

Chemical Analysis Report

CEN-DIST-2021-09-22-02

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

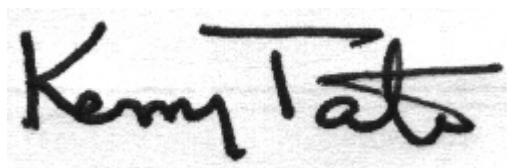
Event Description: **Wildcat Lake_Reference**
Request ID: **RQ-2021-09-06-50**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 20-OCT-2021 09:57

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 "T" and a long horizontal stroke at the end.

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: Wildcat Lake @ Center

Collection Date/Time: 09/21/2021 14:33

Field ID: G2CE0053

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2277463	EPA 180.1 Rev. 2.0	Turbidity	0.50		NTU	P404066	
	EPA 300.0 Rev. 2.1	Bromide	0.024	I	mg Br/L	P404078	
		Chloride	8.6		mg Cl/L	P404146	
		Sulfate	2.7		mg SO4/L	P404147	
	SM 2120 B-2011	Color (true)	27		PCU	P404063	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P404208	
	SM 2540 C-2011	TDS	21	I	mg/L	P404555	
	SM 2540 D-2011	TSS	2	U	mg/L	P404547	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P404211	
2277464	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P404168	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.24		mg N/L	P404123	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P404163	
	EPA 365.1 Rev. 2.0	Total-P	0.005		mg P/L	P404185	
	SM 5310 B-2011	Organic Carbon	5.4		mg C/L	P404342	
2277465	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P404058	
2277473	EPA 200.7 Rev. 4.4	Barium	2.6	I	ug/L	P404143	
		Calcium	0.69		mg/L	P404143	
		Iron	74	I	ug/L	P404143	
		Magnesium	0.78		mg/L	P404143	
		Manganese	7.6		ug/L	P404143	
		Potassium	0.30	U	mg/L	P404143	
		Sodium	4.9		mg/L	P404143	
		Zinc	5.0	U	ug/L	P404143	
	EPA 200.8 Rev. 5.4	Aluminum	70		ug/L	P404143	
		Antimony	0.050	U	ug/L	P404386	
		Arsenic	0.23		ug/L	P404143	
		Beryllium	0.015	I	ug/L	P404143	
		Boron**	20.3		ug/L	P404143	
		Cadmium	0.020	U	ug/L	P404143	
		Chromium	0.40	U	ug/L	P404143	
		Copper	0.40	U	ug/L	P404143	
		Lead	0.20	U	ug/L	P404143	
		Nickel	0.53	I	ug/L	P404143	
		Selenium	0.20	U	ug/L	P404143	
		Silver	0.010	U	ug/L	P404143	
		Thallium	0.10	U	ug/L	P404143	
	SM 2340B	Hardness	4.9		mg/L	P404143	

Ref. Method and Comment:

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: FB

Collection Date/Time: 09/21/2021 15:00

Field ID: FB_09212021

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2277466	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P404066	
	EPA 300.0 Rev. 2.1	Bromide	0.013	U	mg Br/L	P404078	
		Chloride	0.20	U	mg Cl/L	P404146	
		Sulfate	0.20	U	mg SO4/L	P404147	
	SM 2120 B-2011	Color (true)	2.5	U	PCU	P404063	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P404208	
	SM 2540 C-2011	TDS	15	U	mg/L	P404555	
	SM 2540 D-2011	TSS	2	U	mg/L	P404547	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P404211	
2277467	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P404168	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P404113	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P404163	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P404185	
	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P404342	
2277468	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P404058	
2277474	EPA 200.7 Rev. 4.4	Barium	1.0	U	ug/L	P404143	
		Calcium	0.075	U	mg/L	P404143	
		Iron	30	U	ug/L	P404143	
		Magnesium	0.040	U	mg/L	P404143	
		Manganese	1.0	U	ug/L	P404143	
		Potassium	0.30	U	mg/L	P404143	
		Sodium	0.50	U	mg/L	P404143	
		Zinc	5.0	U	ug/L	P404143	
	EPA 200.8 Rev. 5.4	Aluminum	5.0	U	ug/L	P404143	
		Antimony	0.050	U	ug/L	P404143	
		Arsenic	0.050	U	ug/L	P404143	
		Beryllium	0.010	U	ug/L	P404143	
		Boron**	2.0	U	ug/L	P404143	
		Cadmium	0.020	U	ug/L	P404143	
		Chromium	0.40	U	ug/L	P404143	
		Copper	0.40	U	ug/L	P404143	
		Lead	0.20	U	ug/L	P404143	
		Nickel	0.50	U	ug/L	P404143	
		Selenium	0.20	U	ug/L	P404143	
		Silver	0.010	U	ug/L	P404143	
		Thallium	0.10	U	ug/L	P404143	
	SM 2340B	Hardness	0.35	U	mg/L	P404143	

Ref. Method and Comment:

SM 2540 D-2011: 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: P404066

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P404143

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
Manganese	1.0	U	ug/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: P404143

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Beryllium	0.010	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 200.8 Rev. 5.4
Batch ID: P404386

Component	Result	Code	Units
Antimony	0.050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P404078

Component	Result	Code	Units
Bromide	0.013	U	mg Br/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P404146

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: P404147

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P404168

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404113

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404123

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404163

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404185

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404058

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

Reference Method: SM 2120 B-2011
Batch ID: P404063

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P404208

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-2011
Batch ID: P404555

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P404547

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P404211

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P404342

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: P404143

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	100		P	85 - 115
Iron	103		P	85 - 115
Magnesium	102		P	85 - 115
Manganese	99.3		P	85 - 115
Potassium	99.1		P	85 - 115
Sodium	101		P	85 - 115
Zinc	96.2		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P404143

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.9		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	99.7		P	85 - 115
Beryllium	97.5		P	85 - 115
Boron	99.8		P	85 - 115
Cadmium	98.1		P	85 - 115
Chromium	98.8		P	85 - 115
Copper	99.4		P	85 - 115
Lead	95.8		P	85 - 115
Nickel	100		P	85 - 115
Selenium	99.9		P	85 - 115
Silver	98.8		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P404386

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P404078

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P404146

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P404147

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P404168

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: P404113

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404123

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.9		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404163

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404185

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	108		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404058

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

Reference Method: SM 2120 B-2011
Batch ID: P404063

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.7		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P404208

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P404211

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.8		P	93 - 104

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P404342

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P404143

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277473	Barium	103	103	P/P	80 - 120
2277473	Calcium	99.2	100	P/P	80 - 120
2277473	Iron	103	103	P/P	80 - 120
2277473	Magnesium	102	102	P/P	80 - 120
2277473	Manganese	99.3	99.3	P/P	80 - 120
2277473	Potassium	105	106	P/P	80 - 120
2277473	Sodium	99.7		P	80 - 120
2277473	Zinc	96.1	95.9	P/P	80 - 120
2277709	Barium	101		P	80 - 120
2277709	Calcium	98.4		P	80 - 120
2277709	Iron	102		P	80 - 120
2277709	Magnesium	99.9		P	80 - 120
2277709	Manganese	99.3		P	80 - 120
2277709	Potassium	97.1		P	80 - 120
2277709	Sodium	99.1		P	80 - 120
2277709	Zinc	98.0		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P404143

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277473	Aluminum	99.9	101	P/P	80 - 120
2277473	Antimony	104	102	P/P	80 - 120
2277473	Arsenic	99.8	99.8	P/P	80 - 120
2277473	Beryllium	97.2	95.1	P/P	80 - 120
2277473	Boron	101	103	P/P	80 - 120
2277473	Cadmium	101	99.7	P/P	80 - 120
2277473	Chromium	102	102	P/P	80 - 120
2277473	Copper	99.7	100	P/P	80 - 120
2277473	Lead	98.1	97.9	P/P	80 - 120
2277473	Nickel	97.5	97.2	P/P	80 - 120
2277473	Selenium	97.3	98.6	P/P	80 - 120
2277473	Silver	98.6	98.5	P/P	80 - 120
2277473	Thallium	105	106	P/P	80 - 120
2277709	Aluminum	100		P	80 - 120
2277709	Antimony	101		P	80 - 120
2277709	Arsenic	101		P	80 - 120
2277709	Beryllium	97.3		P	80 - 120
2277709	Boron	99.8		P	80 - 120
2277709	Cadmium	98.5		P	80 - 120
2277709	Chromium	101		P	80 - 120
2277709	Copper	101		P	80 - 120
2277709	Lead	98.5		P	80 - 120
2277709	Nickel	101		P	80 - 120
2277709	Selenium	98.7		P	80 - 120
2277709	Silver	99.6		P	80 - 120
2277709	Thallium	107		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P404386

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P404386

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277709	Antimony	102		P	80 - 120
2277886	Antimony	106	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P404078

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2275298	Bromide	102	95.4	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P404146

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277057	Chloride	95.3		P	90 - 110
2277424	Chloride	99.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P404147

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277057	Sulfate	95.8		P	90 - 110
2277424	Sulfate	98.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P404168

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277408	Ammonia-N	97.0	98.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404113

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277538	Kjeldahl Nitrogen	100	97.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404123

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277408	Kjeldahl Nitrogen	98.4	98.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404163

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277442	NO2NO3-N	104	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404185

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277253	Total-P	108	110	P/P	90 - 110

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404058

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277420	O-Phosphate-P	97.7	97.6	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P404211

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277537	Fluoride	98.8	99.8	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P404342

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2277446	Organic Carbon	110	109	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P404066

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277415	Turbidity	2.35	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P404143

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277473	Barium	0.269	Spike	P	0 - 20
2277473	Calcium	0.806	Spike	P	0 - 20
2277473	Iron	0.488	Spike	P	0 - 20
2277473	Magnesium	0.0786	Spike	P	0 - 20
2277473	Manganese	0.0289	Spike	P	0 - 20
2277473	Potassium	0.962	Spike	P	0 - 20
2277473	Sodium	0.346	Spike	P	0 - 20
2277473	Zinc	0.193	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P404143

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277473	Aluminum	0.854	Spike	P	0 - 20
2277473	Antimony	2.05	Spike	P	0 - 20
2277473	Arsenic	0.000702	Spike	P	0 - 20
2277473	Beryllium	2.13	Spike	P	0 - 20
2277473	Boron	0.913	Spike	P	0 - 20
2277473	Cadmium	1.05	Spike	P	0 - 20
2277473	Chromium	0.270	Spike	P	0 - 20
2277473	Copper	0.560	Spike	P	0 - 20
2277473	Lead	0.166	Spike	P	0 - 20
2277473	Nickel	0.290	Spike	P	0 - 20
2277473	Selenium	1.37	Spike	P	0 - 20
2277473	Silver	0.0888	Spike	P	0 - 20
2277473	Thallium	0.882	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P404386

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277886	Antimony	4.99	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P404078

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2275298	Bromide	5.12	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P404146

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277057	Chloride	0.286	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P404147

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277057	Sulfate	0.485	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P404168

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277408	Ammonia-N	1.18	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404113

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277538	Kjeldahl Nitrogen	2.17	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404123

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277408	Kjeldahl Nitrogen	0.00777	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404163

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277442	NO2NO3-N	1.45	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404185

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277253	Total-P	1.47	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404058

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277420	O-Phosphate-P	0.0960	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B-2011
 Batch ID: P404063

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277407	Color (true)	1.20	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
 Batch ID: P404208

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277537	Total Alkalinity	2.94	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
 Batch ID: P404555

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2276743	TDS	5.13	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
 Batch ID: P404211

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277537	Fluoride	0.948	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
 Batch ID: P404342

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2277446	Organic Carbon	0.355	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A107938

Included Lab Sample IDs: 2277465, 2277468

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.1	P/P	90 - 110
O-Phosphate-P	99.1	99.6	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A107943

Included Lab Sample IDs: 2277463, 2277466

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.7	98.8	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A107944

Included Lab Sample IDs: 2277463, 2277466

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	100	P/P	95 - 105

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A107953

Included Lab Sample IDs: 2277463, 2277466

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.6	99.9	P/P	90 - 110
Sulfate	99.6	99.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A107976

Included Lab Sample IDs: 2277464, 2277467

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107977

Included Lab Sample IDs: 2277464, 2277467

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	95.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A107981

Included Lab Sample IDs: 2277464, 2277467

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	99.0	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A107996

Included Lab Sample IDs: 2277463, 2277466

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-2011

Run ID: A107996

Included Lab Sample IDs: 2277463, 2277466

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

Reference Method: SM 4500 F-C-2011

Run ID: A107996

Included Lab Sample IDs: 2277463, 2277466

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	102	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A108016

Included Lab Sample IDs: 2277463, 2277466

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Bromide	106	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A108021

Included Lab Sample IDs: 2277473, 2277474

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	96.9	98.5	P/P	90 - 110
Aluminum	98.5	98.4	P/P	90 - 110
Arsenic	100	99.1	P/P	90 - 110
Arsenic	99.1	97.3	P/P	90 - 110
Beryllium	94.1	96.0	P/P	90 - 110
Beryllium	94.7	94.1	P/P	90 - 110
Boron	95.1	99.6	P/P	90 - 110
Boron	99.6	99.5	P/P	90 - 110
Cadmium	96.8	98.1	P/P	90 - 110
Cadmium	98.1	99.6	P/P	90 - 110
Chromium	95.9	97.1	P/P	90 - 110
Chromium	97.1	97.7	P/P	90 - 110
Copper	97.5	94.8	P/P	90 - 110
Copper	97.6	97.5	P/P	90 - 110
Lead	92.2	92.3	P/P	90 - 110
Lead	92.3	92.1	P/P	90 - 110
Nickel	97.3	95.5	P/P	90 - 110
Nickel	97.9	97.3	P/P	90 - 110
Selenium	98.6	99.0	P/P	90 - 110
Selenium	99.0	98.3	P/P	90 - 110
Silver	96.8	97.7	P/P	90 - 110
Silver	97.7	97.7	P/P	90 - 110
Thallium	99.7	99.8	P/P	90 - 110
Thallium	99.7	99.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A108031

Included Lab Sample IDs: 2277464, 2277467

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A108031

Included Lab Sample IDs: 2277464, 2277467

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.0	99.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A108039

Included Lab Sample IDs: 2277474

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	101	102	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A108040

Included Lab Sample IDs: 2277473, 2277474

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	99.2	P/P	95 - 105
Barium	99.2	99.1	P/P	90 - 110
Calcium	96.9	97.7	P/P	90 - 110
Calcium	98.6	96.9	P/P	95 - 105
Iron	98.3	99.1	P/P	90 - 110
Iron	99.8	98.3	P/P	95 - 105
Magnesium	97.5	98.2	P/P	90 - 110
Magnesium	99.7	97.5	P/P	95 - 105
Manganese	101	103	P/P	90 - 110
Manganese	104	101	P/P	95 - 105
Potassium	98.4	98.6	P/P	95 - 105
Potassium	98.6	99.2	P/P	90 - 110
Sodium	98.9	99.3	P/P	95 - 105
Sodium	99.3	99.7	P/P	90 - 110
Zinc	103	97.4	P/P	95 - 105
Zinc	97.4	97.5	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A108055

Included Lab Sample IDs: 2277464, 2277467

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A108097

Included Lab Sample IDs: 2277473

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	105	105	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					2.35	
EPA 200.7 Rev. 4.4	Barium	102	103	103	101		0.269
	Calcium	100	99.2	100	98.4		0.806
	Iron	103	103	103	102		0.488
	Magnesium	102	102	102	99.9		0.0786
	Manganese	99.3	99.3	99.3	99.3		0.0289
	Potassium	99.1	105	106	97.1		0.962
	Sodium	101	99.7	99.1			0.346
	Zinc	96.2	96.1	95.9	98.0		0.193
EPA 200.8 Rev. 5.4	Aluminum	98.9	100	99.9	101		0.854
	Antimony	104	101	104	102		2.05
	Antimony	104	106	101	102		4.99
	Arsenic	99.7	101	99.8	99.8		0.0007
	Beryllium	97.5	97.3	97.2	95.1		2.13
	Boron	99.8	99.8	101	103		0.913
	Cadmium	98.1	98.5	101	99.7		1.05
	Chromium	98.8	101	102	102		0.270
	Copper	99.4	101	99.7	100		0.560
	Lead	95.8	98.5	98.1	97.9		0.166
	Nickel	100	101	97.5	97.2		0.290
	Selenium	99.9	98.7	97.3	98.6		1.37
	Silver	98.8	99.6	98.6	98.5		0.0888
	Thallium	102	107	105	106		0.882
EPA 300.0 Rev. 2.1	Bromide	106	102	95.4			5.12
	Chloride	97.8	95.3	99.0		0.286	
	Sulfate	97.3	95.8	98.1		0.485	
EPA 350.1 Rev. 2.0	Ammonia-N	99.0	97.0	98.2			1.18
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	100	97.3			2.17
	Kjeldahl Nitrogen	96.9	98.4	98.4			0.0077
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	104	102			1.45
EPA 365.1 Rev. 2.0	Total-P	108	108	110			1.47
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.7	97.7	97.6			0.0960
SM 2120 B-2011	Color (true)	98.7				1.20	
SM 2320 B-2011	Total Alkalinity	102				2.94	
SM 2540 C-2011	TDS					5.13	
SM 4500 F-C-2011	Fluoride	97.8	98.8	99.8			0.948
SM 5310 B-2011	Organic Carbon	102	110	109			0.355

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2277463, 2277466
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2277473, 2277474
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2277473, 2277474
EPA 300.0 Rev. 2.1	Bromide in aqueous matrices	2277463, 2277466
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2277463, 2277466
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2277463, 2277466
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2277464, 2277467
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2277464, 2277467
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2277464, 2277467
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2277464, 2277467

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2277465, 2277468
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2277463, 2277466
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2277463, 2277466
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2277473, 2277474
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2277463, 2277466
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2277463, 2277466
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2277463, 2277466
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2277464, 2277467

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	09/22/2021			09/22/2021 15:01	Khloe J Berg	2277463, 2277466
EPA 200.7 Rev. 4.4	09/22/2021	09/24/2021 11:00	Emily M Philpot	09/28/2021 11:09	Betina Topolski	2277474
	09/22/2021	09/24/2021 11:00	Emily M Philpot	09/28/2021 12:43	Betina Topolski	2277473
EPA 200.8 Rev. 5.4	09/22/2021	09/24/2021 11:00	Emily M Philpot	09/27/2021 16:38	Alexander Thompson	2277474
	09/22/2021	09/24/2021 11:00	Emily M Philpot	09/27/2021 19:41	Alexander Thompson	2277473
	09/22/2021	09/24/2021 11:00	Emily M Philpot	09/28/2021 13:07	Alexander Thompson	2277474
	09/22/2021	09/30/2021 09:30	Emily M Philpot	09/30/2021 22:19	McKinley C Carter	2277473
EPA 300.0 Rev. 2.1	09/22/2021			09/23/2021 02:34	Roberta Tatti	2277463
	09/22/2021			09/23/2021 02:53	Roberta Tatti	2277466
	09/22/2021			09/23/2021 17:49	Roberta Tatti	2277463
	09/22/2021			09/23/2021 18:01	Roberta Tatti	2277466
EPA 350.1 Rev. 2.0	09/22/2021			09/24/2021 11:42	Ping Hua	2277464
	09/22/2021			09/24/2021 11:44	Ping Hua	2277467
EPA 351.2 Rev. 2.0	09/22/2021	09/23/2021 12:39	Benjamin T. Nordmann	09/24/2021 11:02	Alexandra J Mattheus	2277464
	09/22/2021	09/23/2021 12:43	Benjamin T. Nordmann	09/24/2021 11:17	Alexandra J Mattheus	2277467
EPA 353.2 Rev. 2.0	09/22/2021			09/24/2021 10:56	Beverly Y. Sanders	2277464
	09/22/2021			09/24/2021 10:57	Beverly Y. Sanders	2277467
EPA 365.1 Rev. 2.0	09/22/2021	09/24/2021 16:21	Madeline Gruver	09/28/2021 11:44	Lipi Saha	2277464
	09/22/2021	09/24/2021 16:21	Madeline Gruver	09/28/2021 11:45	Lipi Saha	2277467
EPA 365.1 Rev. 2.0 dissolved	09/22/2021			09/22/2021 14:10	James L Waggeberby	2277465
	09/22/2021			09/22/2021 14:15	James L Waggeberby	2277468
SM 2120 B-2011	09/22/2021			09/22/2021 15:38	Benjamin T. Nordmann	2277463
	09/22/2021			09/22/2021 15:39	Benjamin T. Nordmann	2277466
SM 2320 B-2011	09/22/2021			09/23/2021 19:32	Dale L. Simmons	2277463
	09/22/2021			09/23/2021 19:40	Dale L. Simmons	2277466
SM 2340B	09/22/2021			09/28/2021 11:09	Betina Topolski	2277474
	09/22/2021			09/28/2021 12:43	Betina Topolski	2277473
SM 2540 C-2011	09/22/2021			09/23/2021 14:25	Yijie Li	2277463, 2277466
SM 2540 D-2011	09/22/2021			09/23/2021 14:36	Yijie Li	2277463, 2277466
SM 4500 F-C-2011	09/22/2021			09/23/2021 19:32	Dale L. Simmons	2277463
	09/22/2021			09/23/2021 19:40	Dale L. Simmons	2277466
SM 5310 B-2011	09/22/2021			09/27/2021 22:42	Khloe J Berg	2277464
	09/22/2021			09/27/2021 23:02	Khloe J Berg	2277467