

Chemical Analysis Report

CEN-DIST-2020-11-13-04

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

Event Description: **Panther Lake**
Request ID: **RQ-2020-11-09-37**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Kalina Warren

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 04-DEC-2020 10:30



NON-CONFORMANCE REPORT INCLUDED

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: Panther Lake @ Center of Central Lobe

Collection Date/Time: 11/11/2020 11:32

Field ID: G4CE0156

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2207626	EPA 180.1 Rev. 2.0	Turbidity	1.3		NTU	P390078	
	EPA 300.0 Rev. 2.1	Chloride	24		mg Cl/L	P390142	
		Sulfate	19		mg SO4/L	P390143	
		Color (true)	29		PCU	P390066	
	SM 2320 B-2011	Total Alkalinity	17		mg CaCO3/L	P390129	
	SM 2540 C-2011	TDS	87		mg/L	P390316	
	SM 2540 D-2011	TSS	2	U	mg/L	P390207	
	SM 4500 F-C-2011	Fluoride	0.051	I	mg F/L	P390131	
2207629	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P390348	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P390246	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P390278	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P390108	
	SM 5310 B-2011	Organic Carbon	8.2		mg C/L	P390141	
2207632	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	UQ	mg P/L	P390072	
2207638	EPA 200.7 Rev. 4.4	Barium	7.4		ug/L	P390101	
		Calcium	8.24		mg/L	P390101	
		Iron	30	U	ug/L	P390101	
		Magnesium	4.60		mg/L	P390101	
		Potassium	6.4		mg/L	P390101	
		Sodium	14.0		mg/L	P390101	
		Zinc	5.0	U	ug/L	P390101	
	EPA 200.8 Rev. 5.4	Aluminum	9.5	I	ug/L	P390101	
		Antimony	0.063	I	ug/L	P390101	
		Arsenic	0.89		ug/L	P390101	
		Beryllium	0.010	U	ug/L	P390101	
		Boron**	47.1		ug/L	P390101	
		Cadmium	0.020	U	ug/L	P390101	
		Chromium	0.40	U	ug/L	P390101	
		Copper	0.40	U	ug/L	P390101	
		Lead	0.20	U	ug/L	P390101	
		Nickel	0.50	U	ug/L	P390101	
		Selenium	0.20	U	ug/L	P390101	
		Silver	0.010	U	ug/L	P390101	
		Thallium	0.10	U	ug/L	P390101	
		Hardness	39.5		mg/L	P390101	

Ref. Method and Comment:

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

EPA 365.1 Rev. 2.0 dissolved: O-Phosphate-P: The sample expired upon receipt.

Sample Location: Panther Lake @ Center of West Lobe

Collection Date/Time: 11/11/2020 11:47

Field ID: G4CE0164

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2207627	EPA 180.1 Rev. 2.0	Turbidity	1.3	A	NTU	P390078	
	EPA 300.0 Rev. 2.1	Chloride	23		mg Cl/L	P390142	
		Sulfate	18		mg SO4/L	P390143	
		Color (true)	32	A	PCU	P390066	
	SM 2320 B-2011	Total Alkalinity	18		mg CaCO3/L	P390129	
	SM 2540 C-2011	TDS	82		mg/L	P390316	
	SM 2540 D-2011	TSS	2	U	mg/L	P390207	
	SM 4500 F-C-2011	Fluoride	0.052	I	mg F/L	P390131	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P390348	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P390246	
2207630	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P390278	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P390108	
	SM 5310 B-2011	Organic Carbon	8.5		mg C/L	P390141	
	EPA 365.1 Rev. 2.0	O-Phosphate-P	0.004	UQ	mg P/L	P390072	
	dissolved						
2207639	EPA 200.7 Rev. 4.4	Barium	7.2		ug/L	P390101	
		Calcium	7.78		mg/L	P390101	
		Iron	30	U	ug/L	P390101	
		Magnesium	4.46		mg/L	P390101	
		Potassium	6.2		mg/L	P390101	
		Sodium	13.3		mg/L	P390101	
		Zinc	5.0	U	ug/L	P390101	
		Aluminum	10	I	ug/L	P390101	
		Antimony	0.055	I	ug/L	P390101	
		Arsenic	0.87		ug/L	P390101	
	EPA 200.8 Rev. 5.4	Beryllium	0.010	U	ug/L	P390101	
		Boron**	46.3		ug/L	P390101	
		Cadmium	0.020	U	ug/L	P390101	
		Chromium	0.40	U	ug/L	P390101	
		Copper	0.40	U	ug/L	P390101	
		Lead	0.20	U	ug/L	P390101	
		Nickel	0.50	U	ug/L	P390101	
		Selenium	0.20	U	ug/L	P390101	
		Silver	0.010	U	ug/L	P390101	
		Thallium	0.10	U	ug/L	P390101	
	SM 2340B	Hardness	37.8		mg/L	P390101	

Ref. Method and Comment:

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

EPA 365.1 Rev. 2.0 dissolved: O-Phosphate-P: The sample expired upon receipt.

Sample Location: Panther Lake @ Center of East Lobe

Collection Date/Time: 11/11/2020 12:30

Field ID: G4CE0165

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2207628	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P390078	
	EPA 300.0 Rev. 2.1	Chloride	27		mg Cl/L	P390142	
		Sulfate	21		mg SO4/L	P390143	
		Color (true)	40		PCU	P390066	
	SM 2320 B-2011	Total Alkalinity	22		mg CaCO3/L	P390129	
	SM 2540 C-2011	TDS	103	A	mg/L	P390316	
	SM 2540 D-2011	TSS	2	UA	mg/L	P390207	
	SM 4500 F-C-2011	Fluoride	0.053	I	mg F/L	P390131	
2207631	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P390349	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.70		mg N/L	P390246	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P390278	
	EPA 365.1 Rev. 2.0	Total-P	0.016		mg P/L	P390108	
	SM 5310 B-2011	Organic Carbon	9.0		mg C/L	P390141	
2207634	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	UQ	mg P/L	P390072	
2207640	EPA 200.7 Rev. 4.4	Barium	8.1		ug/L	P390101	
		Calcium	8.93		mg/L	P390101	
		Iron	30	U	ug/L	P390101	
		Magnesium	4.47		mg/L	P390101	
		Potassium	6.4		mg/L	P390101	
		Sodium	15.2		mg/L	P390101	
		Zinc	5.0	U	ug/L	P390101	
	EPA 200.8 Rev. 5.4	Aluminum	15	I	ug/L	P390101	
		Antimony	0.058	I	ug/L	P390101	
		Arsenic	0.78		ug/L	P390101	
		Beryllium	0.010	U	ug/L	P390101	
		Boron**	50.0		ug/L	P390101	
		Cadmium	0.020	U	ug/L	P390101	
		Chromium	0.40	U	ug/L	P390101	
		Copper	0.40	U	ug/L	P390101	
		Lead	0.20	U	ug/L	P390101	
		Nickel	0.50	U	ug/L	P390101	
		Selenium	0.20	U	ug/L	P390101	
		Silver	0.010	U	ug/L	P390101	
		Thallium	0.10	U	ug/L	P390101	
	SM 2340B	Hardness	40.7		mg/L	P390101	

Ref. Method and Comment:

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

EPA 365.1 Rev. 2.0 dissolved: O-Phosphate-P: The sample expired upon receipt.

Non-Conformance Report

NCR ID: 8512

Event(s)

CEN-DIST-2020-11-13-04

Job(s)

Sample(s)

Test(s)

NCR Type: SHIPPING/RECEIVING

NCR Category: Samples arrived late

Observation: Samples arrived one or more days late, samples received within the acceptable temperature range.

Resolution: Samples will be qualified as appropriate.

Authorized by/Date: Joshua Ayres 11/17/2020

The Non-Conformance Report details exceptions or problems encountered with the events/jobs/samples/test.
Please address questions to:

Chemistry	Colin Wright	(850) 245-8085
Biology	Cheryl Swanson	(850) 245-8177

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P390078

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P390101

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: P390101

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 300.0 Rev. 2.1
Batch ID: P390142

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P390143

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P390348

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P390349

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390246

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390278

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390108

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390072

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

Reference Method: SM 2120 B-2011
Batch ID: P390066

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P390129

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

Reference Method: SM 2540 C-2011
Batch ID: P390316

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P390207

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P390131

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P390141

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: P390101

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	97.3		P	85 - 115
Iron	104		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	99.3		P	85 - 115
Sodium	102		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P390101

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.1		P	85 - 115
Antimony	96.1		P	85 - 115
Arsenic	97.8		P	85 - 115
Beryllium	94.8		P	85 - 115
Boron	96.6		P	85 - 115
Cadmium	96.0		P	85 - 115
Chromium	96.7		P	85 - 115
Copper	94.9		P	85 - 115
Lead	99.2		P	85 - 115
Nickel	95.7		P	85 - 115
Selenium	96.6		P	85 - 115
Silver	103		P	85 - 115
Thallium	97.1		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P390142

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P390143

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P390348

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P390349

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390246

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390278

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: P390108

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390072

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

Reference Method: SM 2120 B-2011
Batch ID: P390066

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

Reference Method: SM 2320 B-2011
Batch ID: P390129

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P390131

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.7		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P390141

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.5		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P390101

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207784	Barium	94.8	96.5	P/P	80 - 120
2207784	Calcium	97.9		P	80 - 120
2207784	Iron	99.1	98.7	P/P	80 - 120
2207784	Magnesium	94.5	96.8	P/P	80 - 120
2207784	Potassium	93.2	93.3	P/P	80 - 120
2207784	Sodium	90.8	94.8	P/P	80 - 120
2207784	Zinc	92.4	96.3	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P390101

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207784	Aluminum	96.5	94.3	P/P	80 - 120
2207784	Antimony	98.8	97.2	P/P	80 - 120
2207784	Arsenic	100	98.9	P/P	80 - 120
2207784	Beryllium	95.6	96.0	P/P	80 - 120
2207784	Boron	95.7	94.3	P/P	80 - 120
2207784	Cadmium	96.3	98.8	P/P	80 - 120
2207784	Chromium	98.4	97.2	P/P	80 - 120
2207784	Copper	96.5	96.2	P/P	80 - 120
2207784	Lead	99.6	99.6	P/P	80 - 120
2207784	Nickel	97.3	96.4	P/P	80 - 120
2207784	Selenium	96.8	96.6	P/P	80 - 120
2207784	Silver	103	103	P/P	80 - 120
2207784	Thallium	99.0	99.1	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P390142

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207608	Chloride	97.5		P	90 - 110
2207781	Chloride	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P390143

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207608	Sulfate	99.9		P	90 - 110
2207781	Sulfate	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P390348

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207537	Ammonia-N	97.7	98.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P390349

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207782	Ammonia-N	102	102	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390246

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207631	Kjeldahl Nitrogen	94.9	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390278

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207596	NO2NO3-N	97.0	96.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390108

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207610	Total-P	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390072

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207634	O-Phosphate-P	99.7	99.2	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P390131

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207421	Fluoride	100	98.5	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P390141

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2207537	Organic Carbon	99.5	101	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P390078

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207627	Turbidity	8.96	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P390101

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207784	Barium	1.79	Spike	P	0 - 20
2207784	Calcium	1.90	Spike	P	0 - 20
2207784	Iron	0.438	Spike	P	0 - 20
2207784	Magnesium	1.71	Spike	P	0 - 20
2207784	Potassium	0.0827	Spike	P	0 - 20
2207784	Sodium	2.59	Spike	P	0 - 20
2207784	Zinc	4.21	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P390101

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207784	Aluminum	2.19	Spike	P	0 - 20
2207784	Antimony	1.72	Spike	P	0 - 20
2207784	Arsenic	1.29	Spike	P	0 - 20
2207784	Beryllium	0.455	Spike	P	0 - 20
2207784	Boron	1.27	Spike	P	0 - 20
2207784	Cadmium	2.61	Spike	P	0 - 20
2207784	Chromium	1.21	Spike	P	0 - 20
2207784	Copper	0.314	Spike	P	0 - 20
2207784	Lead	0.0443	Spike	P	0 - 20
2207784	Nickel	0.924	Spike	P	0 - 20
2207784	Selenium	0.211	Spike	P	0 - 20
2207784	Silver	0.104	Spike	P	0 - 20
2207784	Thallium	0.0638	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P390142

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207608	Chloride	0.870	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P390143

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207608	Sulfate	2.37	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P390348

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207537	Ammonia-N	0.955	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P390349

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207782	Ammonia-N	0.506	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390246

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207631	Kjeldahl Nitrogen	4.18	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390278

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207596	NO2NO3-N	0.141	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390108

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207610	Total-P	0.109	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390072

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207634	O-Phosphate-P	0.503	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P390066

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207627	Color (true)	0.106	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P390129

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207421	Total Alkalinity	0.734	Sample	P	0 - 8.1

Quality Assurance Report Precision

Reference Method: SM 2540 C-2011
Batch ID: P390316

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207628	TDS	5.83	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P390131

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207421	Fluoride	0.972	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P390141

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2207537	Organic Carbon	0.939	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B-2011

Run ID: A102129

Included Lab Sample IDs: 2207626, 2207627, 2207628

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	103	104	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A102133

Included Lab Sample IDs: 2207632, 2207633, 2207634

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	100	P/P	90 - 110
O-Phosphate-P	99.7	100	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A102140

Included Lab Sample IDs: 2207626, 2207627, 2207628

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	97.5	98.0	P/P	95 - 105

Reference Method: SM 2320 B-2011

Run ID: A102153

Included Lab Sample IDs: 2207626, 2207627, 2207628

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.6	98.6	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A102153

Included Lab Sample IDs: 2207626, 2207627, 2207628

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

Reference Method: SM 5310 B-2011

Run ID: A102158

Included Lab Sample IDs: 2207629, 2207630, 2207631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	100	99.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A102159

Included Lab Sample IDs: 2207626, 2207627, 2207628

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.8	100	P/P	90 - 110
Sulfate	101	102	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A102185

Included Lab Sample IDs: 2207638, 2207639, 2207640

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A102185

Included Lab Sample IDs: 2207638, 2207639, 2207640

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	98.9	P/P	90 - 110
Barium	99.1	102	P/P	95 - 105
Calcium	101	102	P/P	95 - 105
Calcium	102	101	P/P	90 - 110
Iron	103	102	P/P	90 - 110
Iron	103	103	P/P	95 - 105
Magnesium	102	102	P/P	95 - 105
Magnesium	102	100	P/P	90 - 110
Potassium	100	99.5	P/P	95 - 105
Potassium	99.5	97.5	P/P	90 - 110
Sodium	99.1	96.1	P/P	90 - 110
Sodium	99.7	99.1	P/P	95 - 105
Zinc	102	105	P/P	95 - 105
Zinc	105	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A102192

Included Lab Sample IDs: 2207629, 2207630, 2207631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.0	97.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A102213

Included Lab Sample IDs: 2207629, 2207630, 2207631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	105	P/P	90 - 110
Kjeldahl Nitrogen	105	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A102214

Included Lab Sample IDs: 2207629, 2207630, 2207631

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A102243

Included Lab Sample IDs: 2207629, 2207630, 2207631

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A102292

Included Lab Sample IDs: 2207638, 2207639, 2207640

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.8	98.3	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A102292

Included Lab Sample IDs: 2207638, 2207639, 2207640

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.2	97.8	P/P	90 - 110
Antimony	93.2	95.0	P/P	90 - 110
Antimony	93.8	93.2	P/P	90 - 110
Arsenic	97.9	99.7	P/P	90 - 110
Arsenic	99.5	97.9	P/P	90 - 110
Beryllium	98.1	99.0	P/P	90 - 110
Beryllium	99.0	99.3	P/P	90 - 110
Boron	99.5	99.8	P/P	90 - 110
Boron	99.8	97.6	P/P	90 - 110
Cadmium	96.5	99.2	P/P	90 - 110
Cadmium	98.1	96.5	P/P	90 - 110
Chromium	97.0	97.4	P/P	90 - 110
Chromium	97.4	98.9	P/P	90 - 110
Copper	95.7	97.4	P/P	90 - 110
Copper	96.9	95.7	P/P	90 - 110
Lead	101	101	P/P	90 - 110
Lead	101	101	P/P	90 - 110
Nickel	97.2	98.8	P/P	90 - 110
Nickel	98.1	97.2	P/P	90 - 110
Selenium	96.8	97.4	P/P	90 - 110
Selenium	97.4	97.7	P/P	90 - 110
Silver	101	99.4	P/P	90 - 110
Silver	99.4	101	P/P	90 - 110
Thallium	101	99.9	P/P	90 - 110
Thallium	101	101	P/P	90 - 110

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

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements. Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision	
					LCS	SMP MS
EPA 180.1 Rev. 2.0	Turbidity					8.96
EPA 200.7 Rev. 4.4	Barium	102	94.8	96.5		1.79
	Calcium	97.3	97.9			1.90
	Iron	104	99.1	98.7		0.438
	Magnesium	104	94.5	96.8		1.71
	Potassium	99.3	93.2	93.3		0.0827
	Sodium	102	90.8	94.8		2.59
	Zinc	101	92.4	96.3		4.21
EPA 200.8 Rev. 5.4	Aluminum	96.1	96.5	94.3		2.19
	Antimony	96.1	98.8	97.2		1.72
	Arsenic	97.8	100	98.9		1.29
	Beryllium	94.8	95.6	96.0		0.455
	Boron	96.6	95.7	94.3		1.27
	Cadmium	96.0	96.3	98.8		2.61
	Chromium	96.7	98.4	97.2		1.21
	Copper	94.9	96.5	96.2		0.314
	Lead	99.2	99.6	99.6		0.0443
	Nickel	95.7	97.3	96.4		0.924
	Selenium	96.6	96.8	96.6		0.211
	Silver	103	103	103		0.104
	Thallium	97.1	99.0	99.1		0.0638
EPA 300.0 Rev. 2.1	Chloride	100	97.5	100		0.870
	Sulfate	101	99.9	100		2.37
EPA 350.1 Rev. 2.0	Ammonia-N	101	97.7	98.8		0.955
	Ammonia-N	102	102	102		0.506
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	94.9	101		4.18
EPA 353.2 Rev. 2.0	NO2NO3-N	100	97.0	96.8		0.141
EPA 365.1 Rev. 2.0	Total-P	107	102	102		0.109
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.2	99.7	99.2		0.503
SM 2120 B-2011	Color (true)	101				0.106
SM 2320 B-2011	Total Alkalinity	102				0.734
SM 2540 C-2011	TDS					5.83
SM 4500 F-C-2011	Fluoride	97.7	100	98.5		0.972
SM 5310 B-2011	Organic Carbon	99.5	99.5	101		0.939

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2207626, 2207627, 2207628
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2207638, 2207639, 2207640
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2207638, 2207639, 2207640
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2207626, 2207627, 2207628
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2207626, 2207627, 2207628
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2207629, 2207630, 2207631
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2207629, 2207630, 2207631
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2207629, 2207630, 2207631
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2207629, 2207630, 2207631
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2207632, 2207633, 2207634
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2207626, 2207627, 2207628
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2207626, 2207627, 2207628

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2207638, 2207639, 2207640
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2207626, 2207627, 2207628
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2207626, 2207627, 2207628
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2207626, 2207627, 2207628
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2207629, 2207630, 2207631

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	11/13/2020			11/13/2020 10:33	Yen Ta	2207626
	11/13/2020			11/13/2020 10:36	Yen Ta	2207627
	11/13/2020			11/13/2020 10:40	Yen Ta	2207628
EPA 200.7 Rev. 4.4	11/13/2020	11/16/2020 14:15	Elliott D. Healy	11/17/2020 14:09	Betina Topolski	2207638
	11/13/2020	11/16/2020 14:15	Elliott D. Healy	11/17/2020 14:44	Betina Topolski	2207639
	11/13/2020	11/16/2020 14:15	Elliott D. Healy	11/17/2020 14:52	Betina Topolski	2207640
EPA 200.8 Rev. 5.4	11/13/2020	11/16/2020 14:15	Elliott D. Healy	11/25/2020 00:21	Alexander Thompson	2207638
	11/13/2020	11/16/2020 14:15	Elliott D. Healy	11/25/2020 01:00	Alexander Thompson	2207639
	11/13/2020	11/16/2020 14:15	Elliott D. Healy	11/25/2020 01:09	Alexander Thompson	2207640
EPA 300.0 Rev. 2.1	11/13/2020			11/16/2020 19:35	Lipi Saha	2207626
	11/13/2020			11/16/2020 19:48	Lipi Saha	2207627
	11/13/2020			11/16/2020 20:01	Lipi Saha	2207628
EPA 350.1 Rev. 2.0	11/13/2020			11/21/2020 10:59	Ping Hua	2207629
	11/13/2020			11/21/2020 11:01	Ping Hua	2207630
	11/13/2020			11/21/2020 11:17	Ping Hua	2207631
EPA 351.2 Rev. 2.0	11/13/2020	11/18/2020 14:20	David Boose	11/19/2020 11:15	Elliott Rodriguez	2207631
	11/13/2020	11/18/2020 14:20	David Boose	11/19/2020 11:33	Elliott Rodriguez	2207629
	11/13/2020	11/18/2020 14:20	David Boose	11/19/2020 11:35	Elliott Rodriguez	2207630
EPA 353.2 Rev. 2.0	11/13/2020			11/19/2020 14:09	Lauren Lees	2207629
	11/13/2020			11/19/2020 14:11	Lauren Lees	2207630
	11/13/2020			11/19/2020 14:12	Lauren Lees	2207631
EPA 365.1 Rev. 2.0	11/13/2020	11/16/2020 13:34	Yen Ta	11/18/2020 11:20	Shengyu Wang	2207629
	11/13/2020	11/16/2020 13:34	Yen Ta	11/18/2020 11:21	Shengyu Wang	2207630
	11/13/2020	11/16/2020 13:34	Yen Ta	11/18/2020 11:22	Shengyu Wang	2207631
EPA 365.1 Rev. 2.0 dissolved	11/13/2020			11/13/2020 12:52	Blanca Fach	2207634
	11/13/2020			11/13/2020 12:58	Blanca Fach	2207632
	11/13/2020			11/13/2020 13:03	Blanca Fach	2207633
SM 2120 B-2011	11/13/2020			11/13/2020 11:30	Madeline Gruver	2207626
	11/13/2020			11/13/2020 11:32	Madeline Gruver	2207627
	11/13/2020			11/13/2020 11:33	Madeline Gruver	2207628
SM 2320 B-2011	11/13/2020			11/16/2020 19:11	Dale L. Simmons	2207626
	11/13/2020			11/16/2020 19:24	Dale L. Simmons	2207627
	11/13/2020			11/16/2020 19:37	Dale L. Simmons	2207628
SM 2340B	11/13/2020			11/17/2020 14:09	Betina Topolski	2207638
	11/13/2020			11/17/2020 14:44	Betina Topolski	2207639
	11/13/2020			11/17/2020 14:52	Betina Topolski	2207640
SM 2540 C-2011	11/13/2020			11/16/2020 14:25	Yijie Li	2207626, 2207627, 2207628
SM 2540 D-2011	11/13/2020			11/16/2020 14:25	Yijie Li	2207626, 2207627, 2207628
SM 4500 F-C-2011	11/13/2020			11/16/2020 19:11	Dale L. Simmons	2207626
	11/13/2020			11/16/2020 19:24	Dale L. Simmons	2207627

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 4500 F-C-2011	11/13/2020			11/16/2020 19:37	Dale L. Simmons	2207628
SM 5310 B-2011	11/13/2020			11/16/2020 22:25	Touraj Touran	2207629
	11/13/2020			11/16/2020 22:37	Touraj Touran	2207630
	11/13/2020			11/16/2020 22:49	Touraj Touran	2207631