907	EPA 350.1 Rev. 2.0	Ammonia-N	0.073		mg N/L	P347164	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.89		mg N/L	P347334	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.41		mg N/L	P347298	
	EPA 365.1 Rev. 2.0	Total-P	0.18		mg P/L	P347115	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P347066	
1999911	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P346781	
1999923	EPA 200.7 Rev. 4.4	Calcium	8.19		mg/L	P346923	
		Iron	2.60E+03		ug/L	P346923	
		Magnesium	3.77		mg/L	P346923	
		Potassium	3.4		mg/L	P346923	
		Sodium	7.0		mg/L	P346923	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P346923	
		Arsenic	1.78		ug/L	P346923	
		Cadmium	0.020	U	ug/L	P346923	
		Chromium	1.3	I	ug/L	P346923	
		Copper	1.05		ug/L	P346923	
		Lead	0.71		ug/L	P346923	
		Nickel	0.65	I	ug/L	P346923	
		Silver	0.010	U	ug/L	P346923	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: OCHLOCKONEE RIVER DOWNSTREAM OF TOWER RD

Collection Date/Time: 06/12/2018 11:35

Field ID: G1WA0070

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1999904	EPA 180.1 Rev. 2.0	Turbidity	14		NTU	P346786	
	EPA 300.0 Rev. 2.1	Chloride	10		mg Cl/L	P347315	
		Sulfate	4.2		mg SO4/L	P347317	
	SM 2120 B	Color (true)	180		PCU	P346779	
	SM 2320 B-97	Total Alkalinity	24		mg CaCO3/L	P347157	RPD
	SM 2540 C-97	TDS	85		mg/L	P347408	
	SM 2540 D-97	TSS	12		mg/L	P347416	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P347159	
1999908	EPA 350.1 Rev. 2.0	Ammonia-N	0.073		mg N/L	P347164	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.80		mg N/L	P347334	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.41		mg N/L	P347298	
	EPA 365.1 Rev. 2.0	Total-P	0.18		mg P/L	P347115	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P347066	
1999912	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P346781	
1999924	EPA 200.7 Rev. 4.4	Calcium	8.37		mg/L	P346923	
		Iron	2.68E+03		ug/L	P346923	
		Magnesium	3.84		mg/L	P346923	
		Potassium	3.4		mg/L	P346923	
		Sodium	6.8		mg/L	P346923	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P346923	
		Arsenic	1.75		ug/L	P346923	
		Cadmium	0.020	U	ug/L	P346923	
		Chromium	1.1	I	ug/L	P346923	
		Copper	1.06		ug/L	P346923	
		Lead	0.70		ug/L	P346923	
		Nickel	0.65	I	ug/L	P346923	
		Silver	0.010	U	ug/L	P346923	

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: P346785

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P346786

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P346923

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P347261

Component	Result	Code	Units
Sodium	0.50	U	mg/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P346923

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347315

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347317

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347164

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P347334

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P347298

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P347115

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P346781

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

Reference Method: SM 2120 B
Batch ID: P346779

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P346780

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P347035

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

Reference Method: SM 2320 B-97
Batch ID: P347157

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P347408

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P347416

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P347039

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P347159

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P347066

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P346923

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	104		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	100		P	85 - 115
Sodium	101		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P347261

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sodium	96.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P346923

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	97.9		P	85 - 115
Cadmium	99.2		P	85 - 115
Chromium	95.8		P	85 - 115
Copper	96.2		P	85 - 115
Lead	97.2		P	85 - 115
Nickel	97.6		P	85 - 115
Silver	104		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347315

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347317

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: P347164

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P347334

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P347298

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P347115

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	95.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P346781

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

Reference Method: SM 2320 B-97
Batch ID: P347035

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	98 - 107

Reference Method: SM 2320 B-97
Batch ID: P347157

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P347039

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.2		P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P347159

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.5		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P347066

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	102		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P346923

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999775	Calcium	104	105	P/P	80 - 120
1999775	Iron	105	107	P/P	80 - 120
1999775	Magnesium	107	109	P/P	80 - 120
1999775	Potassium	102	103	P/P	80 - 120
1999775	Sodium	101	105	P/P	80 - 120
1999775	Zinc	101	103	P/P	80 - 120
2000416	Calcium	104		P	80 - 120
2000416	Iron	108		P	80 - 120
2000416	Magnesium	105		P	80 - 120
2000416	Potassium	103		P	80 - 120
2000416	Sodium	102		P	80 - 120
2000416	Zinc	105		P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P347261

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2001484	Sodium	96.4	96.8	P/P	80 - 120
2001924	Sodium	97.7		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P346923

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999775	Arsenic	96.7	96.1	P/P	80 - 120
1999775	Cadmium	104	103	P/P	80 - 120
1999775	Chromium	98.3	97.2	P/P	80 - 120
1999775	Copper	94.7	95.3	P/P	80 - 120
1999775	Lead	99.1	99.2	P/P	80 - 120
1999775	Nickel	96.7	96.2	P/P	80 - 120
1999775	Silver	107	105	P/P	80 - 120
2000416	Arsenic	96.8		P	80 - 120
2000416	Cadmium	101		P	80 - 120
2000416	Chromium	94.0		P	80 - 120
2000416	Copper	90.9		P	80 - 120
2000416	Lead	98.3		P	80 - 120
2000416	Nickel	93.5		P	80 - 120
2000416	Silver	105		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P347315

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999741	Chloride	97.0		P	90 - 110
1999988	Chloride	99.1		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P347317

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999741	Sulfate	92.7		P	90 - 110
1999988	Sulfate	101		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347164

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999746	Ammonia-N	99.6	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P347334

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999764	Kjeldahl Nitrogen	100	98.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P347298

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999864	NO2NO3-N	98.6	98.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P347115

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999906	Total-P	93.0	95.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P346781

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999728	O-Phosphate-P	97.0	98.0	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P347039

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999117	Fluoride	96.9	98.2	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P347159

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2000937	Fluoride	94.7	95.8	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P347066

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1999907	Organic Carbon	101	102	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P346785

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999902	Turbidity	5.09	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P346786

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999903	Turbidity	4.14	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P346923

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999775	Calcium	1.09	Spike	P	0 - 20
1999775	Iron	1.35	Spike	P	0 - 20
1999775	Magnesium	1.42	Spike	P	0 - 20
1999775	Potassium	1.61	Spike	P	0 - 20
1999775	Sodium	2.63	Spike	P	0 - 20
1999775	Zinc	2.24	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P347261

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2001484	Sodium	0.423	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P346923

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999775	Arsenic	0.668	Spike	P	0 - 20
1999775	Cadmium	0.658	Spike	P	0 - 20
1999775	Chromium	1.14	Spike	P	0 - 20
1999775	Copper	0.701	Spike	P	0 - 20
1999775	Lead	0.118	Spike	P	0 - 20
1999775	Nickel	0.533	Spike	P	0 - 20
1999775	Silver	1.07	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347315

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999741	Chloride	1.56	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347317

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999741	Sulfate	1.68	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347164

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999746	Ammonia-N	2.83	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P347334

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999764	Kjeldahl Nitrogen	1.63	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P347298

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999864	NO2NO3-N	0.354	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P347115

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999906	Total-P	1.78	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P346781

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999728	O-Phosphate-P	0.727	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P346779

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999792	Color (true)	1.39	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P346780

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999903	Color (true)	0.763	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
 Batch ID: P347035

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999117	Total Alkalinity	7.60	Sample	F	0 - 1.6

Reference Method: SM 2320 B-97
 Batch ID: P347157

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2000937	Total Alkalinity	4.35	Sample	F	0 - 1.6

Reference Method: SM 2540 C-97
 Batch ID: P347408

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999726	TDS	5.95	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
 Batch ID: P347039

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999117	Fluoride	0.972	Spike	P	0 - 3.5

Reference Method: SM 4500 F-C-97
 Batch ID: P347159

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2000937	Fluoride	0.943	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
 Batch ID: P347066

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999907	Organic Carbon	0.341	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

Reference Method: SM 2120 B

Run ID: A84527

Included Lab Sample IDs: 1999902, 1999903, 1999904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.2	99.7	P/P	90 - 115
Color (true)	99.7	97.3	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A84528

Included Lab Sample IDs: 1999910, 1999911, 1999912

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	99.5	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A84529

Included Lab Sample IDs: 1999902, 1999903, 1999904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	99.5	P/P	95 - 105
Turbidity	99.5	99.5	P/P	95 - 105

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A84639

Included Lab Sample IDs: 1999922, 1999923, 1999924

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	103	P/P	90 - 110
Iron	103	103	P/P	90 - 110
Magnesium	103	104	P/P	90 - 110
Potassium	101	102	P/P	90 - 110
Sodium	99.7	102	P/P	90 - 110
Zinc	101	101	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A84646

Included Lab Sample IDs: 1999902, 1999903

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A84646

Included Lab Sample IDs: 1999902, 1999903

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

Reference Method: SM 5310 B-00

Run ID: A84659

Included Lab Sample IDs: 1999906, 1999907, 1999908

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.9	98.7	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A84669

Included Lab Sample IDs: 1999922, 1999923, 1999924

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	95.4	95.9	P/P	90 - 110
Cadmium	100	102	P/P	90 - 110
Chromium	96.2	97.5	P/P	90 - 110
Lead	97.8	99.5	P/P	90 - 110
Silver	97.4	98.4	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A84691

Included Lab Sample IDs: 1999904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A84691

Included Lab Sample IDs: 1999904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A84693

Included Lab Sample IDs: 1999906, 1999907, 1999908

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	104	P/P	90 - 110
Ammonia-N	104	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A84710

Included Lab Sample IDs: 1999906, 1999907, 1999908

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.3	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A84739

Included Lab Sample IDs: 1999906, 1999907, 1999908

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A84742

Included Lab Sample IDs: 1999902, 1999903, 1999904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	101	P/P	90 - 110
Sulfate	103	99.8	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A84767

Included Lab Sample IDs: 1999922, 1999923, 1999924

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A84790

Included Lab Sample IDs: 1999922

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sodium	98.7	98.2	P/P	95 - 105

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A84827

Included Lab Sample IDs: 1999906, 1999907, 1999908

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	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			LCS	Precision	MS
							SMP	
EPA 180.1 Rev. 2.0	Turbidity						5.09	
	Turbidity						4.14	
EPA 200.7 Rev. 4.4	Calcium	105	104	105	104			1.09
	Iron	104	105	107	108			1.35
	Magnesium	107	107	109	105			1.42
	Potassium	100	102	103	103			1.61
	Sodium	101	101	105	102			2.63
	Sodium	96.5	96.4	96.8	97.7			0.423
	Zinc	100	101	103	105			2.24
EPA 200.8 Rev. 5.4	Arsenic	97.9	96.7	96.1	96.8			0.668
	Cadmium	99.2	104	103	101			0.658
	Chromium	95.8	98.3	97.2	94.0			1.14
	Copper	96.2	94.7	95.3	90.9			0.701
	Lead	97.2	99.1	99.2	98.3			0.118
	Nickel	97.6	96.7	96.2	93.5			0.533
	Silver	104	107	105	105			1.07
EPA 300.0 Rev. 2.1	Chloride	97.0	97.0	99.1			1.56	
	Sulfate	97.8	92.7	101			1.68	
EPA 350.1 Rev. 2.0	Ammonia-N	104	99.6	103				2.83
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	100	98.2				1.63
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	98.6	98.2				0.354
EPA 365.1 Rev. 2.0	Total-P	95.0	93.0	95.4				1.78
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	97.0	98.0				0.727
SM 2120 B	Color (true)						1.39	
	Color (true)						0.763	
SM 2320 B-97	Total Alkalinity	100					7.60	
	Total Alkalinity	100					4.35	
SM 2540 C-97	TDS						5.95	
SM 4500 F-C-97	Fluoride	96.2	96.9	98.2				0.972
	Fluoride	96.5	94.7	95.8				0.943
SM 5310 B-00	Organic Carbon	102	101	102				0.341

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1999902, 1999903, 1999904
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1999922, 1999923, 1999924
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1999922, 1999923, 1999924
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1999902, 1999903, 1999904
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1999902, 1999903, 1999904
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1999906, 1999907, 1999908
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1999906, 1999907, 1999908
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1999906, 1999907, 1999908
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1999906, 1999907, 1999908
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1999910, 1999911, 1999912

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2120 B / E31780	True Color measured at 450 nm	1999902, 1999903, 1999904
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1999902, 1999903, 1999904
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1999902, 1999903, 1999904
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	1999902, 1999903, 1999904
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1999902, 1999903, 1999904
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1999906, 1999907, 1999908

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	06/12/2018			06/12/2018 16:26	William L. Brown IV	1999902, 1999903, 1999904
EPA 200.7 Rev. 4.4	06/12/2018	06/14/2018 16:50	Elliott D. Healy	06/15/2018 13:07	Betina Topolski	1999922
	06/12/2018	06/14/2018 16:50	Elliott D. Healy	06/15/2018 13:13	Betina Topolski	1999923
	06/12/2018	06/14/2018 16:50	Elliott D. Healy	06/15/2018 13:19	Betina Topolski	1999924
	06/12/2018	06/21/2018 14:25	Elliott D. Healy	06/22/2018 10:33	Betina Topolski	1999922
EPA 200.8 Rev. 5.4	06/12/2018	06/14/2018 16:50	Elliott D. Healy	06/18/2018 20:41	Allison Taylor	1999922
	06/12/2018	06/14/2018 16:50	Elliott D. Healy	06/18/2018 20:51	Allison Taylor	1999923
	06/12/2018	06/14/2018 16:50	Elliott D. Healy	06/18/2018 21:01	Allison Taylor	1999924
	06/12/2018	06/14/2018 16:50	Elliott D. Healy	06/21/2018 13:22	Allison Taylor	1999922
	06/12/2018	06/14/2018 16:50	Elliott D. Healy	06/21/2018 13:29	Allison Taylor	1999923
	06/12/2018	06/14/2018 16:50	Elliott D. Healy	06/21/2018 13:36	Allison Taylor	1999924
EPA 300.0 Rev. 2.1	06/12/2018			06/21/2018 17:25	Irina Carbone	1999902
	06/12/2018			06/21/2018 17:37	Irina Carbone	1999903
	06/12/2018			06/21/2018 17:49	Irina Carbone	1999904
EPA 350.1 Rev. 2.0	06/12/2018			06/19/2018 11:18	Ping Hua	1999906
	06/12/2018			06/19/2018 11:20	Ping Hua	1999907
	06/12/2018			06/19/2018 11:29	Ping Hua	1999908
EPA 351.2 Rev. 2.0	06/12/2018	06/22/2018 10:30	Adrian Shelby	06/26/2018 10:24	Joseph Suarez	1999906
	06/12/2018	06/22/2018 10:30	Adrian Shelby	06/26/2018 10:25	Joseph Suarez	1999907
	06/12/2018	06/22/2018 10:30	Adrian Shelby	06/26/2018 10:26	Joseph Suarez	1999908
EPA 353.2 Rev. 2.0	06/12/2018			06/20/2018 10:20	Beverly Y. Sanders	1999906
	06/12/2018			06/20/2018 10:21	Beverly Y. Sanders	1999907
	06/12/2018			06/20/2018 10:23	Beverly Y. Sanders	1999908
EPA 365.1 Rev. 2.0	06/12/2018	06/19/2018 11:10	Sima Feizi	06/20/2018 11:03	Lipi Saha	1999906
	06/12/2018	06/19/2018 11:10	Sima Feizi	06/20/2018 11:06	Lipi Saha	1999907
	06/12/2018	06/19/2018 11:10	Sima Feizi	06/20/2018 11:07	Lipi Saha	1999908
EPA 365.1 Rev. 2.0 dissolved	06/12/2018			06/12/2018 15:16	Megan Treadwell	1999910
	06/12/2018			06/12/2018 15:17	Megan Treadwell	1999911, 1999912
SM 2120 B	06/12/2018			06/12/2018 15:18	Tanya Welborn	1999903
	06/12/2018			06/12/2018 15:23	Tanya Welborn	1999902
	06/12/2018			06/12/2018 15:24	Tanya Welborn	1999904
SM 2320 B-97	06/12/2018			06/16/2018 16:58	Dale L. Simmons	1999902
	06/12/2018			06/16/2018 17:08	Dale L. Simmons	1999903
	06/12/2018			06/19/2018 23:43	Lauren Bottorf	1999904
SM 2540 C-97	06/12/2018			06/15/2018 16:52	Yijie Li	1999902, 1999903, 1999904
SM 2540 D-97	06/12/2018			06/15/2018 16:52	Yijie Li	1999902, 1999903, 1999904
SM 4500 F-C-97	06/12/2018			06/16/2018 16:58	Dale L. Simmons	1999902
	06/12/2018			06/16/2018 17:08	Dale L. Simmons	1999903
	06/12/2018			06/19/2018 23:43	Lauren Bottorf	1999904
SM 5310 B-00	06/12/2018			06/16/2018 00:49	Blanca Fach	1999907

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 5310 B-00	06/12/2018			06/16/2018 01:39	Blanca Fach	1999906
	06/12/2018			06/16/2018 01:51	Blanca Fach	1999908