

Chemical Analysis Report

CEN-DIST-2019-09-24-03

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

Event Description: **Trib to Econ + D&B**
Request ID: **RQ-2019-09-23-44**
Customer: **CEN-DIST**
Project ID: **SMP**

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

Date Certified: 11-OCT-2019 10:48

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the first name.

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: Econ River Trib @ 170m N of Jay Blanchard Trail

Collection Date/Time: 09/23/2019 11:00

Field ID: G2CE0198

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2121775	EPA 180.1 Rev. 2.0	Turbidity	2.2		NTU	P371233	
	EPA 300.0 Rev. 2.1	Chloride	19		mg Cl/L	P371463	
		Sulfate	5.5		mg SO4/L	P371464	
	SM 2120 B	Color (true)	91		PCU	P371250	
	SM 2320 B-97	Total Alkalinity	72		mg CaCO3/L	P371528	
	SM 2540 C-97	TDS	145		mg/L	P371616	
	SM 2540 D-97	TSS	3	I	mg/L	P371583	
	SM 4500 F-C-97	Fluoride	0.055	I	mg F/L	P371532	
2121776	EPA 350.1 Rev. 2.0	Ammonia-N	0.25		mg N/L	P371692	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.86		mg N/L	P371300	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.66		mg N/L	P371467	
	EPA 365.1 Rev. 2.0	Total-P	0.078		mg P/L	P371479	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P371372	
2121777	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.056		mg P/L	P371239	
2121787	EPA 200.7 Rev. 4.4	Barium	14.2		ug/L	P371324	
		Calcium	31.8		mg/L	P371324	
		Iron	380		ug/L	P371324	
		Magnesium	1.95		mg/L	P371324	
		Potassium	1.6		mg/L	P371324	
		Sodium	12.2		mg/L	P371324	
		Zinc	5.0	U	ug/L	P371324	
	EPA 200.8 Rev. 5.4	Aluminum	125		ug/L	P371324	
		Antimony	0.084	I	ug/L	P371324	
		Arsenic	0.58		ug/L	P371324	
		Boron**	30.7		ug/L	P371324	
		Cadmium	0.020	U	ug/L	P371324	
		Chromium	0.66	I	ug/L	P371324	
		Copper	0.78	I	ug/L	P371324	
		Lead	0.30	I	ug/L	P371324	
		Nickel	0.50	U	ug/L	P371324	
		Selenium	0.20	U	ug/L	P371324	
		Silver	0.010	U	ug/L	P371324	
		Thallium	0.10	U	ug/L	P371324	

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: Econ River Trib @ 170m N of Jay Blanchard Trail

Collection Date/Time: 09/23/2019 11:05

Field ID: G2CE0198_DUP

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2121778	EPA 180.1 Rev. 2.0	Turbidity	2.2		NTU	P371233	
	EPA 300.0 Rev. 2.1	Chloride	19		mg Cl/L	P371463	
		Sulfate	5.5		mg SO4/L	P371464	
	SM 2120 B	Color (true)	85		PCU	P371250	
	SM 2320 B-97	Total Alkalinity	72		mg CaCO3/L	P371528	
	SM 2540 C-97	TDS	136		mg/L	P371616	
	SM 2540 D-97	TSS	2	I	mg/L	P371583	
	SM 4500 F-C-97	Fluoride	0.054	I	mg F/L	P371532	
2121779	EPA 350.1 Rev. 2.0	Ammonia-N	0.25		mg N/L	P371692	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.85		mg N/L	P371300	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.66		mg N/L	P371467	
	EPA 365.1 Rev. 2.0	Total-P	0.081		mg P/L	P371493	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P371372	
2121780	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.054		mg P/L	P371239	
2121788	EPA 200.7 Rev. 4.4	Barium	14.3		ug/L	P371324	
		Calcium	31.9		mg/L	P371324	
		Iron	380		ug/L	P371324	
		Magnesium	1.96		mg/L	P371324	
		Potassium	1.6		mg/L	P371324	
		Sodium	12.3		mg/L	P371324	
		Zinc	5.0	U	ug/L	P371324	
	EPA 200.8 Rev. 5.4	Aluminum	147		ug/L	P371324	
		Antimony	0.088	I	ug/L	P371324	
		Arsenic	0.62		ug/L	P371324	
		Boron**	30.4		ug/L	P371324	
		Cadmium	0.020	U	ug/L	P371324	
		Chromium	0.59	I	ug/L	P371324	
		Copper	0.76	I	ug/L	P371324	
		Lead	0.31	I	ug/L	P371324	
		Nickel	0.50	U	ug/L	P371324	
		Selenium	0.20	U	ug/L	P371324	
		Silver	0.010	U	ug/L	P371324	
		Thallium	0.10	U	ug/L	P371324	

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: FB_09232019

Collection Date/Time: 09/23/2019 11:20

Field ID: FB_09232019

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2121781	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P371233	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P371463	
		Sulfate	0.20	U	mg SO4/L	P371464	
		Color (true)	2.5	U	PCU	P371250	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P371528	
	SM 2540 C-97	TDS	15	U	mg/L	P371614	
	SM 2540 D-97	TSS	2	U	mg/L	P371581	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P371532	
2121782	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P371692	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P371300	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P371467	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P371493	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P371372	
2121783	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P371239	
2121789	EPA 200.7 Rev. 4.4	Barium	1.0	U	ug/L	P371324	
		Calcium	0.075	U	mg/L	P371324	
		Iron	30	U	ug/L	P371324	
		Magnesium	0.040	U	mg/L	P371324	
		Potassium	0.30	U	mg/L	P371324	
		Sodium	0.50	U	mg/L	P371324	
		Zinc	5.0	U	ug/L	P371324	
	EPA 200.8 Rev. 5.4	Aluminum	5.0	U	ug/L	P371324	
		Antimony	0.050	U	ug/L	P371324	
		Arsenic	0.050	U	ug/L	P371324	
		Boron**	2.0	U	ug/L	P371324	
		Cadmium	0.020	U	ug/L	P371324	
		Chromium	0.40	U	ug/L	P371324	
		Copper	0.40	U	ug/L	P371324	
		Lead	0.20	U	ug/L	P371324	
		Nickel	0.50	U	ug/L	P371324	
		Selenium	0.20	U	ug/L	P371324	
		Silver	0.010	U	ug/L	P371324	
		Thallium	0.10	U	ug/L	P371324	

Ref. Method and Comment:

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P371233

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P371324

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: P371324

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: P371463

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P371464

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P371692

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: P371300

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P371467

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371479

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371493

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371239

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

Reference Method: SM 2120 B
Batch ID: P371250

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P371528

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

Reference Method: SM 2540 C-97
Batch ID: P371614

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P371616

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P371581

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P371583

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P371532

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P371372

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: P371324

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	103		P	85 - 115
Calcium	107		P	85 - 115
Iron	104		P	85 - 115
Magnesium	111		P	85 - 115
Potassium	102		P	85 - 115
Sodium	107		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P371324

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.1		P	85 - 115
Antimony	93.2		P	85 - 115
Arsenic	101		P	85 - 115
Boron	99.0		P	85 - 115
Cadmium	97.9		P	85 - 115
Chromium	97.3		P	85 - 115
Copper	99.4		P	85 - 115
Lead	93.8		P	85 - 115
Nickel	99.8		P	85 - 115
Selenium	97.0		P	85 - 115
Silver	98.2		P	85 - 115
Thallium	98.6		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P371463

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P371464

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P371692

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: P371300

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: P371467

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	103		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371479

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371493

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371239

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.2		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P371250

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

Reference Method: SM 2320 B-97
Batch ID: P371528

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P371532

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.8		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P371372

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	104		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P371324

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121650	Barium	97.9		P	80 - 120
2121650	Calcium	103		P	80 - 120
2121650	Iron	101		P	80 - 120
2121650	Magnesium	105		P	80 - 120
2121650	Potassium	97.2		P	80 - 120
2121650	Sodium	100		P	80 - 120
2121650	Zinc	99.1		P	80 - 120
2121733	Barium	101	101	P/P	80 - 120
2121733	Calcium	106	107	P/P	80 - 120
2121733	Iron	103	104	P/P	80 - 120
2121733	Magnesium	110	111	P/P	80 - 120
2121733	Potassium	109	108	P/P	80 - 120
2121733	Sodium	107	108	P/P	80 - 120
2121733	Zinc	99.1	99.6	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P371324

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121650	Aluminum	98.2		P	80 - 120
2121650	Antimony	94.5		P	80 - 120
2121650	Arsenic	101		P	80 - 120
2121650	Boron	99.6		P	80 - 120
2121650	Cadmium	97.8		P	80 - 120
2121650	Chromium	96.9		P	80 - 120
2121650	Copper	101		P	80 - 120
2121650	Lead	95.5		P	80 - 120
2121650	Nickel	100		P	80 - 120
2121650	Selenium	98.6		P	80 - 120
2121650	Silver	98.4		P	80 - 120
2121650	Thallium	100		P	80 - 120
2121733	Aluminum	99.0	97.9	P/P	80 - 120
2121733	Antimony	94.0	94.9	P/P	80 - 120
2121733	Arsenic	101	99.8	P/P	80 - 120
2121733	Boron	98.6	97.3	P/P	80 - 120
2121733	Cadmium	97.1	96.6	P/P	80 - 120
2121733	Chromium	97.5	95.7	P/P	80 - 120
2121733	Copper	101	100	P/P	80 - 120
2121733	Lead	95.3	94.4	P/P	80 - 120
2121733	Nickel	99.6	99.2	P/P	80 - 120
2121733	Selenium	98.0	97.3	P/P	80 - 120
2121733	Silver	97.8	97.3	P/P	80 - 120
2121733	Thallium	100	99.5	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P371463

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121729	Chloride	97.4	98.3	P/P	90 - 110
2121845	Chloride	96.8		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P371464

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121729	Sulfate	97.5	99.7	P/P	90 - 110
2121845	Sulfate	97.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P371692

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121763	Ammonia-N	94.6	96.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P371300

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121755	Kjeldahl Nitrogen	95.4	98.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P371467

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121663	NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371479

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121660	Total-P	99.6	96.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371493

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121796	Total-P	95.9	95.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371239

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121772	O-Phosphate-P	94.6	95.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P371532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121762	Fluoride	97.2	95.5	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P371372

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121994	Organic Carbon	102	97.7	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P371233

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121754	Turbidity	4.52	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P371324

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121733	Barium	0.0474	Spike	P	0 - 20
2121733	Calcium	0.844	Spike	P	0 - 20
2121733	Iron	0.769	Spike	P	0 - 20
2121733	Magnesium	0.671	Spike	P	0 - 20
2121733	Potassium	0.544	Spike	P	0 - 20
2121733	Sodium	0.685	Spike	P	0 - 20
2121733	Zinc	0.498	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P371324

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121733	Aluminum	1.09	Spike	P	0 - 20
2121733	Antimony	0.928	Spike	P	0 - 20
2121733	Arsenic	1.57	Spike	P	0 - 20
2121733	Boron	1.23	Spike	P	0 - 20
2121733	Cadmium	0.489	Spike	P	0 - 20
2121733	Chromium	1.91	Spike	P	0 - 20
2121733	Copper	0.921	Spike	P	0 - 20
2121733	Lead	0.975	Spike	P	0 - 20
2121733	Nickel	0.469	Spike	P	0 - 20
2121733	Selenium	0.739	Spike	P	0 - 20
2121733	Silver	0.446	Spike	P	0 - 20
2121733	Thallium	0.521	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P371463

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121729	Chloride	0.902	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P371464

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121729	Sulfate	2.21	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P371692

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121763	Ammonia-N	1.18	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P371300

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121755	Kjeldahl Nitrogen	2.44	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P371467

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121663	NO2NO3-N	0.370	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371479

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121660	Total-P	2.73	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371493

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121796	Total-P	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371239

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121772	O-Phosphate-P	0.947	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P371250

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121754	Color (true)	1.78	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P371528

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121762	Total Alkalinity	0.0776	Sample	P	0 - 2.8

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
 Batch ID: P371614

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121278	TDS	0.905	Sample	P	0 - 10

Reference Method: SM 2540 C-97
 Batch ID: P371616

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121659	TDS	5.02	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
 Batch ID: P371532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121762	Fluoride	1.45	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
 Batch ID: P371372

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121994	Organic Carbon	2.45	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A94452

Included Lab Sample IDs: 2121775, 2121778, 2121781

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.9	98.9	P/P	90 - 110
Chloride	98.9	98.7	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A94462

Included Lab Sample IDs: 2121775, 2121778, 2121781

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	102	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A94463

Included Lab Sample IDs: 2121777, 2121780, 2121783

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.6	P/P	90 - 110
O-Phosphate-P	99.6	98.3	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A94469

Included Lab Sample IDs: 2121775, 2121778, 2121781

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

Reference Method: SM 5310 B-00

Run ID: A94516

Included Lab Sample IDs: 2121776, 2121779, 2121782

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	105	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A94525

Included Lab Sample IDs: 2121776, 2121779, 2121782

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A94550

Included Lab Sample IDs: 2121787, 2121788, 2121789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	102	P/P	90 - 110
Aluminum	103	105	P/P	90 - 110
Arsenic	104	104	P/P	90 - 110
Arsenic	104	104	P/P	90 - 110
Boron	101	104	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A94550

Included Lab Sample IDs: 2121787, 2121788, 2121789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	98.1	100	P/P	90 - 110
Cadmium	101	102	P/P	90 - 110
Cadmium	102	101	P/P	90 - 110
Chromium	100	102	P/P	90 - 110
Chromium	99.3	100	P/P	90 - 110
Copper	103	103	P/P	90 - 110
Copper	103	104	P/P	90 - 110
Lead	98.8	98.7	P/P	90 - 110
Lead	99.1	100	P/P	90 - 110
Nickel	104	103	P/P	90 - 110
Nickel	104	105	P/P	90 - 110
Selenium	102	102	P/P	90 - 110
Selenium	103	102	P/P	90 - 110
Silver	100	98.5	P/P	90 - 110
Silver	98.9	98.9	P/P	90 - 110
Thallium	94.5	94.1	P/P	90 - 110
Thallium	95.4	94.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A94554

Included Lab Sample IDs: 2121776, 2121779, 2121782

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	97.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A94562

Included Lab Sample IDs: 2121787, 2121788, 2121789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	101	P/P	90 - 110
Barium	99.9	99.6	P/P	95 - 105
Calcium	100	103	P/P	95 - 105
Calcium	99.3	100	P/P	90 - 110
Iron	101	101	P/P	90 - 110
Iron	101	102	P/P	95 - 105
Magnesium	101	102	P/P	90 - 110
Magnesium	101	102	P/P	95 - 105
Potassium	100	100	P/P	95 - 105
Potassium	101	100	P/P	90 - 110
Sodium	100	100	P/P	90 - 110
Sodium	100	101	P/P	95 - 105
Zinc	98.5	98.1	P/P	95 - 105
Zinc	99.5	99.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A94578

Included Lab Sample IDs: 2121776, 2121779

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A94578

Included Lab Sample IDs: 2121776, 2121779

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

Reference Method: SM 2320 B-97

Run ID: A94582

Included Lab Sample IDs: 2121775, 2121778, 2121781

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

Reference Method: SM 4500 F-C-97

Run ID: A94582

Included Lab Sample IDs: 2121775, 2121778, 2121781

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A94584

Included Lab Sample IDs: 2121782

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	99.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A94590

Included Lab Sample IDs: 2121787, 2121788, 2121789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	93.1	94.3	P/P	90 - 110
Antimony	94.4	93.3	P/P	90 - 110
Silver	97.2	94.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A94647

Included Lab Sample IDs: 2121776, 2121779, 2121782

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	98.7	P/P	90 - 110
Ammonia-N	97.5	97.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A94722

Included Lab Sample IDs: 2121788

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	101	P/P	90 - 110
Boron	97.9	98.8	P/P	90 - 110
Cadmium	95.8	96.7	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A94842

Included Lab Sample IDs: 2121788

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Selenium	106	108	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					4.52	
EPA 200.7 Rev. 4.4	Barium	103	97.9	101	101		0.0474
	Calcium	107	103	106	107		0.844
	Iron	104	101	103	104		0.769
	Magnesium	111	105	110	111		0.671
	Potassium	102	97.2	109	108		0.544
	Sodium	107	100	107	108		0.685
	Zinc	102	99.1	99.1	99.6		0.498
EPA 200.8 Rev. 5.4	Aluminum	97.1	98.2	99.0	97.9		1.09
	Antimony	93.2	94.5	94.0	94.9		0.928
	Arsenic	101	101	101	99.8		1.57
	Boron	99.0	99.6	98.6	97.3		1.23
	Cadmium	97.9	97.8	97.1	96.6		0.489
	Chromium	97.3	96.9	97.5	95.7		1.91
	Copper	99.4	101	101	100		0.921
	Lead	93.8	95.5	95.3	94.4		0.975
	Nickel	99.8	100	99.6	99.2		0.469
	Selenium	97.0	98.6	98.0	97.3		0.739
	Silver	98.2	97.3	98.4	97.8		0.446
	Thallium	98.6	100	100	99.5		0.521
EPA 300.0 Rev. 2.1	Chloride	97.3	97.4	98.3	96.8		0.902
	Sulfate	98.2	97.5	99.7	97.4		2.21
EPA 350.1 Rev. 2.0	Ammonia-N	100	94.6	96.1			1.18
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	95.4	98.8			2.44
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	103	101	102			0.370
EPA 365.1 Rev. 2.0	Total-P	94.6	99.6	96.3			2.73
	Total-P	99.1	95.9	95.9			0.0
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.2	94.6	95.5			0.947
SM 2120 B	Color (true)	101				1.78	
SM 2320 B-97	Total Alkalinity	103				0.0776	
SM 2540 C-97	TDS					0.905	
	TDS					5.02	
SM 4500 F-C-97	Fluoride	98.8	97.2	95.5			1.45
SM 5310 B-00	Organic Carbon	104	102	97.7			2.45

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2121775, 2121778, 2121781
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2121787, 2121788, 2121789
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2121787, 2121788, 2121789
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2121775, 2121778, 2121781
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2121775, 2121778, 2121781
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2121776, 2121779, 2121782
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2121776, 2121779, 2121782
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2121776, 2121779, 2121782

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	2121776, 2121779, 2121782
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2121777, 2121780, 2121783
SM 2120 B / E31780	True Color measured at 450 nm	2121775, 2121778, 2121781
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2121775, 2121778, 2121781
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2121775, 2121778, 2121781
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2121775, 2121778, 2121781
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2121775, 2121778, 2121781
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2121776, 2121779, 2121782

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	09/24/2019			09/24/2019 16:58	Rosalyn Ballman	2121775, 2121778, 2121781
EPA 200.7 Rev. 4.4	09/24/2019	09/25/2019 16:55	Elliott D. Healy	09/27/2019 11:58	Betina Topolski	2121789
	09/24/2019	09/25/2019 16:55	Elliott D. Healy	09/27/2019 14:47	Betina Topolski	2121787
	09/24/2019	09/25/2019 16:55	Elliott D. Healy	09/27/2019 14:54	Betina Topolski	2121788
EPA 200.8 Rev. 5.4	09/24/2019	09/25/2019 16:55	Elliott D. Healy	09/27/2019 00:29	Robert K Palmer	2121789
	09/24/2019	09/25/2019 16:55	Elliott D. Healy	09/27/2019 04:56	Robert K Palmer	2121787
	09/24/2019	09/25/2019 16:55	Elliott D. Healy	09/27/2019 05:06	Robert K Palmer	2121788
	09/24/2019	09/25/2019 16:55	Elliott D. Healy	09/27/2019 12:07	Robert K Palmer	2121789
	09/24/2019	09/25/2019 16:55	Elliott D. Healy	09/27/2019 14:47	Robert K Palmer	2121787
	09/24/2019	09/25/2019 16:55	Elliott D. Healy	09/27/2019 14:53	Robert K Palmer	2121788
	09/24/2019	09/25/2019 16:55	Elliott D. Healy	10/04/2019 07:36	Justin Cutchin	2121788
	09/24/2019	09/25/2019 16:55	Elliott D. Healy	10/10/2019 00:47	Robert K Palmer	2121788
EPA 300.0 Rev. 2.1	09/24/2019			09/25/2019 20:29	Jhamieka S. Greenwood	2121775
	09/24/2019			09/25/2019 21:05	Jhamieka S. Greenwood	2121778
	09/24/2019			09/25/2019 21:17	Jhamieka S. Greenwood	2121781
EPA 350.1 Rev. 2.0	09/24/2019			10/01/2019 13:01	Ping Hua	2121782
	09/24/2019			10/01/2019 14:49	Ping Hua	2121776
	09/24/2019			10/01/2019 14:50	Ping Hua	2121779
EPA 351.2 Rev. 2.0	09/24/2019	09/25/2019 13:28	Sima Feizi	09/26/2019 19:57	Julia Storbeck	2121776
	09/24/2019	09/25/2019 13:28	Sima Feizi	09/26/2019 19:59	Julia Storbeck	2121779
	09/24/2019	09/25/2019 13:28	Sima Feizi	09/26/2019 20:00	Julia Storbeck	2121782
EPA 353.2 Rev. 2.0	09/24/2019			09/26/2019 10:28	Beverly Y. Sanders	2121776
	09/24/2019			09/26/2019 10:29	Beverly Y. Sanders	2121779
	09/24/2019			09/26/2019 10:30	Beverly Y. Sanders	2121782
EPA 365.1 Rev. 2.0	09/24/2019	09/27/2019 15:05	Lipi Saha	09/30/2019 08:33	Lipi Saha	2121776
	09/24/2019	09/27/2019 15:05	Lipi Saha	09/30/2019 08:42	Lipi Saha	2121779
	09/24/2019	09/27/2019 15:05	Lipi Saha	09/30/2019 11:06	Lipi Saha	2121782
EPA 365.1 Rev. 2.0 dissolved	09/24/2019			09/24/2019 16:27	Jhamieka S. Greenwood	2121777
	09/24/2019			09/24/2019 16:28	Jhamieka S. Greenwood	2121780
	09/24/2019			09/24/2019 16:37	Jhamieka S. Greenwood	2121783
SM 2120 B	09/24/2019			09/24/2019 17:25	Madeline Funaro	2121781
	09/24/2019			09/24/2019 17:29	Madeline Funaro	2121775
	09/24/2019			09/24/2019 17:30	Madeline Funaro	2121778
SM 2320 B-97	09/24/2019			09/28/2019 14:17	Dale L. Simmons	2121775
	09/24/2019			09/28/2019 14:29	Dale L. Simmons	2121778
	09/24/2019			09/28/2019 14:44	Dale L. Simmons	2121781
SM 2540 C-97	09/24/2019			09/25/2019 14:25	Yijie Li	2121775, 2121778, 2121781
SM 2540 D-97	09/24/2019			09/25/2019 14:25	Yijie Li	2121775, 2121778, 2121781
SM 4500 F-C-97	09/24/2019			09/28/2019 14:17	Dale L. Simmons	2121775
	09/24/2019			09/28/2019 14:29	Dale L. Simmons	2121778

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 4500 F-C-97	09/24/2019			09/28/2019 14:44	Dale L. Simmons	2121781
SM 5310 B-00	09/24/2019			09/25/2019 22:50	Madeline Funaro	2121776
	09/24/2019			09/25/2019 23:04	Madeline Funaro	2121779
	09/24/2019			09/25/2019 23:18	Madeline Funaro	2121782