Chemical Analysis Report

NW-DIST-2022-01-12-02

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

Event Description: **NW Run**
Request ID: **RQ-2022-01-10-28**
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 Butler

For additional information please contact
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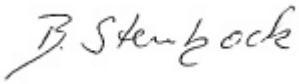
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 04-FEB-2022 15:13



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: Wiggins Branch below Highway 29 **Collection Date/Time: 01/10/2022 10:50**

Field ID: G4NW0163 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2299218	EPA 300.0 Rev. 2.1	Chloride	3.4		mg Cl/L	P409116	
		Sulfate	1.2		mg SO4/L	P409119	
	SM 2320 B-2011	Total Alkalinity	2.7		mg CaCO3/L	P408539	
	SM 2540 C-2011	TDS	24	I	mg/L	P408874	
	SM 2540 D-2011	TSS	3	I	mg/L	P408774	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P408542	
2299219	EPA 350.1 Rev. 2.0	Ammonia-N	0.041		mg N/L	P408830	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.32		mg N/L	P408617	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.027		mg N/L	P408602	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P408644	MS
	SM 5310 B-2011	Organic Carbon	5.7		mg C/L	P409298	
2299222	EPA 200.7 Rev. 4.4	Calcium	1.57		mg/L	P408532	
		Iron	890		ug/L	P408532	
		Magnesium	0.75		mg/L	P408532	
		Potassium	0.33	I	mg/L	P408532	
		Sodium	1.8	I	mg/L	P408532	
		Strontium	5.0	I	ug/L	P408532	
		Tin	3.0	U	ug/L	P408532	
		Titanium	1.1	I	ug/L	P408532	
		Vanadium	2.0	U	ug/L	P408532	
		Zinc	5.0	U	ug/L	P408532	
	EPA 200.8 Rev. 5.4	Aluminum	130		ug/L	P408532	
		Antimony	0.050	U	ug/L	P408532	
		Arsenic	0.36		ug/L	P408532	
		Barium	9.85		ug/L	P408532	
		Beryllium	0.046		ug/L	P408532	
		Boron**	9.5		ug/L	P408532	
		Cadmium	0.020	U	ug/L	P408532	
		Chromium	0.40	U	ug/L	P408532	
		Cobalt	0.334		ug/L	P408532	
		Copper	0.40	U	ug/L	P408532	
		Lead	0.20	U	ug/L	P408532	
		Manganese	26.2		ug/L	P408532	
		Molybdenum	0.15	U	ug/L	P408532	
		Nickel	0.50	U	ug/L	P408532	
		Selenium	0.20	U	ug/L	P408532	
		Silver	0.010	U	ug/L	P408710	
		Thallium	0.10	U	ug/L	P408532	
	SM 2340B	Hardness	7.0		mg/L	P408532	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for boron and manganese are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: Big Escambia Creek downstream of Fannie Rd Collection Date/Time: 01/10/2022 11:20

Field ID: G4NW0421 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2299216	EPA 300.0 Rev. 2.1	Chloride	4.3		mg Cl/L	P409116	
		Sulfate	1.0		mg SO4/L	P409119	
	SM 2320 B-2011	Total Alkalinity	3.3		mg CaCO3/L	P408539	
	SM 2540 C-2011	TDS	33		mg/L	P408874	
	SM 2540 D-2011	TSS	16		mg/L	P408774	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P408542	
2299217	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P408830	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.25		mg N/L	P408618	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.58		mg N/L	P408602	
	EPA 365.1 Rev. 2.0	Total-P	0.026		mg P/L	P408644	MS
	SM 5310 B-2011	Organic Carbon	3.1		mg C/L	P409298	
2299221	EPA 200.7 Rev. 4.4	Calcium	1.88		mg/L	P408532	
		Iron	1.41E+03		ug/L	P408532	
		Magnesium	1.07		mg/L	P408532	
		Potassium	0.68	I	mg/L	P408532	
		Sodium	2.2		mg/L	P408532	
		Strontium	14.0		ug/L	P408532	
		Tin	3.0	U	ug/L	P408532	
		Titanium	3.7		ug/L	P408532	
		Vanadium	2.0	U	ug/L	P408532	
		Zinc	5.0	U	ug/L	P408532	
	EPA 200.8 Rev. 5.4	Aluminum	379		ug/L	P408532	
		Antimony	0.050	U	ug/L	P408532	
		Arsenic	0.43		ug/L	P408532	
		Barium	33.9		ug/L	P408532	
		Beryllium	0.109		ug/L	P408532	
		Boron**	8.4		ug/L	P408532	
		Cadmium	0.020	U	ug/L	P408532	
		Chromium	0.62	I	ug/L	P408532	
		Cobalt	1.09		ug/L	P408532	
		Copper	0.43	I	ug/L	P408532	
		Lead	0.39	I	ug/L	P408532	
		Manganese	47.9		ug/L	P408532	
		Molybdenum	0.15	U	ug/L	P408532	
		Nickel	0.84	I	ug/L	P408532	
		Selenium	0.20	U	ug/L	P408532	
		Silver	0.010	U	ug/L	P408710	
		Thallium	0.10	U	ug/L	P408532	
	SM 2340B	Hardness	9.1		mg/L	P408532	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for boron and manganese are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Non-Conformance Report

NCR ID: 9217

Event(s)	Job(s)	Sample(s)	Test(s)
NW-DIST-2022-01-12-02			

NCR Type: SHIPPING/RECEIVING **NCR Category: Samples arrived late**

Observation: Samples arrived late, samples received within the acceptable temperature range.

Resolution: Samples logged in according to SMP Protocol. Samples will be qualified as appropriate. Customer contacted, email correspondence attached to sample submittal forms. Biology and Chemistry supervisors were notified by email.

Authorized by/Date: Kyle Klug 1/14/2022

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 200.7 Rev. 4.4
Batch ID: P408532

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
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: P408532

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	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
Manganese	0.10	U	ug/L
Molybdenum	0.15	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: P408710

Component	Result	Code	Units
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409116

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409119

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: P408830

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408617

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408618

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408602

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408644

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

Reference Method: SM 2320 B-2011
Batch ID: P408539

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

Reference Method: SM 2540 C-2011
Batch ID: P408874

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P408774

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P408542

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P409298

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: P408532

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	107		P	85 - 115
Iron	111		P	85 - 115
Magnesium	105		P	85 - 115
Potassium	103		P	85 - 115
Sodium	104		P	85 - 115
Strontium	103		P	85 - 115
Tin	109		P	85 - 115
Titanium	106		P	85 - 115
Vanadium	104		P	85 - 115
Zinc	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408532

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	98.6		P	85 - 115
Barium	106		P	85 - 115
Beryllium	102		P	85 - 115
Boron	97.1		P	85 - 115
Cadmium	99.3		P	85 - 115
Chromium	103		P	85 - 115
Cobalt	99.2		P	85 - 115
Copper	100		P	85 - 115
Lead	95.9		P	85 - 115
Manganese	103		P	85 - 115
Molybdenum	99.7		P	85 - 115
Nickel	101		P	85 - 115
Selenium	98.8		P	85 - 115
Thallium	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408710

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409116

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409119

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.1		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408830

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408617

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408618

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.3		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408602

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	108		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408644

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

Reference Method: SM 2320 B-2011
Batch ID: P408539

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	97.7		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P408542

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P409298

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.4		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P408532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299120	Calcium	105		P	80 - 120
2299120	Iron	109	109	P/P	80 - 120
2299120	Magnesium	103		P	80 - 120
2299120	Potassium	102		P	80 - 120
2299120	Sodium	105		P	80 - 120
2299120	Strontium	102	101	P/P	80 - 120
2299120	Tin	110	108	P/P	80 - 120
2299120	Titanium	106	105	P/P	80 - 120
2299120	Vanadium	105	104	P/P	80 - 120
2299120	Zinc	103	102	P/P	80 - 120
2299211	Iron	111		P	80 - 120
2299211	Magnesium	104		P	80 - 120
2299211	Potassium	107		P	80 - 120
2299211	Sodium	100		P	80 - 120
2299211	Strontium	102		P	80 - 120
2299211	Tin	103		P	80 - 120
2299211	Titanium	105		P	80 - 120
2299211	Vanadium	106		P	80 - 120
2299211	Zinc	103		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299120	Aluminum	99.7	99.3	P/P	80 - 120
2299120	Antimony	102	101	P/P	80 - 120
2299120	Arsenic	100	99.5	P/P	80 - 120
2299120	Barium	106	104	P/P	80 - 120
2299120	Beryllium	99.5	99.7	P/P	80 - 120
2299120	Cadmium	101	99.6	P/P	80 - 120
2299120	Chromium	106	104	P/P	80 - 120
2299120	Cobalt	100	97.7	P/P	80 - 120
2299120	Copper	101	99.3	P/P	80 - 120
2299120	Lead	96.4	95.1	P/P	80 - 120
2299120	Molybdenum	103	101	P/P	80 - 120
2299120	Nickel	103	101	P/P	80 - 120
2299120	Selenium	100	99.8	P/P	80 - 120
2299120	Thallium	106	105	P/P	80 - 120
2299211	Aluminum	97.4		P	80 - 120
2299211	Antimony	104		P	80 - 120
2299211	Arsenic	105		P	80 - 120
2299211	Barium	105		P	80 - 120
2299211	Beryllium	103		P	80 - 120
2299211	Boron	90.6		P	80 - 120
2299211	Cadmium	102		P	80 - 120
2299211	Chromium	106		P	80 - 120
2299211	Cobalt	102		P	80 - 120
2299211	Copper	101		P	80 - 120
2299211	Lead	97.6		P	80 - 120
2299211	Manganese	104		P	80 - 120
2299211	Molybdenum	104		P	80 - 120
2299211	Nickel	104		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299211	Selenium	104		P	80 - 120
2299211	Thallium	109		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408710

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299623	Silver	100	100	P/P	80 - 120
2299727	Silver	100		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409116

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299186	Chloride	103		P	90 - 110
2299260	Chloride	103		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409119

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299186	Sulfate	97.8		P	90 - 110
2299260	Sulfate	96.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408830

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299219	Ammonia-N	98.4	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408617

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2297922	Kjeldahl Nitrogen	105	108	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408618

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2298925	Kjeldahl Nitrogen	103	99.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408602

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299187	NO2NO3-N	105	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408644

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408644

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299197	Total-P	113	108	F/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P408542

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2298602	Fluoride	99.0	99.7	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P409298

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299418	Organic Carbon	92.8	92.2	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P408532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299120	Calcium	0.600	Spike	P	0 - 20
2299120	Iron	0.646	Spike	P	0 - 20
2299120	Magnesium	0.814	Spike	P	0 - 20
2299120	Potassium	1.08	Spike	P	0 - 20
2299120	Sodium	1.46	Spike	P	0 - 20
2299120	Strontium	0.546	Spike	P	0 - 20
2299120	Tin	1.71	Spike	P	0 - 20
2299120	Titanium	0.484	Spike	P	0 - 20
2299120	Vanadium	0.680	Spike	P	0 - 20
2299120	Zinc	0.772	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299120	Aluminum	0.464	Spike	P	0 - 20
2299120	Antimony	1.82	Spike	P	0 - 20
2299120	Arsenic	0.521	Spike	P	0 - 20
2299120	Barium	1.43	Spike	P	0 - 20
2299120	Beryllium	0.190	Spike	P	0 - 20
2299120	Boron	0.359	Spike	P	0 - 20
2299120	Cadmium	1.26	Spike	P	0 - 20
2299120	Chromium	1.94	Spike	P	0 - 20
2299120	Cobalt	2.34	Spike	P	0 - 20
2299120	Copper	1.89	Spike	P	0 - 20
2299120	Lead	1.36	Spike	P	0 - 20
2299120	Manganese	1.15	Spike	P	0 - 20
2299120	Molybdenum	1.60	Spike	P	0 - 20
2299120	Nickel	2.16	Spike	P	0 - 20
2299120	Selenium	0.552	Spike	P	0 - 20
2299120	Thallium	0.812	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408710

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299623	Silver	0.312	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409116

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299186	Chloride	1.12	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409119

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299186	Sulfate	1.66	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408830

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299219	Ammonia-N	0.444	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408617

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2297922	Kjeldahl Nitrogen	1.81	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408618

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2298925	Kjeldahl Nitrogen	2.60	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408602

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299187	NO2NO3-N	0.388	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408644

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299197	Total-P	3.33	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P408539

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2298602	Total Alkalinity	1.59	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P408874

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299336	TDS	4.37	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-2011
Batch ID: P408542

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2298602	Fluoride	0.531	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P409298

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299418	Organic Carbon	0.388	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-2011
Run ID: A109873
Included Lab Sample IDs: 2299216, 2299218

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	98.1	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A109873
Included Lab Sample IDs: 2299216, 2299218

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A109898
Included Lab Sample IDs: 2299221, 2299222

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	99.9	P/P	90 - 110
Antimony	102	101	P/P	90 - 110
Arsenic	101	99.8	P/P	90 - 110
Barium	102	102	P/P	90 - 110
Beryllium	99.8	100	P/P	90 - 110
Boron	97.3	96.6	P/P	90 - 110
Cadmium	100	100	P/P	90 - 110
Chromium	101	101	P/P	90 - 110
Cobalt	97.6	96.6	P/P	90 - 110
Copper	100	99.3	P/P	90 - 110
Lead	93.8	92.6	P/P	90 - 110
Manganese	103	102	P/P	90 - 110
Molybdenum	99.1	99.1	P/P	90 - 110
Nickel	100	99.4	P/P	90 - 110
Selenium	102	101	P/P	90 - 110
Thallium	104	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A109906
Included Lab Sample IDs: 2299217, 2299219

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	108	108	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A109916
Included Lab Sample IDs: 2299221, 2299222

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	103	104	P/P	90 - 110
Iron	105	105	P/P	90 - 110
Magnesium	103	103	P/P	90 - 110
Potassium	100	101	P/P	90 - 110
Sodium	102	103	P/P	90 - 110
Strontium	99.9	102	P/P	90 - 110
Tin	102	103	P/P	90 - 110
Titanium	99.4	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A109916
Included Lab Sample IDs: 2299221, 2299222

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Vanadium	99.1	100	P/P	90 - 110
Zinc	101	99.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A109942
Included Lab Sample IDs: 2299217, 2299219

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	97.1	P/P	90 - 110
Kjeldahl Nitrogen	102	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A109953
Included Lab Sample IDs: 2299221, 2299222

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	99.7	98.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A109957
Included Lab Sample IDs: 2299217, 2299219

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A110040
Included Lab Sample IDs: 2299216, 2299218

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	103	103	P/P	90 - 110
Sulfate	99.7	98.9	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A110168
Included Lab Sample IDs: 2299217, 2299219

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.7	95.4	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 200.7 Rev. 4.4	Calcium	107	105					0.600
	Iron	111	109	109	111			0.646
	Magnesium	105	103	104				0.814
	Potassium	103	102	107				1.08
	Sodium	104	105	100				1.46
	Strontium	103	102	101	102			0.546
	Tin	109	110	108	103			1.71
	Titanium	106	106	105	105			0.484
	Vanadium	104	105	104	106			0.680
	Zinc	105	103	102	103			0.772
EPA 200.8 Rev. 5.4	Aluminum	103	99.7	99.3	97.4			0.464
	Antimony	101	102	101	104			1.82
	Arsenic	98.6	100	99.5	105			0.521
	Barium	106	106	104	105			1.43
	Beryllium	102	99.5	99.7	103			0.190
	Boron	97.1	90.6					0.359
	Cadmium	99.3	101	99.6	102			1.26
	Chromium	103	106	104	106			1.94
	Cobalt	99.2	100	97.7	102			2.34
	Copper	100	101	99.3	101			1.89
	Lead	95.9	96.4	95.1	97.6			1.36
	Manganese	103	104					1.15
	Molybdenum	99.7	103	101	104			1.60
	Nickel	101	103	101	104			2.16
	Selenium	98.8	100	99.8	104			0.552
	Silver	102	100	100	100			0.312
	Thallium	105	106	105	109			0.812
EPA 300.0 Rev. 2.1	Chloride	102	103	103			1.12	
	Sulfate	98.1	97.8	96.6			1.66	
EPA 350.1 Rev. 2.0	Ammonia-N	98.6	98.4	99.2				0.444
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.4	105	108				1.81
	Kjeldahl Nitrogen	98.3	103	99.2				2.60
EPA 353.2 Rev. 2.0	NO2NO3-N	108	105	105				0.388
EPA 365.1 Rev. 2.0	Total-P	110	113	108				3.33
SM 2320 B-2011	Total Alkalinity	97.7					1.59	
SM 2540 C-2011	TDS						4.37	
SM 4500 F-C-2011	Fluoride	100	99.0	99.7				0.531
SM 5310 B-2011	Organic Carbon	96.4	92.8	92.2				0.388

Reference Method Descriptions

Method	Description	Associated Samples
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2299221, 2299222
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2299221, 2299222
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2299216, 2299218
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2299216, 2299218
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2299217, 2299219
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2299217, 2299219
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2299217, 2299219
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2299217, 2299219
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2299216, 2299218

Reference Method Descriptions

Method	Description	Associated Samples
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2299221, 2299222
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2299216, 2299218
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2299216, 2299218
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2299216, 2299218
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2299217, 2299219

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 200.7 Rev. 4.4	01/12/2022	01/14/2022 11:00	Vijayalakshmi Reddy	01/18/2022 20:43	Josef B Mick	2299221
	01/12/2022	01/14/2022 11:00	Vijayalakshmi Reddy	01/18/2022 20:48	Josef B Mick	2299222
EPA 200.8 Rev. 5.4	01/12/2022	01/14/2022 11:00	Vijayalakshmi Reddy	01/14/2022 18:53	Alexander Thompson	2299221
	01/12/2022	01/14/2022 11:00	Vijayalakshmi Reddy	01/14/2022 19:03	Alexander Thompson	2299222
	01/12/2022	01/20/2022 09:53	Emily M Philpot	01/20/2022 19:18	McKinley C Carter	2299221
	01/12/2022	01/20/2022 09:53	Emily M Philpot	01/20/2022 19:28	McKinley C Carter	2299222
EPA 300.0 Rev. 2.1	01/12/2022			01/27/2022 22:35	Roberta Tatti	2299216
	01/12/2022			01/27/2022 22:47	Roberta Tatti	2299218
EPA 350.1 Rev. 2.0	01/12/2022			01/21/2022 12:03	Ping Hua	2299219
	01/12/2022			01/21/2022 12:15	Ping Hua	2299217
EPA 351.2 Rev. 2.0	01/12/2022	01/19/2022 11:18	Samantha L Bates	01/20/2022 10:22	Alexandra J Mattheus	2299219
	01/12/2022	01/19/2022 11:18	Samantha L Bates	01/20/2022 10:48	Alexandra J Mattheus	2299217
EPA 353.2 Rev. 2.0	01/12/2022			01/18/2022 10:52	Beverly Y. Sanders	2299217
	01/12/2022			01/18/2022 10:53	Beverly Y. Sanders	2299219
EPA 365.1 Rev. 2.0	01/12/2022	01/19/2022 16:00	Simonne.V. Calhoun	01/20/2022 15:08	Shengyu Ding	2299217
	01/12/2022	01/19/2022 16:00	Simonne.V. Calhoun	01/20/2022 15:09	Shengyu Ding	2299219
SM 2320 B-2011	01/12/2022			01/14/2022 07:02	Dale L. Simmons	2299216
	01/12/2022			01/14/2022 07:11	Dale L. Simmons	2299218
SM 2340B	01/12/2022			01/18/2022 20:43	Josef B Mick	2299221
	01/12/2022			01/18/2022 20:48	Josef B Mick	2299222
SM 2540 C-2011	01/12/2022			01/13/2022 14:02	Yijie Li	2299216, 2299218
SM 2540 D-2011	01/12/2022			01/13/2022 14:02	Yijie Li	2299216, 2299218
SM 4500 F-C-2011	01/12/2022			01/14/2022 07:02	Dale L. Simmons	2299216
	01/12/2022			01/14/2022 07:11	Dale L. Simmons	2299218
SM 5310 B-2011	01/12/2022			01/31/2022 22:33	Nathaniel J Jones	2299217
	01/12/2022			01/31/2022 22:42	Nathaniel J Jones	2299219