Chemical Analysis Report

TLH-ROC-2019-05-28-01

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

Event Description: **Run 11**
Request ID: **RQ-2019-05-27-43**
Customer: **TLH-ROC**
Project ID: **SMP**

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 11-JUN-2019 10:07

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 by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

A - Value reported is the mean of two or more determinations.
B - Results based on colony counts outside the acceptable range.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J - Estimated value and/or the analysis did not meet established quality control criteria.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
N - Presumptive evidence of presence of material.
O - Sampled, but analysis lost or not performed.
Q - Sample held beyond normal holding time.
T - Value reported is less than the criterion of detection.
U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
V - Analyte was detected in both sample and method blank.
X - Too few individuals to calculate SCI value.
Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: BROTHERS RIVER @ MOUTH **Collection Date/Time: 05/28/2019 10:25**

Field ID: G2TLHR0013 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2089404	EPA 180.1 Rev. 2.0	Turbidity	15	A	NTU	P364600	
	EPA 300.0 Rev. 2.1	Chloride	4.9		mg Cl/L	P364935	
		Sulfate	5.4		mg SO4/L	P364937	
	SM 2120 B	Color (true)	26	J	PCU	P364663	
	SM 2320 B-97	Total Alkalinity	47		mg CaCO3/L	P364859	
	SM 2540 C-97	TDS	62		mg/L	P365258	
	SM 2540 D-97	TSS	11		mg/L	P365056	
	SM 4500 F-C-97	Fluoride	0.069	I	mg F/L	P364863	
2089407	EPA 350.1 Rev. 2.0	Ammonia-N	0.031		mg N/L	P364914	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.31		mg N/L	P364896	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.30		mg N/L	P364727	
	EPA 365.1 Rev. 2.0	Total-P	0.041		mg P/L	P364900	
	SM 5310 B-00	Organic Carbon	2.9		mg C/L	P364798	
2089410	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.008	I	mg P/L	P364677	
2089419	EPA 200.7 Rev. 4.4	Barium	24.0		ug/L	P364672	
		Calcium	15.6		mg/L	P364672	
		Iron	800		ug/L	P364672	
		Magnesium	2.11		mg/L	P364672	
		Potassium	1.7		mg/L	P364672	
		Sodium	5.6		mg/L	P364672	
		Zinc	5.0	U	ug/L	P364672	
	EPA 200.8 Rev. 5.4	Aluminum	433		ug/L	P364672	
		Antimony	0.050	U	ug/L	P364672	
		Arsenic	0.52		ug/L	P364672	
		Boron**	18.3		ug/L	P364672	
		Cadmium	0.020	U	ug/L	P364672	
		Chromium	0.65	I	ug/L	P364672	
		Copper	0.77	I	ug/L	P364672	
		Lead	0.33	I	ug/L	P364672	
		Nickel	0.50	U	ug/L	P364672	
		Selenium	0.20	U	ug/L	P364672	
		Silver	0.010	U	ug/L	P364672	
		Thallium	0.10	U	ug/L	P364672	

Ref. Method and Comment:
SM 2120 B: Result may be biased high because of matrix interference.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for potassium and sodium are unavailable because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for boron are unavailable because of high analyte concentration in the QC sample.

Sample Location: FORT GADSDEN @ MOUTH **Collection Date/Time: 05/28/2019 11:00**

Field ID: G2TLHR0023 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2089405	EPA 180.1 Rev. 2.0	Turbidity	16	A	NTU	P364601	
	EPA 300.0 Rev. 2.1	Chloride	4.7		mg Cl/L	P364935	
		Sulfate	4.3		mg SO4/L	P364937	
	SM 2120 B	Color (true)	23	A	PCU	P364666	
	SM 2320 B-97	Total Alkalinity	45		mg CaCO3/L	P364859	
	SM 2540 C-97	TDS	62		mg/L	P365258	
	SM 2540 D-97	TSS	14		mg/L	P365056	
	SM 4500 F-C-97	Fluoride	0.063	I	mg F/L	P364863	
2089408	EPA 350.1 Rev. 2.0	Ammonia-N	0.035		mg N/L	P364914	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.34		mg N/L	P364896	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.36		mg N/L	P364727	
	EPA 365.1 Rev. 2.0	Total-P	0.042		mg P/L	P364900	
	SM 5310 B-00	Organic Carbon	4.0		mg C/L	P364798	
2089411	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P364677	
2089420	EPA 200.7 Rev. 4.4	Barium	24.1		ug/L	P364672	
		Calcium	15.6		mg/L	P364672	
		Iron	980		ug/L	P364672	
		Magnesium	1.96		mg/L	P364672	
		Potassium	1.5		mg/L	P364672	
		Sodium	4.8		mg/L	P364672	
		Zinc	5.0	U	ug/L	P364672	
	EPA 200.8 Rev. 5.4	Aluminum	519		ug/L	P364672	
		Antimony	0.050	U	ug/L	P364672	
		Arsenic	0.50		ug/L	P364672	
		Boron**	16.1		ug/L	P364672	
		Cadmium	0.020	U	ug/L	P364672	
		Chromium	0.86	I	ug/L	P364672	
		Copper	0.76	I	ug/L	P364672	
		Lead	0.39	I	ug/L	P364672	
		Nickel	0.50	U	ug/L	P364672	
		Selenium	0.20	U	ug/L	P364672	
		Silver	0.010	U	ug/L	P364672	
		Thallium	0.10	U	ug/L	P364672	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for potassium and sodium are unavailable because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for boron are unavailable because of high analyte concentration in the QC sample.

Sample Location: APALACHICOLA RIVER 0.8 MILES UPSTREAM OWL CREEK **Collection Date/Time: 05/28/2019 11:20**

Field ID: G2TLHR0042 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2089406	EPA 180.1 Rev. 2.0	Turbidity	18	A	NTU	P364602	
	EPA 300.0 Rev. 2.1	Chloride	4.8		mg Cl/L	P364935	
		Sulfate	4.8		mg SO4/L	P364937	
	SM 2120 B	Color (true)	9.2		PCU	P364666	
	SM 2320 B-97	Total Alkalinity	50		mg CaCO3/L	P364859	
	SM 2540 C-97	TDS	72		mg/L	P365258	
	SM 2540 D-97	TSS	25		mg/L	P365056	
	SM 4500 F-C-97	Fluoride	0.066	I	mg F/L	P364863	
2089409	EPA 350.1 Rev. 2.0	Ammonia-N	0.033		mg N/L	P364914	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.29		mg N/L	P364896	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.46		mg N/L	P364727	
	EPA 365.1 Rev. 2.0	Total-P	0.048		mg P/L	P364901	
	SM 5310 B-00	Organic Carbon	2.7		mg C/L	P364798	
2089412	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P364677	
2089421	EPA 200.7 Rev. 4.4	Barium	27.3		ug/L	P364672	
		Calcium	17.5		mg/L	P364672	
		Iron	1.19E+03		ug/L	P364672	
		Magnesium	2.17		mg/L	P364672	
		Potassium	1.6		mg/L	P364672	
		Sodium	5.0		mg/L	P364672	
		Zinc	5.0	U	ug/L	P364672	
	EPA 200.8 Rev. 5.4	Aluminum	857		ug/L	P364672	
		Antimony	0.050	U	ug/L	P364672	
		Arsenic	0.57		ug/L	P364672	
		Boron**	16.3		ug/L	P364672	
		Cadmium	0.020	U	ug/L	P364672	
		Chromium	1.5	I	ug/L	P364672	
		Copper	1.03		ug/L	P364672	
		Lead	0.56		ug/L	P364672	
		Nickel	0.65	I	ug/L	P364672	
		Selenium	0.20	U	ug/L	P364672	
		Silver	0.010	U	ug/L	P364672	
		Thallium	0.10	U	ug/L	P364672	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for potassium and sodium are unavailable because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for boron are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P364600

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P364601

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P364602

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P364672

Component	Result	Code	Units
Barium	1.0	U	ug/L
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 200.8 Rev. 5.4
Batch ID: P364672

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P364935

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P364937

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P364914

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P364896

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P364727

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P364900

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P364901

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364677

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

Reference Method: SM 2120 B
Batch ID: P364663

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P364666

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P364859

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

Reference Method: SM 2540 C-97
Batch ID: P365258

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P365056

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P364863

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P364798

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: P364672

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.4		P	85 - 115
Calcium	99.1		P	85 - 115
Iron	101		P	85 - 115
Magnesium	98.9		P	85 - 115
Potassium	99.0		P	85 - 115
Sodium	99.9		P	85 - 115
Zinc	96.1		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P364672

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	107		P	85 - 115
Boron	102		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	102		P	85 - 115
Copper	105		P	85 - 115
Lead	96.4		P	85 - 115
Nickel	104		P	85 - 115
Selenium	107		P	85 - 115
Silver	103		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P364935

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P364937

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P364914

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P364896

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: P364727

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P364900

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P364901

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364677

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.1		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P364663

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	101		P	85 - 115

Reference Method: SM 2120 B
Batch ID: P364666

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P364859

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P364863

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.4		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P364798

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	105		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P364672

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089144	Barium	97.1	96.2	P/P	80 - 120
2089144	Calcium	97.7		P	80 - 120
2089144	Iron	99.1	98.4	P/P	80 - 120
2089144	Magnesium	98.9		P	80 - 120
2089144	Zinc	96.3	95.9	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P364672

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089144	Aluminum	107	107	P/P	80 - 120
2089144	Antimony	103	104	P/P	80 - 120
2089144	Arsenic	110	110	P/P	80 - 120
2089144	Cadmium	101	104	P/P	80 - 120
2089144	Chromium	91.0	92.6	P/P	80 - 120
2089144	Copper	97.4	98.1	P/P	80 - 120
2089144	Lead	99.3	101	P/P	80 - 120
2089144	Nickel	94.1	95.8	P/P	80 - 120
2089144	Selenium	108	108	P/P	80 - 120
2089144	Silver	97.8	98.8	P/P	80 - 120
2089144	Thallium	107	110	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P364935

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089211	Chloride	99.6		P	90 - 110
2089534	Chloride	103		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P364937

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089211	Sulfate	101		P	90 - 110
2089534	Sulfate	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P364914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089212	Ammonia-N	97.9	96.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P364896

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089432	Kjeldahl Nitrogen	102	109	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P364727

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P364727

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089407	NO2NO3-N	97.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P364900

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089407	Total-P	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P364901

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089433	Total-P	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364677

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089411	O-Phosphate-P	93.7	94.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P364863

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089037	Fluoride	101	102	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P364798

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089040	Organic Carbon	106	106	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P364600

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089404	Turbidity	1.37	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P364601

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089405	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P364602

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089406	Turbidity	3.28	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P364672

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089144	Barium	0.907	Spike	P	0 - 20
2089144	Calcium	0.731	Spike	P	0 - 20
2089144	Iron	0.773	Spike	P	0 - 20
2089144	Magnesium	1.32	Spike	P	0 - 20
2089144	Potassium	1.36	Spike	P	0 - 20
2089144	Sodium	2.48	Spike	P	0 - 20
2089144	Zinc	0.406	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P364672

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089144	Aluminum	0.337	Spike	P	0 - 20
2089144	Antimony	0.833	Spike	P	0 - 20
2089144	Arsenic	0.473	Spike	P	0 - 20
2089144	Boron	0.603	Spike	P	0 - 20
2089144	Cadmium	3.00	Spike	P	0 - 20
2089144	Chromium	1.74	Spike	P	0 - 20
2089144	Copper	0.720	Spike	P	0 - 20
2089144	Lead	1.74	Spike	P	0 - 20
2089144	Nickel	1.78	Spike	P	0 - 20
2089144	Selenium	0.893	Spike	P	0 - 20
2089144	Silver	1.00	Spike	P	0 - 20
2089144	Thallium	2.96	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P364935

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089534	Chloride	6.03	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P364937

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089534	Sulfate	6.30	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P364914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089212	Ammonia-N	1.75	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P364896

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089432	Kjeldahl Nitrogen	4.12	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P364727

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089407	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P364900

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089407	Total-P	0.0447	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P364901

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089433	Total-P	1.26	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364677

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089411	O-Phosphate-P	1.00	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2120 B
Batch ID: P364663

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089429	Color (true)	4.68	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P364666

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089405	Color (true)	11.1	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P364859

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089037	Total Alkalinity	0.628	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P365258

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089431	TDS	4.05	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P364863

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089037	Fluoride	0.958	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P364798

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2089040	Organic Carbon	0.259	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 180.1 Rev. 2.0
Run ID: A91692
Included Lab Sample IDs: 2089404, 2089405, 2089406

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

Reference Method: SM 2120 B
Run ID: A91724
Included Lab Sample IDs: 2089404, 2089405, 2089406

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	101	P/P	90 - 115
Color (true)	102	102	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A91728
Included Lab Sample IDs: 2089410, 2089411, 2089412

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	97.7	P/P	90 - 110
O-Phosphate-P	96.2	95.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A91740
Included Lab Sample IDs: 2089407, 2089408, 2089409

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	98.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A91767
Included Lab Sample IDs: 2089419, 2089420, 2089421

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	100	P/P	90 - 110
Calcium	98.7	98.4	P/P	90 - 110
Iron	99.8	99.6	P/P	90 - 110
Magnesium	98.5	98.3	P/P	90 - 110
Potassium	99.4	99.3	P/P	90 - 110
Sodium	99.1	99.1	P/P	90 - 110
Zinc	101	98.5	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A91779
Included Lab Sample IDs: 2089407, 2089408, 2089409

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	107	107	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A91798
Included Lab Sample IDs: 2089404, 2089405, 2089406

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A91798
Included Lab Sample IDs: 2089404, 2089405, 2089406

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	105	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A91798
Included Lab Sample IDs: 2089404, 2089405, 2089406

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A91814
Included Lab Sample IDs: 2089407, 2089408, 2089409

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.1	100	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A91823
Included Lab Sample IDs: 2089404, 2089405, 2089406

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A91828
Included Lab Sample IDs: 2089419, 2089420, 2089421

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	103	103	P/P	90 - 110
Antimony	96.8	95.8	P/P	90 - 110
Arsenic	102	101	P/P	90 - 110
Boron	107	108	P/P	90 - 110
Cadmium	101	100	P/P	90 - 110
Chromium	98.3	99.9	P/P	90 - 110
Copper	101	102	P/P	90 - 110
Lead	96.9	96.5	P/P	90 - 110
Nickel	99.9	101	P/P	90 - 110
Selenium	101	102	P/P	90 - 110
Silver	100	101	P/P	90 - 110
Thallium	96.6	96.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A91830
Included Lab Sample IDs: 2089407, 2089408, 2089409

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	108	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A91839
Included Lab Sample IDs: 2089407, 2089408, 2089409

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	99.5	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					1.37	
	Turbidity					0.0	
	Turbidity					3.28	
EPA 200.7 Rev. 4.4	Barium	99.4	97.1	96.2			0.907
	Calcium	99.1	97.7				0.731
	Iron	101	99.1	98.4			0.773
	Magnesium	98.9	98.9				1.32
	Potassium	99.0					1.36
	Sodium	99.9					2.48
	Zinc	96.1	96.3	95.9			0.406
EPA 200.8 Rev. 5.4	Aluminum	103	107	107			0.337
	Antimony	100	103	104			0.833
	Arsenic	107	110	110			0.473
	Boron	102					0.603
	Cadmium	102	101	104			3.00
	Chromium	102	91.0	92.6			1.74
	Copper	105	97.4	98.1			0.720
	Lead	96.4	99.3	101			1.74
	Nickel	104	94.1	95.8			1.78
	Selenium	107	108	108			0.893
	Silver	103	97.8	98.8			1.00
	Thallium	102	107	110			2.96
EPA 300.0 Rev. 2.1	Chloride	102	103	99.6		6.03	
	Sulfate	103	103	101		6.30	
EPA 350.1 Rev. 2.0	Ammonia-N	102	97.9	96.0			1.75
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	102	109			4.12
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	97.2				0.0
EPA 365.1 Rev. 2.0	Total-P	99.4	102	102			0.0447
	Total-P	103	101	102			1.26
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.1	93.7	94.7			1.00
SM 2120 B	Color (true)	101				4.68	
	Color (true)	102				11.1	
SM 2320 B-97	Total Alkalinity	104				0.628	
SM 2540 C-97	TDS					4.05	
SM 4500 F-C-97	Fluoride	99.4	101	102			0.958
SM 5310 B-00	Organic Carbon	105	106	106			0.259

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2089404, 2089405, 2089406
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2089419, 2089420, 2089421
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2089419, 2089420, 2089421
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2089404, 2089405, 2089406
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2089404, 2089405, 2089406
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2089407, 2089408, 2089409
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2089407, 2089408, 2089409

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2089407, 2089408, 2089409
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2089407, 2089408, 2089409
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2089410, 2089411, 2089412
SM 2120 B / E31780	True Color measured at 450 nm	2089404, 2089405, 2089406
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2089404, 2089405, 2089406
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2089404, 2089405, 2089406
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2089404, 2089405, 2089406
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2089404, 2089405, 2089406
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2089407, 2089408, 2089409

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	05/28/2019			05/28/2019 17:31	Julia Storbeck	2089404, 2089405, 2089406
EPA 200.7 Rev. 4.4	05/28/2019	05/29/2019 16:40	Elliott D. Healy	05/30/2019 20:58	Betina Topolski	2089419
	05/28/2019	05/29/2019 16:40	Elliott D. Healy	05/30/2019 21:05	Betina Topolski	2089420
	05/28/2019	05/29/2019 16:40	Elliott D. Healy	05/30/2019 21:13	Betina Topolski	2089421
EPA 200.8 Rev. 5.4	05/28/2019	05/29/2019 16:40	Elliott D. Healy	06/04/2019 02:36	Robert K Palmer	2089419
	05/28/2019	05/29/2019 16:40	Elliott D. Healy	06/04/2019 02:46	Robert K Palmer	2089420
	05/28/2019	05/29/2019 16:40	Elliott D. Healy	06/04/2019 02:55	Robert K Palmer	2089421
EPA 300.0 Rev. 2.1	05/28/2019			06/03/2019 17:59	Lipi Saha	2089404
	05/28/2019			06/03/2019 18:11	Lipi Saha	2089405
	05/28/2019			06/03/2019 18:47	Lipi Saha	2089406
EPA 350.1 Rev. 2.0	05/28/2019			05/31/2019 13:51	Ping Hua	2089407
	05/28/2019			05/31/2019 13:52	Ping Hua	2089408
	05/28/2019			05/31/2019 13:54	Ping Hua	2089409
EPA 351.2 Rev. 2.0	05/28/2019	06/03/2019 13:00	Adrian Shelby	06/03/2019 23:00	Virginia P. Brown	2089407
	05/28/2019	06/03/2019 13:00	Adrian Shelby	06/03/2019 23:01	Virginia P. Brown	2089408
	05/28/2019	06/03/2019 13:00	Adrian Shelby	06/03/2019 23:03	Virginia P. Brown	2089409
EPA 353.2 Rev. 2.0	05/28/2019			05/30/2019 09:33	Beverly Y. Sanders	2089407
	05/28/2019			05/30/2019 09:41	Beverly Y. Sanders	2089408
	05/28/2019			05/30/2019 09:42	Beverly Y. Sanders	2089409
EPA 365.1 Rev. 2.0	05/28/2019	06/03/2019 11:05	Sima Feizi	06/04/2019 12:35	Rosalyn Ballman	2089407
	05/28/2019	06/03/2019 11:05	Sima Feizi	06/04/2019 12:36	Rosalyn Ballman	2089408
	05/28/2019	06/03/2019 11:05	Sima Feizi	06/04/2019 12:38	Rosalyn Ballman	2089409
EPA 365.1 Rev. 2.0 dissolved	05/28/2019			05/29/2019 16:07	Jhamieka S. Greenwood	2089411
	05/28/2019			05/29/2019 16:35	Jhamieka S. Greenwood	2089410, 2089412
SM 2120 B	05/28/2019			05/29/2019 15:09	Madeline Funaro	2089404
	05/28/2019			05/29/2019 15:42	Madeline Funaro	2089405, 2089406
SM 2320 B-97	05/28/2019			06/02/2019 00:33	Dale L. Simmons	2089404
	05/28/2019			06/02/2019 00:46	Dale L. Simmons	2089405
	05/28/2019			06/02/2019 00:58	Dale L. Simmons	2089406
SM 2540 C-97	05/28/2019			05/31/2019 15:11	Yijie Li	2089404, 2089405, 2089406
SM 2540 D-97	05/28/2019			05/31/2019 15:11	Yijie Li	2089404, 2089405, 2089406
SM 4500 F-C-97	05/28/2019			06/02/2019 00:33	Dale L. Simmons	2089404
	05/28/2019			06/02/2019 00:46	Dale L. Simmons	2089405
	05/28/2019			06/02/2019 00:58	Dale L. Simmons	2089406
SM 5310 B-00	05/28/2019			05/31/2019 02:43	Julia Storbeck	2089407
	05/28/2019			05/31/2019 02:55	Julia Storbeck	2089408
	05/28/2019			05/31/2019 03:08	Julia Storbeck	2089409