

Chemical Analysis Report

CEN-DIST-2021-08-05-01

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

Event Description: **Florence/Ruth/Blank**
Request ID: **RQ-2021-08-02-90**
Customer: **CEN-DIST**
Project ID: **SMP**

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

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: Liang Lin, Environmental Administrator

Date Certified: 30-AUG-2021 13:22

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored background.

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: Florence Lake @ Center

Collection Date/Time: 08/04/2021 11:11

Field ID: G3CE0012

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2267730	EPA 180.1 Rev. 2.0	Turbidity	9.4		NTU	P402070	
	EPA 300.0 Rev. 2.1	Chloride	160		mg Cl/L	P402412	
		Sulfate	64		mg SO4/L	P402415	
		Color (true)	210		PCU	P402071	
	SM 2320 B-2011	Total Alkalinity	69		mg CaCO3/L	P402156	
	SM 2540 C-2011	TDS	518		mg/L	P402435	
	SM 2540 D-2011	TSS	10		mg/L	P402193	
2267731	SM 4500 F-C-2011	Fluoride	0.10		mg F/L	P402158	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.040		mg N/L	P402385	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P402785	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.046		mg N/L	P402107	
	EPA 365.1 Rev. 2.0	Total-P	0.15		mg P/L	P402894	
2267732	SM 5310 B-2011	Organic Carbon	23		mg C/L	P402733	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.068		mg P/L	P402066	
2267741	EPA 200.7 Rev. 4.4	Barium	35.9		ug/L	P402431	
		Calcium	46.4		mg/L	P402431	
		Iron	1.12E+03		ug/L	P402431	
		Magnesium	14.9		mg/L	P402431	
		Manganese	19.8		ug/L	P402431	
		Potassium	3.2		mg/L	P402431	
		Sodium	84.3		mg/L	P402431	
	EPA 200.8 Rev. 5.4	Zinc	8.7	I	ug/L	P402431	
		Aluminum	248		ug/L	P402431	
		Antimony	0.20		ug/L	P402431	
		Arsenic	1.87		ug/L	P402431	
		Beryllium	0.024	I	ug/L	P402431	
		Boron**	42.8		ug/L	P402431	
		Cadmium	0.020	U	ug/L	P402431	
		Chromium	0.84	I	ug/L	P402431	
		Copper	2.02		ug/L	P402431	
		Lead	1.34		ug/L	P402431	
		Nickel	0.65	I	ug/L	P402431	
		Selenium	0.22	I	ug/L	P402431	
		Silver	0.010	U	ug/L	P402737	
		Thallium	0.10	U	ug/L	P402431	
	SM 2340B	Hardness	177		mg/L	P402431	

Ref. Method and Comment:

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

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: FB

Collection Date/Time: 08/04/2021 11:27

Field ID: FB_08042021

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2267733	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P402070	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P402413	
		Sulfate	0.20	U	mg SO4/L	P402416	
		Color (true)	2.5	U	PCU	P402071	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P402156	
	SM 2540 C-2011	TDS	15	U	mg/L	P402432	
	SM 2540 D-2011	TSS	2	U	mg/L	P402190	
2267734	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P402158	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P402385	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P402785	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P402107	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P402322	
2267735	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P402733	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P402066	
2267742	EPA 200.7 Rev. 4.4	Barium	1.0	U	ug/L	P402431	
		Calcium	0.075	U	mg/L	P402431	
		Iron	30	U	ug/L	P402431	
		Magnesium	0.040	U	mg/L	P402431	
		Manganese	1.0	U	ug/L	P402431	
		Potassium	0.30	U	mg/L	P402431	
		Sodium	0.50	U	mg/L	P402431	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P402431	
		Aluminum	5.0	U	ug/L	P402431	
		Antimony	0.050	U	ug/L	P402431	
		Arsenic	0.050	U	ug/L	P402431	
		Beryllium	0.010	U	ug/L	P402431	
		Boron**	2.0	U	ug/L	P402431	
		Cadmium	0.020	U	ug/L	P402431	
		Chromium	0.40	U	ug/L	P402431	
		Copper	0.40	U	ug/L	P402431	
		Lead	0.20	U	ug/L	P402431	
		Nickel	0.50	U	ug/L	P402431	
		Selenium	0.20	U	ug/L	P402431	
		Silver	0.010	U	ug/L	P402737	
		Thallium	0.10	U	ug/L	P402431	
		Hardness	0.35	U	mg/L	P402431	

Ref. Method and Comment:

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

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Ruth Lake @ Center

Collection Date/Time: 08/04/2021 13:06

Field ID: G3CE0021

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2267736	EPA 180.1 Rev. 2.0	Turbidity	8.5		NTU	P402070	
	EPA 300.0 Rev. 2.1	Chloride	480		mg Cl/L	P402413	
		Sulfate	100		mg SO4/L	P402416	
	SM 2120 B-2011	Color (true)	250		PCU	P402073	
	SM 2320 B-2011	Total Alkalinity	40		mg CaCO3/L	P402156	
	SM 2540 C-2011	TDS	1.02E+03		mg/L	P402435	
	SM 2540 D-2011	TSS	5	I	mg/L	P402193	
	SM 4500 F-C-2011	Fluoride	0.097	I	mg F/L	P402158	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P402385	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P402785	
2267737	EPA 353.2 Rev. 2.0	NO2NO3-N	0.006	I	mg N/L	P402107	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P402894	
	SM 5310 B-2011	Organic Carbon	27		mg C/L	P402733	
	EPA 365.1 Rev. 2.0	O-Phosphate-P	0.029		mg P/L	P402066	
	dissolved						

Ref. Method and Comment:

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

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P402070

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P402431

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: P402431

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
Thallium	0.10	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402737

Component	Result	Code	Units
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402412

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402413

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: P402415

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402416

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402385

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402785

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P402107

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402322

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402894

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402066

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

Reference Method: SM 2120 B-2011
Batch ID: P402071

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report

Method Blank Results

Reference Method: SM 2120 B-2011
Batch ID: P402073

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P402156

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 C-2011
Batch ID: P402432

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-2011
Batch ID: P402435

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P402190

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P402193

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P402158

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P402733

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: P402431

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	103		P	85 - 115
Iron	108		P	85 - 115
Magnesium	103		P	85 - 115
Manganese	102		P	85 - 115
Potassium	98.9		P	85 - 115
Sodium	101		P	85 - 115
Zinc	98.6		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P402431

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	104		P	85 - 115
Antimony	105		P	85 - 115
Arsenic	105		P	85 - 115
Beryllium	99.5		P	85 - 115
Boron	101		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	101		P	85 - 115
Copper	103		P	85 - 115
Lead	109		P	85 - 115
Nickel	105		P	85 - 115
Selenium	106		P	85 - 115
Thallium	110		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P402737

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P402412

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P402413

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P402415

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402416

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402385

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402785

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: P402107

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402322

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402894

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402066

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.0		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P402071

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.3		P	85 - 115

Reference Method: SM 2120 B-2011
Batch ID: P402073

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.4		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-2011
Batch ID: P402156

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

Reference Method: SM 4500 F-C-2011
Batch ID: P402158

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.1		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P402733

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.4		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P402431

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267764	Barium	101	102	P/P	80 - 120
2267764	Calcium	102		P	80 - 120
2267764	Iron	103	106	P/P	80 - 120
2267764	Magnesium	104		P	80 - 120
2267764	Manganese	100	99.6	P/P	80 - 120
2267764	Potassium	97.3		P	80 - 120
2267764	Sodium	99.7		P	80 - 120
2267764	Zinc	98.6	99.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P402431

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267764	Aluminum	101	99.3	P/P	80 - 120
2267764	Antimony	103	102	P/P	80 - 120
2267764	Arsenic	103	103	P/P	80 - 120
2267764	Beryllium	103	98.2	P/P	80 - 120
2267764	Boron	103	103	P/P	80 - 120
2267764	Cadmium	103	102	P/P	80 - 120
2267764	Chromium	99.2	99.4	P/P	80 - 120
2267764	Copper	98.7	98.0	P/P	80 - 120
2267764	Lead	109	108	P/P	80 - 120
2267764	Nickel	93.5	95.5	P/P	80 - 120
2267764	Selenium	103	103	P/P	80 - 120
2267764	Thallium	112	113	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P402737

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2270375	Silver	102		P	80 - 120
2270488	Silver	103	103	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P402412

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267169	Chloride	97.8		P	90 - 110
2267317	Chloride	99.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P402413

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267746	Chloride	98.4		P	90 - 110
2267940	Chloride	93.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P402415

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267169	Sulfate	98.7		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402415

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267317	Sulfate	98.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402416

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267746	Sulfate	98.1		P	90 - 110
2267940	Sulfate	99.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402385

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267653	Ammonia-N	99.2	97.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P402107

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267705	NO2NO3-N	99.7	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402322

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267734	Total-P	109	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402894

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267731	Total-P	103	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402066

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267654	O-Phosphate-P	103	99.3	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P402158

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267837	Fluoride	99.8	99.2	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P402733

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267659	Organic Carbon	99.0	99.2	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P402070

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267704	Turbidity	6.56	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P402431

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267764	Barium	0.321	Spike	P	0 - 20
2267764	Calcium	0.518	Spike	P	0 - 20
2267764	Iron	1.39	Spike	P	0 - 20
2267764	Magnesium	0.0463	Spike	P	0 - 20
2267764	Manganese	0.525	Spike	P	0 - 20
2267764	Potassium	0.164	Spike	P	0 - 20
2267764	Sodium	1.13	Spike	P	0 - 20
2267764	Zinc	1.14	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P402431

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267764	Aluminum	0.615	Spike	P	0 - 20
2267764	Antimony	0.994	Spike	P	0 - 20
2267764	Arsenic	0.644	Spike	P	0 - 20
2267764	Beryllium	3.99	Spike	P	0 - 20
2267764	Boron	0.252	Spike	P	0 - 20
2267764	Cadmium	1.45	Spike	P	0 - 20
2267764	Chromium	0.200	Spike	P	0 - 20
2267764	Copper	0.570	Spike	P	0 - 20
2267764	Lead	0.753	Spike	P	0 - 20
2267764	Nickel	1.87	Spike	P	0 - 20
2267764	Selenium	0.661	Spike	P	0 - 20
2267764	Thallium	1.11	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P402737

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2270488	Silver	0.638	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P402412

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267317	Chloride	1.35	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402413

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267746	Chloride	1.30	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402415

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267317	Sulfate	0.597	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402416

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267746	Sulfate	1.96	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402385

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267653	Ammonia-N	1.50	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402785

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267688	Kjeldahl Nitrogen	2.32	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P402107

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267705	NO2NO3-N	0.381	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402322

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267734	Total-P	0.412	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402894

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267731	Total-P	0.251	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402066

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267654	O-Phosphate-P	3.46	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P402071

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267494	Color (true)	1.84	Sample	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P402073

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267791	Color (true)	2.37	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P402156

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267837	Total Alkalinity	0.942	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P402432

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267072	TDS	6.48	Sample	P	0 - 10

Reference Method: SM 2540 C-2011
Batch ID: P402435

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267704	TDS	4.67	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P402158

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267837	Fluoride	0.467	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P402733

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267659	Organic Carbon	0.165	Spike	P	0 - 20

Quality Assurance Report

Precision

* 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: A107065

Included Lab Sample IDs: 2267732, 2267735, 2267738

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.9	99.4	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A107067

Included Lab Sample IDs: 2267730, 2267733, 2267736

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

Reference Method: SM 2120 B-2011

Run ID: A107068

Included Lab Sample IDs: 2267730, 2267733, 2267736

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.9	100	P/P	90 - 115
Color (true)	99.4	98.9	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A107091

Included Lab Sample IDs: 2267731, 2267734, 2267737

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

Reference Method: SM 2320 B-2011

Run ID: A107112

Included Lab Sample IDs: 2267730, 2267733, 2267736

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	105	99.6	P/P	90 - 110
Total Alkalinity	99.9	105	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A107112

Included Lab Sample IDs: 2267730, 2267733, 2267736

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A107166

Included Lab Sample IDs: 2267730, 2267733, 2267736

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.0	99.4	P/P	90 - 110
Chloride	99.4	100	P/P	90 - 110
Sulfate	98.3	98.7	P/P	90 - 110
Sulfate	98.7	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A107208

Included Lab Sample IDs: 2267734

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A107211

Included Lab Sample IDs: 2267731, 2267734, 2267737

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	99.6	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A107261

Included Lab Sample IDs: 2267741, 2267742

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	95.2	97.0	P/P	90 - 110
Barium	98.0	95.2	P/P	95 - 105
Calcium	103	104	P/P	95 - 105
Calcium	104	100	P/P	90 - 110
Iron	103	105	P/P	95 - 105
Iron	105	102	P/P	90 - 110
Magnesium	103	104	P/P	95 - 105
Magnesium	104	101	P/P	90 - 110
Manganese	100	101	P/P	90 - 110
Manganese	101	100	P/P	95 - 105
Potassium	101	98.2	P/P	90 - 110
Potassium	99.5	101	P/P	95 - 105
Sodium	101	102	P/P	95 - 105
Sodium	102	99.2	P/P	90 - 110
Zinc	94.6	98.1	P/P	90 - 110
Zinc	99.2	94.6	P/P	95 - 105

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A107280

Included Lab Sample IDs: 2267741, 2267742

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	102	P/P	90 - 110
Aluminum	102	100	P/P	90 - 110
Antimony	100	102	P/P	90 - 110
Antimony	102	101	P/P	90 - 110
Arsenic	100	99.5	P/P	90 - 110
Arsenic	102	100	P/P	90 - 110
Beryllium	98.6	98.7	P/P	90 - 110
Beryllium	98.7	97.5	P/P	90 - 110
Boron	101	101	P/P	90 - 110
Boron	97.6	101	P/P	90 - 110
Cadmium	100	99.4	P/P	90 - 110
Cadmium	98.8	100	P/P	90 - 110
Chromium	94.8	96.5	P/P	90 - 110
Chromium	95.1	94.8	P/P	90 - 110
Copper	96.8	97.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A107280

Included Lab Sample IDs: 2267741, 2267742

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	97.9	96.8	P/P	90 - 110
Lead	102	104	P/P	90 - 110
Lead	104	102	P/P	90 - 110
Nickel	96.3	97.8	P/P	90 - 110
Nickel	99.0	96.3	P/P	90 - 110
Selenium	99.3	99.4	P/P	90 - 110
Selenium	99.4	97.7	P/P	90 - 110
Thallium	105	105	P/P	90 - 110
Thallium	105	103	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A107360

Included Lab Sample IDs: 2267731, 2267734, 2267737

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.2	99.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A107401

Included Lab Sample IDs: 2267741, 2267742

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	95.9	97.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107450

Included Lab Sample IDs: 2267731, 2267734, 2267737

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.7	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A107462

Included Lab Sample IDs: 2267731, 2267737

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	102	P/P	90 - 110
Total-P	100	100	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					6.56	
EPA 200.7 Rev. 4.4	Barium	102	101	102			0.321
	Calcium	103	102				0.518
	Iron	108	103	106			1.39
	Magnesium	103	104				0.0463
	Manganese	102	100	99.6			0.525
	Potassium	98.9	97.3				0.164
	Sodium	101	99.7				1.13
	Zinc	98.6	98.6	99.8			1.14
EPA 200.8 Rev. 5.4	Aluminum	104	101	99.3			0.615
	Antimony	105	102	103			0.994
	Arsenic	105	103	103			0.644
	Beryllium	99.5	103	98.2			3.99
	Boron	101	103	103			0.252
	Cadmium	101	103	102			1.45
	Chromium	101	99.2	99.4			0.200
	Copper	103	98.7	98.0			0.570
	Lead	109	109	108			0.753
	Nickel	105	93.5	95.5			1.87
	Selenium	106	103	103			0.661
	Silver	105	103	103	102		0.638
	Thallium	110	112	113			1.11
EPA 300.0 Rev. 2.1	Chloride	101	99.6	97.8		1.35	
	Chloride	97.9	98.4	93.4		1.30	
	Sulfate	101	98.7	98.7		0.597	
	Sulfate	99.8	98.1	99.7		1.96	
EPA 350.1 Rev. 2.0	Ammonia-N	97.8	99.2	97.4			1.50
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104					2.32
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101	99.7	100			0.381
EPA 365.1 Rev. 2.0	Total-P	107	109	109			0.412
	Total-P	103	103	103			0.251
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.0	103	99.3			3.46
SM 2120 B-2011	Color (true)	99.3				1.84	
	Color (true)	99.4				2.37	
SM 2320 B-2011	Total Alkalinity	102				0.942	
SM 2540 C-2011	TDS					6.48	
	TDS					4.67	
SM 4500 F-C-2011	Fluoride	99.1	99.8	99.2			0.467
SM 5310 B-2011	Organic Carbon	95.4	99.0	99.2			0.165

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2267730, 2267733, 2267736
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2267741, 2267742
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2267741, 2267742
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2267730, 2267733, 2267736
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2267730, 2267733, 2267736
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2267731, 2267734, 2267737
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2267731, 2267734, 2267737
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2267731, 2267734, 2267737

Reference Method Descriptions

Method	Description	Associated Samples
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2267731, 2267734, 2267737
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2267732, 2267735, 2267738
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2267730, 2267733, 2267736
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2267730, 2267733, 2267736
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2267741, 2267742
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2267730, 2267733, 2267736
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2267730, 2267733, 2267736
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2267730, 2267733, 2267736
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2267731, 2267734, 2267737

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	08/05/2021			08/05/2021 15:14	Sarah A Nixon	2267730, 2267733, 2267736
EPA 200.7 Rev. 4.4	08/05/2021	08/13/2021 12:20	Elliott D. Healy	08/15/2021 12:10	Betina Topolski	2267742
	08/05/2021	08/13/2021 12:20	Elliott D. Healy	08/15/2021 13:34	Betina Topolski	2267741
EPA 200.8 Rev. 5.4	08/05/2021	08/13/2021 12:20	Elliott D. Healy	08/16/2021 16:05	McKinley C Carter	2267742
	08/05/2021	08/13/2021 12:20	Elliott D. Healy	08/16/2021 17:43	McKinley C Carter	2267741
	08/05/2021	08/20/2021 12:50	Elliott D. Healy	08/23/2021 20:31	Alexander Thompson	2267742
	08/05/2021	08/20/2021 12:50	Elliott D. Healy	08/23/2021 21:10	Alexander Thompson	2267741
EPA 300.0 Rev. 2.1	08/05/2021			08/11/2021 23:19	Lipi Saha	2267730
	08/05/2021			08/12/2021 01:33	Lipi Saha	2267733
	08/05/2021			08/12/2021 01:45	Lipi Saha	2267736
EPA 350.1 Rev. 2.0	08/05/2021			08/12/2021 11:56	Roberta Tatti	2267731
	08/05/2021			08/12/2021 11:58	Roberta Tatti	2267734
	08/05/2021			08/12/2021 11:59	Roberta Tatti	2267737
EPA 351.2 Rev. 2.0	08/05/2021	08/20/2021 12:58	Benjamin T. Nordmann	08/24/2021 14:32	Virginia P. Brown	2267731
	08/05/2021	08/20/2021 12:58	Benjamin T. Nordmann	08/24/2021 14:34	Virginia P. Brown	2267734
	08/05/2021	08/20/2021 12:58	Benjamin T. Nordmann	08/24/2021 14:36	Virginia P. Brown	2267737
EPA 353.2 Rev. 2.0	08/05/2021			08/06/2021 11:07	Beverly Y. Sanders	2267731
	08/05/2021			08/06/2021 11:08	Beverly Y. Sanders	2267734
	08/05/2021			08/06/2021 11:09	Beverly Y. Sanders	2267737
EPA 365.1 Rev. 2.0	08/05/2021	08/11/2021 13:55	Simonne.V. Calhoun	08/12/2021 12:42	Shengyu Ding	2267734
	08/05/2021	08/24/2021 14:32	Simonne.V. Calhoun	08/25/2021 15:01	Shengyu Ding	2267731
	08/05/2021	08/24/2021 14:32	Simonne.V. Calhoun	08/25/2021 15:09	Shengyu Ding	2267737
EPA 365.1 Rev. 2.0 dissolved	08/05/2021			08/05/2021 15:45	Patrick M. Roche	2267732
	08/05/2021			08/05/2021 15:46	Patrick M. Roche	2267735
	08/05/2021			08/05/2021 15:47	Patrick M. Roche	2267738
SM 2120 B-2011	08/05/2021			08/05/2021 15:55	Sarah A Nixon	2267733
	08/05/2021			08/05/2021 16:04	Sarah A Nixon	2267730
	08/05/2021			08/05/2021 16:05	Sarah A Nixon	2267736
SM 2320 B-2011	08/05/2021			08/06/2021 19:10	Dale L. Simmons	2267730
	08/05/2021			08/06/2021 19:18	Dale L. Simmons	2267733
	08/05/2021			08/06/2021 21:14	Dale L. Simmons	2267736
SM 2340B	08/05/2021			08/15/2021 12:10	Betina Topolski	2267742
	08/05/2021			08/15/2021 13:34	Betina Topolski	2267741
SM 2540 C-2011	08/05/2021			08/06/2021 15:32	Yijie Li	2267730, 2267733, 2267736
SM 2540 D-2011	08/05/2021			08/06/2021 15:32	Yijie Li	2267730, 2267733, 2267736
SM 4500 F-C-2011	08/05/2021			08/06/2021 19:10	Dale L. Simmons	2267730
	08/05/2021			08/06/2021 19:18	Dale L. Simmons	2267733
	08/05/2021			08/06/2021 21:14	Dale L. Simmons	2267736
SM 5310 B-2011	08/05/2021			08/19/2021 16:19	Madeline Gruver	2267731
	08/05/2021			08/19/2021 16:32	Madeline Gruver	2267734

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 5310 B-2011	08/05/2021			08/19/2021 16:45	Madeline Gruver	2267737