Chemical Analysis Report

TLH-ROC-2018-07-05-01

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

Event Description: **kit D-b (WBID 1274 Apalachicola Bay)**
Request ID: **RQ-2018-04-30-25**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
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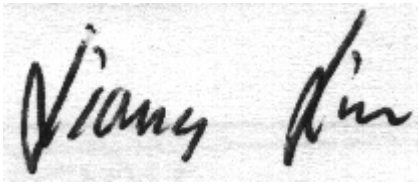
Certified by: Liang Lin, Environmental Administrator

Date Certified: 01-AUG-2018 10:31



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: Apalachicola Bay 1200m South of US98 Bridge Collection Date/Time: 07/05/2018 10:30

Field ID: G2TLHR0035 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2004935	EPA 180.1 Rev. 2.0	Turbidity	9.0	A	NTU	P348042	
	SM 2320 B-97	Total Alkalinity	54		mg CaCO3/L	P348194	
	SM 2540 D-97	TSS	13		mg/L	P348320	
	SM 4500 F-C-97	Fluoride	0.26		mg F/L	P348197	
2004937	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P348697	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.43		mg N/L	P348143	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.15		mg N/L	P348202	
	EPA 365.1 Rev. 2.0	Total-P	0.037		mg P/L	P348246	
	SM 5310 B-00	Organic Carbon	4.7		mg C/L	P348454	
2004939	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P347995	
2004947	EPA 200.7 Rev. 4.4	Iron	620		ug/L	P348183	
	EPA 200.8 Rev. 5.4	Arsenic	1.10		ug/L	P348183	
		Cadmium	0.020	U	ug/L	P348183	
		Chromium	0.55	I	ug/L	P348183	
		Copper	0.63	I	ug/L	P348183	
		Lead	0.38	I	ug/L	P348183	
		Nickel	0.41	I	ug/L	P348183	
		Silver	0.010	U	ug/L	P348183	
		Zinc	1.5	I	ug/L	P348183	

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: APALACHICOLA BAY **Collection Date/Time: 07/05/2018 11:20**

Field ID: G2TLHR0036 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2004936	EPA 180.1 Rev. 2.0	Turbidity	12		NTU	P348042	
	SM 2320 B-97	Total Alkalinity	101	A	mg CaCO3/L	P348195	
	SM 2540 D-97	TSS	21	A	mg/L	P348562	
	SM 4500 F-C-97	Fluoride	0.99		mg F/L	P348198	
2004938	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P348475	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.44		mg N/L	P348214	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.019		mg N/L	P348151	
	EPA 365.1 Rev. 2.0	Total-P	0.034		mg P/L	P348245	
	SM 5310 B-00	Organic Carbon	3.0		mg C/L	P348375	
2004940	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P347996	
2004948	EPA 200.7 Rev. 4.4	Iron	760		ug/L	P348184	
	EPA 200.8 Rev. 5.4	Arsenic	2.84		ug/L	P348184	
		Cadmium	0.20	U	ug/L	P348184	
		Chromium	1.6	U	ug/L	P348184	
		Copper	0.80	U	ug/L	P348184	
		Lead	0.66	I	ug/L	P348184	
		Nickel	0.80	U	ug/L	P348184	
		Silver	0.10	U	ug/L	P348184	
		Zinc	4.0	U	ug/L	P348184	

Ref. Method and Comment:
EPA 200.8 Rev. 5.4: The sample required dilution due to matrix interference.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P348042

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348183

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348184

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348183

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: P348184

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: P348475

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P348697

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348143

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348214

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348151

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348202

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348245

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348246

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347995

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347996

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

Reference Method: SM 2320 B-97
Batch ID: P348194

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: P348195

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

Reference Method: SM 2540 D-97
Batch ID: P348320

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P348562

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P348197

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P348198

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P348375

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

Reference Method: SM 5310 B-00
Batch ID: P348454

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: P348183

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	106		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348184

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	97.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348183

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	96.9		P	85 - 115
Cadmium	104		P	85 - 115
Chromium	94.1		P	85 - 115
Copper	95.6		P	85 - 115
Lead	101		P	85 - 115
Nickel	95.8		P	85 - 115
Silver	106		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348184

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	102		P	85 - 115
Cadmium	108		P	85 - 115
Chromium	103		P	85 - 115
Copper	99.3		P	85 - 115
Lead	104		P	85 - 115
Nickel	99.5		P	85 - 115
Silver	108		P	85 - 115
Zinc	107		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P348475

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: P348697

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348143

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348214

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348151

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348202

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348245

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348246

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	94.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347995

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347996

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	95.9		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P348194

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	105		P	98 - 107

Reference Method: SM 2320 B-97
Batch ID: P348195

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	105		P	98 - 107

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P348197

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.5		P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P348198

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.1		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P348375

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.0		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P348454

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.4		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348183

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005265	Iron	104	105	P/P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348184

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004948	Iron	95.3	96.2	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348183

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005265	Arsenic	103	102	P/P	80 - 120
2005265	Cadmium	109	109	P/P	80 - 120
2005265	Chromium	99.8	99.0	P/P	80 - 120
2005265	Copper	101	101	P/P	80 - 120
2005265	Lead	106	106	P/P	80 - 120
2005265	Nickel	100	100	P/P	80 - 120
2005265	Silver	108	108	P/P	80 - 120
2005265	Zinc	106	106	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348184

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004948	Arsenic	113	113	P/P	80 - 120
2004948	Cadmium	113	114	P/P	70 - 130
2004948	Chromium	92.0	89.0	P/P	70 - 130
2004948	Copper	107	103	P/P	70 - 130
2004948	Lead	125	122	P/P	70 - 130
2004948	Nickel	114	110	P/P	70 - 130
2004948	Silver	112	111	P/P	70 - 130
2004948	Zinc	99.7	96.1	P/P	70 - 130

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P348475

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004938	Ammonia-N	103	104	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P348697

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005705	Ammonia-N	96.3	98.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348143

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004678	Kjeldahl Nitrogen	109	102	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348214

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004938	Kjeldahl Nitrogen	99.6	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348151

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004845	NO2NO3-N	95.8	95.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348202

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004712	NO2NO3-N	99.0	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348245

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004938	Total-P	90.1	90.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348246

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004834	Total-P	92.2	96.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347995

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004939	O-Phosphate-P	91.9	93.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347996

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004940	O-Phosphate-P	93.6	93.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P348197

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005058	Fluoride	96.3	95.7	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P348198

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004936	Fluoride	92.4	91.8	P/P	91 - 105

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P348375

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2003418	Organic Carbon	92.3	96.3	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P348454

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004540	Organic Carbon	97.0	97.7	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P348042

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004935	Turbidity	12.2	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348183

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005265	Iron	0.318	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348184

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004948	Iron	0.978	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348183

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005265	Arsenic	0.591	Spike	P	0 - 20
2005265	Cadmium	0.143	Spike	P	0 - 20
2005265	Chromium	0.799	Spike	P	0 - 20
2005265	Copper	0.466	Spike	P	0 - 20
2005265	Lead	0.577	Spike	P	0 - 20
2005265	Nickel	0.224	Spike	P	0 - 20
2005265	Silver	0.308	Spike	P	0 - 20
2005265	Zinc	0.227	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348184

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004948	Arsenic	0.0867	Spike	P	0 - 20
2004948	Cadmium	0.672	Spike	P	0 - 20
2004948	Chromium	3.30	Spike	P	0 - 20
2004948	Copper	3.59	Spike	P	0 - 20
2004948	Lead	2.33	Spike	P	0 - 20
2004948	Nickel	3.84	Spike	P	0 - 20
2004948	Silver	0.769	Spike	P	0 - 20
2004948	Zinc	3.70	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P348475

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004938	Ammonia-N	1.46	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P348697

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005705	Ammonia-N	1.31	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348143

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004678	Kjeldahl Nitrogen	4.70	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348214

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004938	Kjeldahl Nitrogen	3.71	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348151

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004845	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348202

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004712	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348245

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004938	Total-P	0.716	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348246

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004834	Total-P	4.25	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347995

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004939	O-Phosphate-P	1.53	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347996

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004940	O-Phosphate-P	0.428	Spike	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P348194

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005058	Total Alkalinity	0.239	Sample	P	0 - 1.6

Reference Method: SM 2320 B-97
Batch ID: P348195

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004936	Total Alkalinity	0.218	Sample	P	0 - 1.6

Reference Method: SM 2540 D-97
Batch ID: P348562

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004936	TSS	7.55	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P348197

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005058	Fluoride	0.470	Spike	P	0 - 3.5

Reference Method: SM 4500 F-C-97
Batch ID: P348198

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004936	Fluoride	0.470	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P348375

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2003418	Organic Carbon	3.47	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P348454

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004540	Organic Carbon	0.735	Spike	P	0 - 20

Quality Assurance Report
Precision

* 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: A85039
Included Lab Sample IDs: 2004939, 2004940

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	94.3	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A85063
Included Lab Sample IDs: 2004935, 2004936

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A85115
Included Lab Sample IDs: 2004938

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

Reference Method: SM 2320 B-97
Run ID: A85129
Included Lab Sample IDs: 2004935, 2004936

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	107	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A85129
Included Lab Sample IDs: 2004935, 2004936

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.1	98.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A85130
Included Lab Sample IDs: 2004937

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A85140
Included Lab Sample IDs: 2004937, 2004938

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	99.8	P/P	90 - 110
Total-P	99.8	99.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A85155
Included Lab Sample IDs: 2004948

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	95.9	94.6	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A85157
Included Lab Sample IDs: 2004947, 2004948

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.6	99.4	P/P	90 - 110
Cadmium	104	105	P/P	90 - 110
Cadmium	105	106	P/P	90 - 110
Chromium	97.8	100	P/P	90 - 110
Chromium	98.8	96.9	P/P	90 - 110
Copper	103	102	P/P	90 - 110
Copper	98.8	100	P/P	90 - 110
Lead	103	104	P/P	90 - 110
Nickel	101	99.3	P/P	90 - 110
Nickel	96.4	97.9	P/P	90 - 110
Silver	102	103	P/P	90 - 110
Silver	103	104	P/P	90 - 110
Zinc	103	105	P/P	90 - 110
Zinc	106	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A85175
Included Lab Sample IDs: 2004938

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.5	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A85189
Included Lab Sample IDs: 2004937

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	99.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A85190
Included Lab Sample IDs: 2004947

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	102	99.6	P/P	95 - 105

Reference Method: SM 5310 B-00
Run ID: A85195
Included Lab Sample IDs: 2004938

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.4	94.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A85197
Included Lab Sample IDs: 2004947, 2004948

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	104	101	P/P	90 - 110
Lead	99.7	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 5310 B-00
Run ID: A85235
Included Lab Sample IDs: 2004937

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.4	97.2	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A85243
Included Lab Sample IDs: 2004938

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A85318
Included Lab Sample IDs: 2004937

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	101	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					12.2	
EPA 200.7 Rev. 4.4	Iron	106	104	105			0.318
	Iron	97.9	95.3	96.2			0.978
EPA 200.8 Rev. 5.4	Arsenic	96.9	103	102			0.591
	Arsenic	102	113	113			0.0867
	Cadmium	104	109	109			0.143
	Cadmium	108	113	114			0.672
	Chromium	94.1	99.8	99.0			0.799
	Chromium	103	92.0	89.0			3.30
	Copper	95.6	101	101			0.466
	Copper	99.3	107	103			3.59
	Lead	101	106	106			0.577
	Lead	104	125	122			2.33
	Nickel	95.8	100	100			0.224
	Nickel	99.5	114	110			3.84
	Silver	106	108	108			0.308
	Silver	108	112	111			0.769
	Zinc	101	106	106			0.227
	Zinc	107	99.7	96.1			3.70
EPA 350.1 Rev. 2.0	Ammonia-N	102	103	104			1.46
	Ammonia-N	100	96.3	98.1			1.31
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	109	102			4.70
	Kjeldahl Nitrogen	106	99.6	104			3.71
EPA 353.2 Rev. 2.0	NO2NO3-N	102	95.8	95.8			0.0
	NO2NO3-N	101	99.0	99.0			0.0
EPA 365.1 Rev. 2.0	Total-P	98.8	90.1	90.8			0.716
	Total-P	94.0	92.2	96.8			4.25
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	93.3	91.9	93.4			1.53
	O-Phosphate-P	95.9	93.6	93.2			0.428
SM 2320 B-97	Total Alkalinity	105				0.239	
	Total Alkalinity	105				0.218	
SM 2540 D-97	TSS					7.55	
SM 4500 F-C-97	Fluoride	97.5	96.3	95.7			0.470
	Fluoride	97.1	92.4	91.8			0.470
SM 5310 B-00	Organic Carbon	99.0	92.3	96.3			3.47
	Organic Carbon	97.4	97.0	97.7			0.735

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2004935, 2004936
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2004947, 2004948
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2004947, 2004948
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2004937, 2004938
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2004937, 2004938
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2004937, 2004938
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2004937, 2004938

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2004939, 2004940
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2004935, 2004936
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2004935, 2004936
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2004935, 2004936
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2004937, 2004938

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	07/05/2018			07/06/2018 14:35	William L. Brown IV	2004935, 2004936
EPA 200.7 Rev. 4.4	07/05/2018	07/10/2018 18:30	Elliott D. Healy	07/11/2018 15:01	Betina Topolski	2004948
	07/05/2018	07/10/2018 18:30	Elliott D. Healy	07/12/2018 11:33	Betina Topolski	2004947
EPA 200.8 Rev. 5.4	07/05/2018	07/10/2018 18:30	Elliott D. Healy	07/11/2018 17:41	Allison Taylor	2004947
	07/05/2018	07/10/2018 18:30	Elliott D. Healy	07/11/2018 19:55	Allison Taylor	2004948
	07/05/2018	07/10/2018 18:30	Elliott D. Healy	07/11/2018 21:03	Allison Taylor	2004948
	07/05/2018	07/10/2018 18:30	Elliott D. Healy	07/12/2018 18:26	Allison Taylor	2004947
	07/05/2018	07/10/2018 18:30	Elliott D. Healy	07/12/2018 21:00	Allison Taylor	2004948
EPA 350.1 Rev. 2.0	07/05/2018			07/13/2018 12:09	Ping Hua	2004938
	07/05/2018			07/17/2018 13:27	Ping Hua	2004937
EPA 351.2 Rev. 2.0	07/05/2018	07/10/2018 15:30	Adrian Shelby	07/12/2018 15:22	Joseph Suarez	2004937
	07/05/2018	07/11/2018 10:45	Adrian Shelby	07/12/2018 13:26	Joseph Suarez	2004938
EPA 353.2 Rev. 2.0	07/05/2018			07/09/2018 14:00	Lauren Bottorf	2004937
	07/05/2018			07/10/2018 13:02	Lauren Bottorf	2004938
EPA 365.1 Rev. 2.0	07/05/2018	07/10/2018 13:00	Sima Feizi	07/11/2018 12:02	Beverly Y. Sanders	2004938
	07/05/2018	07/10/2018 13:00	Sima Feizi	07/11/2018 12:18	Beverly Y. Sanders	2004937
EPA 365.1 Rev. 2.0 dissolved	07/05/2018			07/05/2018 16:41	Megan Treadwell	2004939
	07/05/2018			07/05/2018 16:46	Megan Treadwell	2004940
SM 2320 B-97	07/05/2018			07/10/2018 17:05	Dale L. Simmons	2004935
	07/05/2018			07/10/2018 18:26	Dale L. Simmons	2004936
SM 2540 D-97	07/05/2018			07/06/2018 19:00	William L. Brown IV	2004935
	07/05/2018			07/11/2018 14:46	Yijie Li	2004936
SM 4500 F-C-97	07/05/2018			07/10/2018 17:05	Dale L. Simmons	2004935
	07/05/2018			07/10/2018 18:02	Dale L. Simmons	2004936
SM 5310 B-00	07/05/2018			07/12/2018 13:53	Megan Treadwell	2004938
	07/05/2018			07/13/2018 00:30	Megan Treadwell	2004937