

Chemical Analysis Report

SO-DIST-2018-09-12-01

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

Event Description: **Hicpochee, OK Branch**
Request ID: **RQ-2018-09-10-68**
Customer: **SO-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901-3381
Attn: Maryann Dugan

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

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

Date Certified: 03-OCT-2018 13:16

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 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: OK Branch @ Eucalyptus

Collection Date/Time: 09/11/2018 14:00

Field ID: G3SD0099

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2024408	EPA 180.1 Rev. 2.0	Turbidity	3.5		NTU	P351635	
	EPA 300.0 Rev. 2.1	Chloride	20		mg Cl/L	P351985	
		Sulfate	9.2		mg SO4/L	P351989	
		Color (true)	97	A	PCU	P351517	
	SM 2320 B-97	Total Alkalinity	205		mg CaCO3/L	P351712	
	SM 2540 C-97	TDS	275		mg/L	P351934	
	SM 2540 D-97	TSS	2	I	mg/L	P351976	
	SM 4500 F-C-97	Fluoride	0.15		mg F/L	P351716	
2024409	EPA 350.1 Rev. 2.0	Ammonia-N	0.13		mg N/L	P351764	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.97		mg N/L	P351747	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.083		mg N/L	P351696	
	EPA 365.1 Rev. 2.0	Total-P	0.049		mg P/L	P351602	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P351878	
2024410	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.029		mg P/L	P351520	
2025666	EPA 200.7 Rev. 4.4	Calcium	81.1		mg/L	P351526	
		Iron	860		ug/L	P351526	
		Magnesium	3.72		mg/L	P351526	
		Potassium	1.7		mg/L	P351526	
		Sodium	16.1		mg/L	P351526	
		Zinc	5.0	U	ug/L	P351526	
	EPA 200.8 Rev. 5.4	Arsenic	2.05		ug/L	P351526	
		Cadmium	0.020	U	ug/L	P351526	
		Chromium	0.75	I	ug/L	P351526	
		Copper	0.20	I	ug/L	P351526	
		Lead	0.050	U	ug/L	P351526	
		Nickel	0.63	I	ug/L	P352390	
		Silver	0.010	U	ug/L	P351526	

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: Lake Hicpochee in Canal

Collection Date/Time: 09/11/2018 11:40

Field ID: G3SD0102

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2024411	EPA 180.1 Rev. 2.0	Turbidity	4.0		NTU	P351635	
	EPA 300.0 Rev. 2.1	Chloride	48		mg Cl/L	P351985	
		Sulfate	28		mg SO4/L	P351989	
		Color (true)	150		PCU	P351516	
	SM 2320 B-97	Total Alkalinity	137		mg CaCO3/L	P351712	
	SM 2540 C-97	TDS	321		mg/L	P351934	
	SM 2540 D-97	TSS	4	I	mg/L	P351976	
	SM 4500 F-C-97	Fluoride	0.20		mg F/L	P351716	
2024412	EPA 350.1 Rev. 2.0	Ammonia-N	0.22		mg N/L	P351764	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P351747	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.19		mg N/L	P351696	
	EPA 365.1 Rev. 2.0	Total-P	0.22		mg P/L	P351602	
	SM 5310 B-00	Organic Carbon	21		mg C/L	P351878	
2024413	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.17		mg P/L	P351520	

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: P351635

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P351526

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P351526

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
Silver	0.010	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P352390

Component	Result	Code	Units
Nickel	0.20	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P351985

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P351989

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P351764

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P351747

Component	Result	Code	Units
-----------	--------	------	-------

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P351747

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P351696

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P351602

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P351520

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

Reference Method: SM 2120 B
Batch ID: P351516

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P351517

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P351712

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

Reference Method: SM 2540 C-97
Batch ID: P351934

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P351976

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P351716

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P351878

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: P351526

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	100		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	99.4		P	85 - 115
Sodium	101		P	85 - 115
Zinc	98.2		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P351526

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	102		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	104		P	85 - 115
Copper	98.1		P	85 - 115
Lead	103		P	85 - 115
Silver	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P352390

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Nickel	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P351985

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P351989

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P351764

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P351747

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P351696

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P351696

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P351602

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	109		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P351520

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

Reference Method: SM 2120 B
Batch ID: P351516

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	96.7		P	85 - 115

Reference Method: SM 2120 B
Batch ID: P351517

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	96.6		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P351712

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P351716

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

Reference Method: SM 5310 B-00
Batch ID: P351878

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.0		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P351526

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2023697	Calcium	103		P	80 - 120
2023697	Iron	101		P	80 - 120
2023697	Magnesium	105		P	80 - 120
2023697	Potassium	104		P	80 - 120
2023697	Sodium	101		P	80 - 120
2023697	Zinc	98.5		P	80 - 120
2024444	Calcium	104	104	P/P	80 - 120
2024444	Iron	103	102	P/P	80 - 120
2024444	Magnesium	107	107	P/P	80 - 120
2024444	Potassium	105	104	P/P	80 - 120
2024444	Sodium	104		P	80 - 120
2024444	Zinc	103	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P351526

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2023697	Arsenic	103		P	80 - 120
2023697	Cadmium	102		P	80 - 120
2023697	Chromium	105		P	80 - 120
2023697	Copper	97.0		P	80 - 120
2023697	Lead	103		P	80 - 120
2023697	Silver	103		P	80 - 120
2024444	Arsenic	104	104	P/P	80 - 120
2024444	Cadmium	104	104	P/P	80 - 120
2024444	Chromium	107	108	P/P	80 - 120
2024444	Copper	100	99.7	P/P	80 - 120
2024444	Lead	105	105	P/P	80 - 120
2024444	Silver	104	104	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P352390

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2028316	Nickel	99.7		P	80 - 120
2028580	Nickel	101	98.3	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P351985

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2023823	Chloride	98.6		P	90 - 110
2024371	Chloride	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P351989

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2023823	Sulfate	97.2		P	90 - 110
2024371	Sulfate	100		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P351764

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2024372	Ammonia-N	97.8	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P351747

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2024421	Kjeldahl Nitrogen	94.6	97.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P351696

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2024409	NO2NO3-N	99.6	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P351602

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2024280	Total-P	103	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P351520

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2024386	O-Phosphate-P	95.5	95.0	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P351716

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2024886	Fluoride	99.5	98.8	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P351878

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2024208	Organic Carbon	95.2	94.2	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P351635

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024420	Turbidity	2.83	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P351526

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024444	Calcium	0.294	Spike	P	0 - 20
2024444	Iron	0.613	Spike	P	0 - 20
2024444	Magnesium	0.0656	Spike	P	0 - 20
2024444	Potassium	1.08	Spike	P	0 - 20
2024444	Sodium	0.406	Spike	P	0 - 20
2024444	Zinc	1.64	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P351526

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024444	Arsenic	0.199	Spike	P	0 - 20
2024444	Cadmium	0.0846	Spike	P	0 - 20
2024444	Chromium	0.454	Spike	P	0 - 20
2024444	Copper	0.281	Spike	P	0 - 20
2024444	Lead	0.0488	Spike	P	0 - 20
2024444	Silver	0.216	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P352390

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2028580	Nickel	2.52	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P351985

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2023823	Chloride	0.658	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P351989

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2023823	Sulfate	0.702	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P351764

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024372	Ammonia-N	2.56	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P351747

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024421	Kjeldahl Nitrogen	1.49	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P351696

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024409	NO2NO3-N	0.707	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P351602

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024280	Total-P	0.820	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P351520

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024386	O-Phosphate-P	0.525	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P351516

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024466	Color (true)	0.850	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P351517

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024408	Color (true)	3.87	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P351712

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024886	Total Alkalinity	0.425	Sample	P	0 - 1.6

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P351934

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024196	TDS	8.45	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P351716

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024886	Fluoride	0.473	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P351878

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2024208	Organic Carbon	0.575	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B

Run ID: A86442

Included Lab Sample IDs: 2024408, 2024411

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.1	97.7	P/P	90 - 115
Color (true)	99.4	97.1	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A86443

Included Lab Sample IDs: 2024410, 2024413

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	99.2	P/P	90 - 110
O-Phosphate-P	99.2	98.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A86466

Included Lab Sample IDs: 2025666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.0	97.8	P/P	90 - 110
Iron	98.4	99.3	P/P	90 - 110
Magnesium	98.3	99.1	P/P	90 - 110
Potassium	99.3	99.6	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Zinc	99.6	100	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A86474

Included Lab Sample IDs: 2024408, 2024411

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	103	102	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A86488

Included Lab Sample IDs: 2024412

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A86506

Included Lab Sample IDs: 2024409, 2024412

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

Reference Method: SM 2320 B-97

Run ID: A86512

Included Lab Sample IDs: 2024408, 2024411

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

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-97

Run ID: A86512

Included Lab Sample IDs: 2024408, 2024411

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A86516

Included Lab Sample IDs: 2024409

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	96.8	96.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A86531

Included Lab Sample IDs: 2024409, 2024412

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.4	97.1	P/P	90 - 110
Ammonia-N	97.5	96.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A86551

Included Lab Sample IDs: 2024409, 2024412

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A86563

Included Lab Sample IDs: 2025666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	97.3	97.3	P/P	90 - 110
Cadmium	95.9	97.1	P/P	90 - 110
Chromium	99.3	101	P/P	90 - 110
Copper	95.5	95.1	P/P	90 - 110
Lead	106	105	P/P	90 - 110
Silver	101	100	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A86566

Included Lab Sample IDs: 2024408, 2024411

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

Reference Method: SM 5310 B-00

Run ID: A86574

Included Lab Sample IDs: 2024409, 2024412

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.1	94.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A86804

Included Lab Sample IDs: 2025666

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

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						2.83	
EPA 200.7 Rev. 4.4	Calcium	104	103	104	104			0.294
	Iron	100	101	103	102			0.613
	Magnesium	106	105	107	107			0.0656
	Potassium	99.4	104	105	104			1.08
	Sodium	101	101	104				0.406
	Zinc	98.2	98.5	103	101			1.64
EPA 200.8 Rev. 5.4	Arsenic	102	103	104	104			0.199
	Cadmium	102	102	104	104			0.0846
	Chromium	104	105	107	108			0.454
	Copper	98.1	97.0	100	99.7			0.281
	Lead	103	103	105	105			0.0488
	Nickel	101	99.7	101	98.3			2.52
	Silver	101	103	104	104			0.216
EPA 300.0 Rev. 2.1	Chloride	100	98.6	100			0.658	
	Sulfate	99.9	97.2	100			0.702	
EPA 350.1 Rev. 2.0	Ammonia-N	99.0	97.8	101				2.56
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	94.6	97.5				1.49
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	99.6	101				0.707
EPA 365.1 Rev. 2.0	Total-P	109	103	104				0.820
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	95.5	95.0				0.525
SM 2120 B	Color (true)	96.7					0.850	
	Color (true)	96.6					3.87	
SM 2320 B-97	Total Alkalinity	103					0.425	
SM 2540 C-97	TDS						8.45	
SM 4500 F-C-97	Fluoride	98.2	99.5	98.8				0.473
SM 5310 B-00	Organic Carbon	96.0	95.2	94.2				0.575

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2024408, 2024411
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2025666
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2025666
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2024408, 2024411
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2024408, 2024411
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2024409, 2024412
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2024409, 2024412
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2024409, 2024412
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2024409, 2024412
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2024410, 2024413
SM 2120 B / E31780	True Color measured at 450 nm	2024408, 2024411
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2024408, 2024411
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2024408, 2024411
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2024408, 2024411

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2024408, 2024411
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2024409, 2024412

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	09/12/2018			09/12/2018 17:42	Megan Treadwell	2024408, 2024411
EPA 200.7 Rev. 4.4	09/12/2018	09/12/2018 17:50	Elliott D. Healy	09/13/2018 15:04	Betina Topolski	2025666
EPA 200.8 Rev. 5.4	09/12/2018	09/12/2018 17:50	Elliott D. Healy	09/18/2018 21:54	Allison Taylor	2025666
	09/12/2018	09/27/2018 16:45	Elliott D. Healy	09/30/2018 21:26	Robert K Palmer	2025666
EPA 300.0 Rev. 2.1	09/12/2018			09/19/2018 02:59	Lipi Saha	2024408
	09/12/2018			09/19/2018 03:11	Lipi Saha	2024411
EPA 350.1 Rev. 2.0	09/12/2018			09/17/2018 14:04	Ping Hua	2024409
	09/12/2018			09/17/2018 16:19	Ping Hua	2024412
EPA 351.2 Rev. 2.0	09/12/2018	09/17/2018 15:30	Adrian Shelby	09/18/2018 12:02	Joseph Suarez	2024409
	09/12/2018	09/17/2018 15:30	Adrian Shelby	09/18/2018 12:03	Joseph Suarez	2024412
EPA 353.2 Rev. 2.0	09/12/2018			09/14/2018 12:44	Lauren Bottorf	2024409
	09/12/2018			09/14/2018 12:52	Lauren Bottorf	2024412
EPA 365.1 Rev. 2.0	09/12/2018	09/13/2018 15:36	Sima Feizi	09/14/2018 11:02	Beverly Y. Sanders	2024412
	09/12/2018	09/13/2018 15:36	Sima Feizi	09/14/2018 13:27	Beverly Y. Sanders	2024409
EPA 365.1 Rev. 2.0 dissolved	09/12/2018			09/12/2018 15:51	Julia Storbeck	2024413
	09/12/2018			09/12/2018 16:03	Julia Storbeck	2024410
SM 2120 B	09/12/2018			09/12/2018 16:08	DeAsia Armster	2024411
	09/12/2018			09/12/2018 16:16	DeAsia Armster	2024408
SM 2320 B-97	09/12/2018			09/14/2018 19:12	Dale L. Simmons	2024408
	09/12/2018			09/14/2018 19:23	Dale L. Simmons	2024411
SM 2540 C-97	09/12/2018			09/14/2018 15:32	Yijie Li	2024408, 2024411
SM 2540 D-97	09/12/2018			09/14/2018 15:32	Yijie Li	2024408, 2024411
SM 4500 F-C-97	09/12/2018			09/14/2018 19:12	Dale L. Simmons	2024408
	09/12/2018			09/14/2018 19:23	Dale L. Simmons	2024411
SM 5310 B-00	09/12/2018			09/17/2018 21:20	Megan Treadwell	2024409
	09/12/2018			09/17/2018 21:34	Megan Treadwell	2024412