Chemical Analysis Report

SO-DIST-2018-04-24-02

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

Event Description: **Charlotte Harbor**
Request ID: **RQ-2018-04-02-65**
Customer: **SO-DIST**
Project ID: **SMP**

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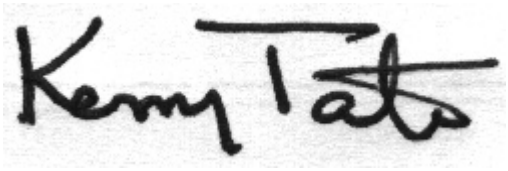
Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 01-JUN-2018 11:47



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: TrailerParkCanal@Mouth **Collection Date/Time: 04/23/2018 10:45**

Field ID: G3SD0072 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1986622	EPA 180.1 Rev. 2.0	Turbidity	6.5		NTU	P343999	
	SM 2320 B-97	Total Alkalinity	116		mg CaCO3/L	P344174	RPD
	SM 2540 D-97	TSS	28	A	mg/L	P344680	
	SM 4500 F-C-97	Fluoride	1.0		mg F/L	P344178	
1986624	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P344429	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.69		mg N/L	P34990	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P344030	
	EPA 365.1 Rev. 2.0	Total-P	0.22		mg P/L	P344039	
	SM 5310 B-00	Organic Carbon	9.1		mg C/L	P344291	
1986626	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.10		mg P/L	P343972	
1986660	EPA 200.7 Rev. 4.4	Iron	600		ug/L	P344068	
	EPA 200.8 Rev. 5.4	Arsenic	2.66		ug/L	P344068	
		Cadmium	0.080	U	ug/L	P344068	
		Chromium	1.6	U	ug/L	P344068	
		Copper	0.80	U	ug/L	P344068	
		Lead	0.50	U	ug/L	P344068	
		Nickel	0.80	U	ug/L	P344068	
		Silver	0.040	U	ug/L	P344068	
		Zinc	4.0	U	ug/L	P344068	

Sample Location: TrailerParkCanal@Mouth **Collection Date/Time: 04/23/2018 10:50**

Field ID: BLANK_04232018 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1986623	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P343999	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P344453	RPD
	SM 2540 D-97	TSS	2	U	mg/L	P344678	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P344457	
1986625	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P344184	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P34989	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P344119	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P344042	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P344290	
1986627	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P343969	
1986661	EPA 200.7 Rev. 4.4	Iron	30	U	ug/L	P344067	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P344067	
		Cadmium	0.020	U	ug/L	P344067	
		Chromium	0.40	U	ug/L	P344067	
		Copper	0.20	U	ug/L	P344067	
		Lead	0.050	U	ug/L	P344067	
		Nickel	0.20	U	ug/L	P344067	
		Silver	0.010	U	ug/L	P344067	
		Zinc	1.0	U	ug/L	P344067	

Field ID: BLANK_04232018 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 5310 B-00: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Myakka Cutoff (Western) **Collection Date/Time: 04/23/2018 11:10**

Field ID: G3SD0073 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1986628	EPA 180.1 Rev. 2.0	Turbidity	2.9		NTU	P344000	
	SM 2320 B-97	Total Alkalinity	115		mg CaCO3/L	P344174	RPD
	SM 2540 D-97	TSS	10		mg/L	P344680	
	SM 4500 F-C-97	Fluoride	1.1		mg F/L	P344178	
1986630	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P344429	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.63		mg N/L	P34990	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P344031	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P344039	
	SM 5310 B-00	Organic Carbon	8.1		mg C/L	P344291	
1986632	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P343972	

Sample Location: Whidden Creek-South Pt **Collection Date/Time: 04/23/2018 13:30**

Field ID: G2SD0029 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1986629	EPA 180.1 Rev. 2.0	Turbidity	2.0		NTU	P344000	
	SM 2320 B-97	Total Alkalinity	129		mg CaCO3/L	P344174	RPD
	SM 2540 D-97	TSS	12		mg/L	P344680	
	SM 4500 F-C-97	Fluoride	1.3		mg F/L	P344178	
1986631	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P344429	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.82		mg N/L	P34990	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P344031	
	EPA 365.1 Rev. 2.0	Total-P	0.039		mg P/L	P344039	
	SM 5310 B-00	Organic Carbon	8.3		mg C/L	P344291	
1986633	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P343972	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P343999

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P344000

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P344067

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P344068

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344067

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
Zinc	1.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344068

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
Zinc	1.0	U	ug/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344184

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344429

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P34989

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P34990

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344030

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344031

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344119

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P344039

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P344042

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343969

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343972

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

Reference Method: SM 2320 B-97
Batch ID: P344174

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P344453

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

Reference Method: SM 2540 D-97
Batch ID: P344678

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P344680

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P344178

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P344457

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P344290

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

Reference Method: SM 5310 B-00
Batch ID: P344291

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: P344067

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	107		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P344068

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P344068

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344067

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	99.4		P	85 - 115
Cadmium	100		P	85 - 115
Chromium	97.1		P	85 - 115
Copper	94.8		P	85 - 115
Lead	96.1		P	85 - 115
Nickel	97.8		P	85 - 115
Silver	98.5		P	85 - 115
Zinc	97.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344068

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	100		P	85 - 115
Cadmium	99.5		P	85 - 115
Chromium	97.3		P	85 - 115
Copper	94.7		P	85 - 115
Lead	95.5		P	85 - 115
Nickel	97.4		P	85 - 115
Silver	98.3		P	85 - 115
Zinc	97.8		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344184

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344429

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P34989

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P34990

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.6		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344030

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344031

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344119

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P344039

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P344042

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343969

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343972

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

Reference Method: SM 2320 B-97
Batch ID: P344174

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 107

Reference Method: SM 2320 B-97
Batch ID: P344453

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 107

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P344178

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.3		P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P344457

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

Reference Method: SM 5310 B-00
Batch ID: P344290

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.6		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P344291

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.4		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P344067

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986963	Iron	102	103	P/P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P344068

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986497	Iron	104	105	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344067

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986963	Arsenic	102	101	P/P	80 - 120
1986963	Cadmium	101	100	P/P	80 - 120
1986963	Chromium	95.7	95.0	P/P	80 - 120
1986963	Copper	94.5	94.4	P/P	80 - 120
1986963	Lead	99.0	97.6	P/P	80 - 120
1986963	Nickel	97.2	96.3	P/P	80 - 120
1986963	Silver	99.0	98.4	P/P	80 - 120
1986963	Zinc	97.2	96.0	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344068

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986497	Arsenic	104	105	P/P	70 - 130
1986497	Cadmium	84.3	86.9	P/P	70 - 130
1986497	Chromium	80.4	80.9	P/P	70 - 130
1986497	Copper	96.2	96.4	P/P	70 - 130
1986497	Lead	101	102	P/P	70 - 130
1986497	Nickel	102	103	P/P	70 - 130
1986497	Silver	86.7	87.4	P/P	70 - 130
1986497	Zinc	87.2	88.1	P/P	70 - 130

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344184

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986579	Ammonia-N	100	98.3	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344429

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986367	Ammonia-N	104	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P34989

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986580	Kjeldahl Nitrogen	89.7	96.3	F/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P34990

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986624	Kjeldahl Nitrogen	103	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344030

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986368	NO2NO3-N	100	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344031

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986630	NO2NO3-N	97.0	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344119

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986579	NO2NO3-N	102	102	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P344039

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986624	Total-P	93.8	94.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P344042

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986607	Total-P	103	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343969

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986584	O-Phosphate-P	98.9	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343972

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986710	O-Phosphate-P	98.7	98.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P344178

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986386	Fluoride	94.7	96.2	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P344457

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986644	Fluoride	94.2	94.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P344291

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1986430	Organic Carbon	93.6	94.0	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P343999

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986574	Turbidity	1.83	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P344000

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986634	Turbidity	1.94	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P344067

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986963	Iron	1.07	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P344068

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986497	Iron	0.934	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344067

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986963	Arsenic	0.452	Spike	P	0 - 20
1986963	Cadmium	0.908	Spike	P	0 - 20
1986963	Chromium	0.706	Spike	P	0 - 20
1986963	Copper	0.122	Spike	P	0 - 20
1986963	Lead	1.42	Spike	P	0 - 20
1986963	Nickel	0.923	Spike	P	0 - 20
1986963	Silver	0.554	Spike	P	0 - 20
1986963	Zinc	1.23	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344068

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986497	Arsenic	1.10	Spike	P	0 - 20
1986497	Cadmium	3.05	Spike	P	0 - 20
1986497	Chromium	0.641	Spike	P	0 - 20
1986497	Copper	0.273	Spike	P	0 - 20
1986497	Lead	0.986	Spike	P	0 - 20
1986497	Nickel	0.443	Spike	P	0 - 20
1986497	Silver	0.829	Spike	P	0 - 20
1986497	Zinc	1.11	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344184

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986579	Ammonia-N	1.60	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P344429

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986367	Ammonia-N	0.945	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P34989

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986580	Kjeldahl Nitrogen	4.35	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P34990

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986624	Kjeldahl Nitrogen	0.0316	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344030

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986368	NO2NO3-N	1.01	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344031

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986630	NO2NO3-N	1.53	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P344119

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986579	NO2NO3-N	0.489	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P344039

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986624	Total-P	0.676	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P344042

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986607	Total-P	0.968	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343969

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986584	O-Phosphate-P	1.12	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343972

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986710	O-Phosphate-P	0.294	Spike	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P344174

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986386	Total Alkalinity	1.95	Sample	F	0 - 1.6

Reference Method: SM 2320 B-97
Batch ID: P344453

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986644	Total Alkalinity	4.08	Sample	F	0 - 1.6

Reference Method: SM 2540 D-97
Batch ID: P344680

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986622	TSS	7.09	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P344178

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986386	Fluoride	0.953	Spike	P	0 - 3.5

Reference Method: SM 4500 F-C-97
Batch ID: P344457

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986644	Fluoride	0.479	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P344290

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986583	Organic Carbon	0.174	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 5310 B-00
Batch ID: P344291

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1986430	Organic Carbon	0.318	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: EPA 365.1 Rev. 2.0 dissolved
Run ID: A83428
Included Lab Sample IDs: 1986626, 1986627, 1986632, 1986633

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.8	97.1	P/P	90 - 110
O-Phosphate-P	98.0	98.2	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A83437
Included Lab Sample IDs: 1986622, 1986623, 1986628, 1986629

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.0	99.5	P/P	95 - 105
Turbidity	99.5	99.0	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A83453
Included Lab Sample IDs: 1986624, 1986630, 1986631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	97.0	97.5	P/P	90 - 110
NO2NO3-N	97.5	97.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A83467
Included Lab Sample IDs: 1986624, 1986625, 1986630, 1986631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.7	98.2	P/P	90 - 110
Kjeldahl Nitrogen	98.2	99.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A83479
Included Lab Sample IDs: 1986625

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A83489
Included Lab Sample IDs: 1986660

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	99.6	100	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A83492
Included Lab Sample IDs: 1986622, 1986628, 1986629

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.9	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A83492
Included Lab Sample IDs: 1986622, 1986628, 1986629

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.5	99.0	P/P	90 - 110
Fluoride	99.0	99.1	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A83494
Included Lab Sample IDs: 1986625

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A83513
Included Lab Sample IDs: 1986625, 1986631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.5	100	P/P	90 - 110
Total-P	99.5	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A83527
Included Lab Sample IDs: 1986661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	103	101	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A83539
Included Lab Sample IDs: 1986624, 1986625, 1986630, 1986631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.1	98.8	P/P	90 - 110
Organic Carbon	98.7	98.4	P/P	90 - 110
Organic Carbon	98.8	98.1	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A83547
Included Lab Sample IDs: 1986624, 1986630

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A83584
Included Lab Sample IDs: 1986660, 1986661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	102	100	P/P	90 - 110
Arsenic	102	102	P/P	90 - 110
Cadmium	97.3	96.7	P/P	90 - 110
Cadmium	98.7	99.6	P/P	90 - 110
Chromium	95.7	94.2	P/P	90 - 110
Chromium	96.5	98.7	P/P	90 - 110
Copper	101	98.0	P/P	90 - 110
Copper	99.8	97.6	P/P	90 - 110
Lead	97.0	97.0	P/P	90 - 110
Lead	97.5	97.7	P/P	90 - 110
Nickel	101	98.6	P/P	90 - 110
Nickel	99.7	97.9	P/P	90 - 110
Silver	98.5	97.6	P/P	90 - 110
Silver	99.0	98.7	P/P	90 - 110
Zinc	101	98.5	P/P	90 - 110
Zinc	99.7	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A83587
Included Lab Sample IDs: 1986624, 1986630, 1986631

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

Reference Method: SM 2320 B-97
Run ID: A83593
Included Lab Sample IDs: 1986623

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	99.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A83593
Included Lab Sample IDs: 1986623

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	99.0	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		Precision		
					LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity					1.83	
	Turbidity					1.94	
EPA 200.7 Rev. 4.4	Iron	107	102	103			1.07
	Iron	103	104	105			0.934
EPA 200.8 Rev. 5.4	Arsenic	99.4	102	101			0.452
	Arsenic	100	104	105			1.10
	Cadmium	100	101	100			0.908
	Cadmium	99.5	84.3	86.9			3.05
	Chromium	97.1	95.7	95.0			0.706
	Chromium	97.3	80.4	80.9			0.641
	Copper	94.8	94.5	94.4			0.122
	Copper	94.7	96.2	96.4			0.273
	Lead	96.1	99.0	97.6			1.42
	Lead	95.5	101	102			0.986
	Nickel	97.8	97.2	96.3			0.923
	Nickel	97.4	102	103			0.443
	Silver	98.5	99.0	98.4			0.554
	Silver	98.3	86.7	87.4			0.829
	Zinc	97.7	97.2	96.0			1.23
	Zinc	97.8	87.2	88.1			1.11
EPA 350.1 Rev. 2.0	Ammonia-N	102	100	98.3			1.60
	Ammonia-N	101	104	105			0.945
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	89.7	96.3			4.35
	Kjeldahl Nitrogen	98.6	103	103			0.0316
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	100	99.0			1.01
	NO2NO3-N	98.5	97.0	98.5			1.53
	NO2NO3-N	99.0	102	102			0.489
EPA 365.1 Rev. 2.0	Total-P	105	93.8	94.6			0.676
	Total-P	102	103	104			0.968
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.2	98.9	100			1.12
	O-Phosphate-P	100	98.7	98.2			0.294
SM 2320 B-97	Total Alkalinity	101				1.95	
	Total Alkalinity	102				4.08	
SM 2540 D-97	TSS					7.09	
SM 4500 F-C-97	Fluoride	95.3	94.7	96.2			0.953
	Fluoride	96.5	94.2	94.7			0.479
SM 5310 B-00	Organic Carbon	96.6					0.174
	Organic Carbon	96.4	93.6	94.0			0.318

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1986622, 1986623, 1986628, 1986629
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1986660, 1986661
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1986660, 1986661
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1986624, 1986625, 1986630, 1986631
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1986624, 1986625, 1986630, 1986631
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1986624, 1986625, 1986630, 1986631

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1986624, 1986625, 1986630, 1986631
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1986626, 1986627, 1986632, 1986633
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1986622, 1986623, 1986628, 1986629
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1986622, 1986623, 1986628, 1986629
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1986622, 1986623, 1986628, 1986629
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1986624, 1986625, 1986630, 1986631

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	04/24/2018			04/24/2018 16:04	William L. Brown IV	1986622, 1986623, 1986628, 1986629
EPA 200.7 Rev. 4.4	04/24/2018	04/25/2018 17:45	Elliott D. Healy	04/27/2018 13:59	Betina Topolski	1986661
	04/24/2018	04/25/2018 17:50	Elliott D. Healy	04/26/2018 17:06	Betina Topolski	1986660
EPA 200.8 Rev. 5.4	04/24/2018	04/25/2018 17:45	Elliott D. Healy	05/01/2018 13:42	Nadine Brooks	1986661
	04/24/2018	04/25/2018 17:50	Elliott D. Healy	05/01/2018 20:03	Nadine Brooks	1986660
	04/24/2018	04/25/2018 17:50	Elliott D. Healy	05/01/2018 21:57	Nadine Brooks	1986660
EPA 350.1 Rev. 2.0	04/24/2018			04/25/2018 12:23	Ping Hua	1986625
	04/24/2018			04/30/2018 13:21	Ping Hua	1986624
	04/24/2018			04/30/2018 13:23	Ping Hua	1986630
	04/24/2018			04/30/2018 13:24	Ping Hua	1986631
EPA 351.2 Rev. 2.0	04/24/2018	04/25/2018 10:20	Adrian Shelby	04/25/2018 16:26	Tanya Welborn	1986625
	04/24/2018	04/25/2018 10:20	Adrian Shelby	04/25/2018 16:38	Tanya Welborn	1986624
	04/24/2018	04/25/2018 10:20	Adrian Shelby	04/25/2018 16:46	Tanya Welborn	1986630
	04/24/2018	04/25/2018 10:20	Adrian Shelby	04/25/2018 16:48	Tanya Welborn	1986631
EPA 353.2 Rev. 2.0	04/24/2018			04/25/2018 12:10	Lauren Bottorf	1986624
	04/24/2018			04/25/2018 12:17	Lauren Bottorf	1986630
	04/24/2018			04/25/2018 12:23	Lauren Bottorf	1986631
	04/24/2018			04/26/2018 11:14	Lauren Bottorf	1986625
EPA 365.1 Rev. 2.0	04/24/2018	04/25/2018 13:20	Sima Feizi	04/27/2018 12:55	Beverly Y. Sanders	1986631
	04/24/2018	04/25/2018 13:20	Sima Feizi	04/27/2018 13:47	Beverly Y. Sanders	1986625
	04/24/2018	04/25/2018 13:20	Sima Feizi	04/30/2018 14:28	Beverly Y. Sanders	1986624
	04/24/2018	04/25/2018 13:20	Sima Feizi	04/30/2018 14:32	Beverly Y. Sanders	1986630
EPA 365.1 Rev. 2.0 dissolved	04/24/2018			04/24/2018 14:55	Megan Treadwell	1986627
	04/24/2018			04/24/2018 14:57	Megan Treadwell	1986633
	04/24/2018			04/24/2018 15:30	Megan Treadwell	1986626
	04/24/2018			04/24/2018 15:31	Megan Treadwell	1986632
SM 2320 B-97	04/24/2018			04/27/2018 02:54	Dale L. Simmons	1986622
	04/24/2018			04/27/2018 03:04	Dale L. Simmons	1986628
	04/24/2018			04/27/2018 03:13	Dale L. Simmons	1986629
	04/24/2018			05/02/2018 05:50	Dale L. Simmons	1986623
SM 2540 D-97	04/24/2018			04/27/2018 16:08	Yijie Li	1986622, 1986623, 1986628, 1986629
SM 4500 F-C-97	04/24/2018			04/26/2018 23:07	Dale L. Simmons	1986622
	04/24/2018			04/26/2018 23:45	Dale L. Simmons	1986628
	04/24/2018			04/26/2018 23:48	Dale L. Simmons	1986629
	04/24/2018			05/02/2018 05:50	Dale L. Simmons	1986623
SM 5310 B-00	04/24/2018			04/28/2018 04:48	Julia Storbeck	1986625
	04/24/2018			04/28/2018 11:17	Julia Storbeck	1986624
	04/24/2018			04/28/2018 11:45	Julia Storbeck	1986630
	04/24/2018			04/28/2018 12:28	Julia Storbeck	1986631