Chemical Analysis Report

NW-DIST-2021-11-17-02

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

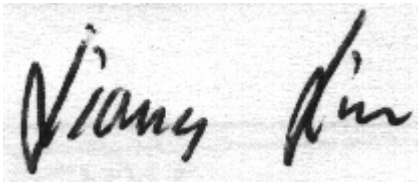
Event Description: **Eastern Lakes**
Request ID: **RQ-2021-11-08-24**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 Government Center
Suite 208
Pensacola, FL 32502-5794
Attn: Myranda K Butler

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: 07-DEC-2021 14:15



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: Cassidy Lake Center **Collection Date/Time: 11/16/2021 12:09**

Field ID: G3NW0183 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2290012	EPA 180.1 Rev. 2.0	Turbidity	0.60		NTU	P406466	
	EPA 300.0 Rev. 2.1	Chloride	2.8		mg Cl/L	P406747	
		Sulfate	0.78		mg SO4/L	P406749	
	SM 2120 B-2011	Color (true)	3.1	I	PCU	P406461	
	SM 2320 B-2011	Total Alkalinity	0.81	I	mg CaCO3/L	P406619	
	SM 2540 C-2011	TDS	15	U	mg/L	P406776	
	SM 2540 D-2011	TSS	2	I	mg/L	P406735	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P406621	
2290013	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P406718	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.18	I	mg N/L	P406790	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P406613	
	EPA 365.1 Rev. 2.0	Total-P	0.003	I	mg P/L	P406625	
	SM 5310 B-2011	Organic Carbon	2.4		mg C/L	P407035	
2290014	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P406450	

Sample Location: Lake Karick (Center) (also 33040210) **Collection Date/Time: 11/16/2021 14:20**

Field ID: G4NW0274 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2290009	EPA 180.1 Rev. 2.0	Turbidity	2.5	A	NTU	P406466	
	EPA 300.0 Rev. 2.1	Chloride	2.4		mg Cl/L	P406747	
		Sulfate	0.37	I	mg SO4/L	P406749	
	SM 2120 B-2011	Color (true)	13		PCU	P406461	
	SM 2320 B-2011	Total Alkalinity	1.8	I	mg CaCO3/L	P406619	
	SM 2540 C-2011	TDS	19	I	mg/L	P406776	
	SM 2540 D-2011	TSS	2	I	mg/L	P406735	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P406621	
2290010	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P406718	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.22		mg N/L	P406790	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P406613	
	EPA 365.1 Rev. 2.0	Total-P	0.006		mg P/L	P406625	
	SM 5310 B-2011	Organic Carbon	3.3		mg C/L	P407035	
2290011	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P406450	
2290028	EPA 200.7 Rev. 4.4	Barium	3.8	I	ug/L	P406549	
		Calcium	0.87		mg/L	P406549	
		Iron	200		ug/L	P406549	
		Magnesium	0.43		mg/L	P406549	
		Manganese	2.3	I	ug/L	P406549	
		Potassium	0.30	U	mg/L	P406549	
		Sodium	1.4	I	mg/L	P406549	
		Strontium	2.8	I	ug/L	P406549	
		Tin	3.0	U	ug/L	P406549	
		Titanium	1.1	I	ug/L	P406549	
		Vanadium	2.0	U	ug/L	P406549	
		Zinc	5.0	U	ug/L	P406549	
	EPA 200.8 Rev. 5.4	Aluminum	78		ug/L	P406549	
		Antimony	0.050	U	ug/L	P406549	
		Arsenic	0.34		ug/L	P406549	
		Beryllium	0.010	U	ug/L	P406549	
		Boron**	9.5		ug/L	P406549	
		Cadmium	0.020	U	ug/L	P406549	
		Chromium	0.40	U	ug/L	P406549	
		Cobalt	0.027	I	ug/L	P406549	
		Copper	0.40	U	ug/L	P406549	
		Lead	0.20	U	ug/L	P406549	
		Molybdenum	0.15	U	ug/L	P406549	
		Nickel	0.50	U	ug/L	P406549	
		Selenium	0.20	U	ug/L	P406549	
		Silver	0.010	U	ug/L	P406549	
		Thallium	0.10	U	ug/L	P406549	
	SM 2340B	Hardness	4.0		mg/L	P406549	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P406466

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406549

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
Strontium	2.0	U	ug/L
Tin	3.0	U	ug/L
Titanium	0.75	U	ug/L
Vanadium	2.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406549

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
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Molybdenum	0.15	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: P406747

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406749

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P406718

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406790

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406613

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406625

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406450

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

Reference Method: SM 2120 B-2011
Batch ID: P406461

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P406619

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

Reference Method: SM 2540 C-2011
Batch ID: P406776

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P406735

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P406621

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P407035

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: P406549

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	106		P	85 - 115
Calcium	106		P	85 - 115
Iron	108		P	85 - 115
Magnesium	111		P	85 - 115
Manganese	104		P	85 - 115
Potassium	97.9		P	85 - 115
Sodium	102		P	85 - 115
Strontium	101		P	85 - 115
Tin	106		P	85 - 115
Titanium	102		P	85 - 115
Vanadium	99.7		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406549

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	104		P	85 - 115
Antimony	106		P	85 - 115
Arsenic	100		P	85 - 115
Beryllium	102		P	85 - 115
Boron	101		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	101		P	85 - 115
Cobalt	96.6		P	85 - 115
Copper	96.9		P	85 - 115
Lead	97.3		P	85 - 115
Molybdenum	102		P	85 - 115
Nickel	97.9		P	85 - 115
Selenium	98.8		P	85 - 115
Silver	98.5		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406747

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	96.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406749

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P406718

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	91.6		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406790

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406613

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406625

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406450

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

Reference Method: SM 2120 B-2011
Batch ID: P406461

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	100		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P406619

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.8		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P406621

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	101		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P407035

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.6		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406549

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290028	Barium	113		P	80 - 120
2290028	Calcium	108		P	80 - 120
2290028	Iron	110		P	80 - 120
2290028	Magnesium	113		P	80 - 120
2290028	Manganese	109		P	80 - 120
2290028	Potassium	103		P	80 - 120
2290028	Sodium	103		P	80 - 120
2290028	Strontium	102		P	80 - 120
2290028	Tin	110		P	80 - 120
2290028	Titanium	106		P	80 - 120
2290028	Vanadium	104		P	80 - 120
2290028	Zinc	107		P	80 - 120
2290216	Barium	112	117	P/P	80 - 120
2290216	Calcium	105		P	80 - 120
2290216	Iron	109	111	P/P	80 - 120
2290216	Magnesium	110	113	P/P	80 - 120
2290216	Manganese	107	112	P/P	80 - 120
2290216	Potassium	102	105	P/P	80 - 120
2290216	Sodium	102	104	P/P	80 - 120
2290216	Strontium	101	104	P/P	80 - 120
2290216	Tin	106	111	P/P	80 - 120
2290216	Titanium	105	111	P/P	80 - 120
2290216	Vanadium	104	109	P/P	80 - 120
2290216	Zinc	103	109	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406549

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290028	Aluminum	105		P	80 - 120
2290028	Antimony	110		P	80 - 120
2290028	Arsenic	101		P	80 - 120
2290028	Beryllium	105		P	80 - 120
2290028	Boron	102		P	80 - 120
2290028	Cadmium	104		P	80 - 120
2290028	Chromium	104		P	80 - 120
2290028	Cobalt	96.2		P	80 - 120
2290028	Copper	97.8		P	80 - 120
2290028	Lead	100		P	80 - 120
2290028	Molybdenum	104		P	80 - 120
2290028	Nickel	96.8		P	80 - 120
2290028	Selenium	98.8		P	80 - 120
2290028	Silver	99.6		P	80 - 120
2290028	Thallium	104		P	80 - 120
2290216	Aluminum	104	104	P/P	80 - 120
2290216	Antimony	108	111	P/P	80 - 120
2290216	Arsenic	98.1	100	P/P	80 - 120
2290216	Beryllium	105	104	P/P	80 - 120
2290216	Boron	105	104	P/P	80 - 120
2290216	Cadmium	104	103	P/P	80 - 120
2290216	Chromium	105	105	P/P	80 - 120
2290216	Cobalt	95.7	95.1	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406549

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290216	Copper	96.1	96.3	P/P	80 - 120
2290216	Lead	98.5	98.8	P/P	80 - 120
2290216	Molybdenum	105	106	P/P	80 - 120
2290216	Nickel	96.9	96.5	P/P	80 - 120
2290216	Selenium	98.4	99.2	P/P	80 - 120
2290216	Silver	98.7	100	P/P	80 - 120
2290216	Thallium	106	104	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406747

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2289864	Chloride	96.6		P	90 - 110
2290115	Chloride	95.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406749

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2289864	Sulfate	97.1		P	90 - 110
2290115	Sulfate	99.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P406718

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2289708	Ammonia-N	93.6	94.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406790

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2289930	Kjeldahl Nitrogen	107	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406613

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290010	NO2NO3-N	106	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406625

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290117	Total-P	106	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406450

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290011	O-Phosphate-P	99.3	98.4	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P406621

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2289929	Fluoride	101	101	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P407035

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290178	Organic Carbon	95.0	95.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P406466

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290009	Turbidity	4.03	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406549

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290216	Barium	4.51	Spike	P	0 - 20
2290216	Calcium	2.56	Spike	P	0 - 20
2290216	Iron	2.43	Spike	P	0 - 20
2290216	Magnesium	2.26	Spike	P	0 - 20
2290216	Manganese	4.71	Spike	P	0 - 20
2290216	Potassium	3.27	Spike	P	0 - 20
2290216	Sodium	1.20	Spike	P	0 - 20
2290216	Strontium	2.36	Spike	P	0 - 20
2290216	Tin	4.50	Spike	P	0 - 20
2290216	Titanium	5.51	Spike	P	0 - 20
2290216	Vanadium	4.73	Spike	P	0 - 20
2290216	Zinc	5.79	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406549

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290216	Aluminum	0.00430	Spike	P	0 - 20
2290216	Antimony	2.46	Spike	P	0 - 20
2290216	Arsenic	2.10	Spike	P	0 - 20
2290216	Beryllium	0.891	Spike	P	0 - 20
2290216	Boron	0.306	Spike	P	0 - 20
2290216	Cadmium	0.238	Spike	P	0 - 20
2290216	Chromium	0.161	Spike	P	0 - 20
2290216	Cobalt	0.568	Spike	P	0 - 20
2290216	Copper	0.160	Spike	P	0 - 20
2290216	Lead	0.316	Spike	P	0 - 20
2290216	Molybdenum	1.12	Spike	P	0 - 20
2290216	Nickel	0.385	Spike	P	0 - 20
2290216	Selenium	0.813	Spike	P	0 - 20
2290216	Silver	1.28	Spike	P	0 - 20
2290216	Thallium	1.32	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406747

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289864	Chloride	0.471	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406749

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289864	Sulfate	0.307	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P406718

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289708	Ammonia-N	0.350	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406790

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289930	Kjeldahl Nitrogen	0.409	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406613

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290010	NO2NO3-N	0.475	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406625

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290117	Total-P	0.140	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406450

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290011	O-Phosphate-P	0.910	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P406461

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289928	Color (true)	3.12	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P406619

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289929	Total Alkalinity	0.0923	Sample	P	0 - 5.2

Quality Assurance Report
Precision

Reference Method: SM 2540 C-2011
Batch ID: P406776

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289658	TDS	1.92	Sample	P	0 - 10

Reference Method: SM 2540 D-2011
Batch ID: P406735

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289658	TSS	7.69	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P406621

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289929	Fluoride	0.487	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P407035

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290178	Organic Carbon	0.492	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: A108949
Included Lab Sample IDs: 2290011, 2290014

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.1	98.5	P/P	90 - 110

Reference Method: SM 2120 B-2011
Run ID: A108950
Included Lab Sample IDs: 2290009, 2290012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.6	102	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A108951
Included Lab Sample IDs: 2290009, 2290012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	100	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A109021
Included Lab Sample IDs: 2290010, 2290013

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: A109022
Included Lab Sample IDs: 2290009, 2290012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	96.8	98.6	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A109022
Included Lab Sample IDs: 2290009, 2290012

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A109036
Included Lab Sample IDs: 2290028

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	103	102	P/P	90 - 110
Antimony	103	104	P/P	90 - 110
Arsenic	99.1	95.7	P/P	90 - 110
Beryllium	101	100	P/P	90 - 110
Boron	104	105	P/P	90 - 110
Cadmium	103	103	P/P	90 - 110
Chromium	103	101	P/P	90 - 110
Cobalt	92.0	91.4	P/P	90 - 110
Copper	94.3	91.9	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A109036
Included Lab Sample IDs: 2290028

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	94.7	94.9	P/P	90 - 110
Molybdenum	102	101	P/P	90 - 110
Nickel	93.6	92.1	P/P	90 - 110
Selenium	103	101	P/P	90 - 110
Silver	96.7	96.7	P/P	90 - 110
Thallium	98.1	96.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A109059
Included Lab Sample IDs: 2290010, 2290013

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	94.0	93.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A109066
Included Lab Sample IDs: 2290010, 2290013

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.0	98.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A109076
Included Lab Sample IDs: 2290028

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	110	110	P/P	90 - 110
Calcium	102	103	P/P	90 - 110
Iron	103	104	P/P	90 - 110
Magnesium	104	104	P/P	90 - 110
Manganese	105	105	P/P	90 - 110
Potassium	94.5	96.0	P/P	90 - 110
Sodium	98.1	99.7	P/P	90 - 110
Strontium	101	101	P/P	90 - 110
Tin	104	103	P/P	90 - 110
Titanium	102	101	P/P	90 - 110
Vanadium	99.1	98.6	P/P	90 - 110
Zinc	104	102	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A109104
Included Lab Sample IDs: 2290009, 2290012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	100	P/P	90 - 110
Sulfate	99.0	99.4	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A109126
Included Lab Sample IDs: 2290010, 2290013

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.9	98.2	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A109206
Included Lab Sample IDs: 2290010, 2290013

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.4	97.2	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						4.03	
EPA 200.7 Rev. 4.4	Barium	106	113	112	117			4.51
	Calcium	106	108	105				2.56
	Iron	108	110	109	111			2.43
	Magnesium	111	113	110	113			2.26
	Manganese	104	109	107	112			4.71
	Potassium	97.9	103	102	105			3.27
	Sodium	102	103	102	104			1.20
	Strontium	101	102	101	104			2.36
	Tin	106	110	106	111			4.50
	Titanium	102	106	105	111			5.51
	Vanadium	99.7	104	104	109			4.73
	Zinc	103	107	103	109			5.79
EPA 200.8 Rev. 5.4	Aluminum	104	104	104	105			0.0043
	Antimony	106	108	111	110			2.46
	Arsenic	100	98.1	100	101			2.10
	Beryllium	102	105	104	105			0.891
	Boron	101	105	104	102			0.306
	Cadmium	101	104	103	104			0.238
	Chromium	101	105	105	104			0.161
	Cobalt	96.6	95.7	95.1	96.2			0.568
	Copper	96.9	96.1	96.3	97.8			0.160
	Lead	97.3	98.5	98.8	100			0.316
	Molybdenum	102	105	106	104			1.12
	Nickel	97.9	96.9	96.5	96.8			0.385
	Selenium	98.8	98.4	99.2	98.8			0.813
	Silver	98.5	98.7	100	99.6			1.28
	Thallium	102	106	104	104			1.32
EPA 300.0 Rev. 2.1	Chloride	96.7	96.6	95.5			0.471	
	Sulfate	97.5	97.1	99.7			0.307	
EPA 350.1 Rev. 2.0	Ammonia-N	91.6	93.6	94.0				0.350
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	107	108				0.409
EPA 353.2 Rev. 2.0	NO2NO3-N	103	106	105				0.475
EPA 365.1 Rev. 2.0	Total-P	104	106	106				0.140
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	99.3	98.4				0.910
SM 2120 B-2011	Color (true)	100					3.12	
SM 2320 B-2011	Total Alkalinity	99.8					0.0923	
SM 2540 C-2011	TDS						1.92	
SM 2540 D-2011	TSS						7.69	
SM 4500 F-C-2011	Fluoride	101	101	101				0.487
SM 5310 B-2011	Organic Carbon	98.6	95.0	95.9				0.492

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2290009, 2290012
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2290028
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2290028
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2290009, 2290012
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2290009, 2290012
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2290010, 2290013

Reference Method Descriptions

Method	Description	Associated Samples
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2290010, 2290013
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2290010, 2290013
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2290010, 2290013
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2290011, 2290014
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2290009, 2290012
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2290009, 2290012
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2290028
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2290009, 2290012
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2290009, 2290012
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2290009, 2290012
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2290010, 2290013

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	11/17/2021			11/17/2021 15:13	Khloe J Berg	2290009, 2290012
EPA 200.7 Rev. 4.4	11/17/2021	11/19/2021 10:30	Emily M Philpot	11/23/2021 20:28	Josef B Mick	2290028
EPA 200.8 Rev. 5.4	11/17/2021	11/19/2021 10:30	Emily M Philpot	11/22/2021 18:30	Alexander Thompson	2290028
EPA 300.0 Rev. 2.1	11/17/2021			11/22/2021 21:51	James L Waggerby	2290009
	11/17/2021			11/22/2021 22:03	James L Waggerby	2290012
EPA 350.1 Rev. 2.0	11/17/2021			11/23/2021 14:18	Roberta Tatti	2290010
	11/17/2021			11/23/2021 14:19	Roberta Tatti	2290013
EPA 351.2 Rev. 2.0	11/17/2021	11/29/2021 13:10	Benjamin T. Nordmann	11/30/2021 12:07	Alexandra J Mattheus	2290010
	11/17/2021	11/29/2021 13:10	Benjamin T. Nordmann	11/30/2021 12:08	Alexandra J Mattheus	2290013
EPA 353.2 Rev. 2.0	11/17/2021			11/19/2021 10:30	Beverly Y. Sanders	2290010
	11/17/2021			11/19/2021 10:41	Beverly Y. Sanders	2290013
EPA 365.1 Rev. 2.0	11/17/2021	11/22/2021 17:50	Simonne.V. Calhoun	11/23/2021 16:07	Sarah A Nixon	2290010
	11/17/2021	11/22/2021 17:50	Simonne.V. Calhoun	11/23/2021 16:08	Sarah A Nixon	2290013
EPA 365.1 Rev. 2.0 dissolved	11/17/2021			11/17/2021 14:25	James L Waggerby	2290011
	11/17/2021			11/17/2021 14:29	James L Waggerby	2290014
SM 2120 B-2011	11/17/2021			11/17/2021 15:47	Benjamin T. Nordmann	2290009
	11/17/2021			11/17/2021 15:48	Benjamin T. Nordmann	2290012
SM 2320 B-2011	11/17/2021			11/18/2021 20:37	Dale L. Simmons	2290009
	11/17/2021			11/18/2021 20:46	Dale L. Simmons	2290012
SM 2340B	11/17/2021			11/23/2021 20:28	Josef B Mick	2290028
SM 2540 C-2011	11/17/2021			11/18/2021 15:56	Yijie Li	2290009, 2290012
SM 2540 D-2011	11/17/2021			11/18/2021 15:56	Yijie Li	2290009, 2290012
SM 4500 F-C-2011	11/17/2021			11/18/2021 20:37	Dale L. Simmons	2290009
	11/17/2021			11/18/2021 20:46	Dale L. Simmons	2290012
SM 5310 B-2011	11/17/2021			12/01/2021 20:14	Khloe J Berg	2290010
	11/17/2021			12/01/2021 20:26	Khloe J Berg	2290013