Chemical Analysis Report

NW-DIST-2021-11-09-01

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

Event Description: **Escambia River Run**
Request ID: **RQ-2021-11-08-21**
Customer: **NW-DIST**
Project ID: **SMP**

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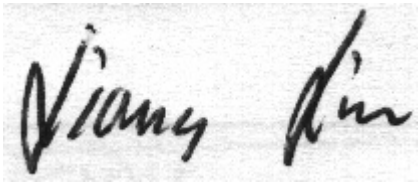
Date Certified: 30-NOV-2021 15:14



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: Escambia River upstream of Mitchell Creek **Collection Date/Time: 11/08/2021 11:25**

Field ID: G4NW0404 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2288956	EPA 180.1 Rev. 2.0	Turbidity	9.4		NTU	P406210	
	EPA 300.0 Rev. 2.1	Chloride	6.0		mg Cl/L	P406347	
		Sulfate	9.4		mg SO4/L	P406350	
	SM 2120 B-2011	Color (true)	50		PCU	P406206	
	SM 2320 B-2011	Total Alkalinity	32		mg CaCO3/L	P406439	
	SM 2540 C-2011	TDS	77		mg/L	P406559	
	SM 2540 D-2011	TSS	8	I	mg/L	P406565	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P406441	
2288958	EPA 350.1 Rev. 2.0	Ammonia-N	0.080		mg N/L	P406592	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.28		mg N/L	P406628	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.34		mg N/L	P406300	
	EPA 365.1 Rev. 2.0	Total-P	0.038		mg P/L	P406315	MS
	SM 5310 B-2011	Organic Carbon	3.7		mg C/L	P406623	
2288960	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.016		mg P/L	P406202	
2288964	EPA 200.7 Rev. 4.4	Barium	26.7		ug/L	P406216	
		Calcium	11.7		mg/L	P406216	
		Iron	940		ug/L	P406216	
		Magnesium	1.33		mg/L	P406216	
		Manganese	54.6		ug/L	P406216	
		Potassium	1.0	I	mg/L	P406216	
		Sodium	7.7		mg/L	P406216	
		Strontium	36.7		ug/L	P406216	
		Tin	3.0	U	ug/L	P406216	
		Titanium	1.2	I	ug/L	P406216	
		Vanadium	2.0	U	ug/L	P406216	
		Zinc	5.0	U	ug/L	P406216	
	EPA 200.8 Rev. 5.4	Aluminum	83		ug/L	P406216	
		Antimony	0.050	U	ug/L	P406216	
		Arsenic	0.47		ug/L	P406216	
		Beryllium	0.044		ug/L	P406216	
		Boron**	11.3		ug/L	P406216	
		Cadmium	0.020	U	ug/L	P406216	
		Chromium	0.40	U	ug/L	P406216	
		Cobalt	0.439		ug/L	P406216	
		Copper	0.40	U	ug/L	P406216	
		Lead	0.20	U	ug/L	P406216	
		Molybdenum	0.15	U	ug/L	P406216	
		Nickel	0.53	I	ug/L	P406549	
		Selenium	0.20	U	ug/L	P406216	
		Silver	0.010	U	ug/L	P406216	
		Thallium	0.10	U	ug/L	P406216	
	SM 2340B	Hardness	34.7		mg/L	P406216	

Field ID: G4NW0404 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes

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

Sample Location: Escambia River downstream of Cotton Lake **Collection Date/Time: 11/08/2021 12:20**

Field ID: G4NW0403 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2288957	EPA 180.1 Rev. 2.0	Turbidity	10	A	NTU	P406210	
	EPA 300.0 Rev. 2.1	Chloride	5.8		mg Cl/L	P406347	
		Sulfate	9.4		mg SO4/L	P406350	
	SM 2120 B-2011	Color (true)	52		PCU	P406206	
	SM 2320 B-2011	Total Alkalinity	31		mg CaCO3/L	P406439	
	SM 2540 C-2011	TDS	73		mg/L	P406559	
	SM 2540 D-2011	TSS	8	I A	mg/L	P406565	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P406441	
2288959	EPA 350.1 Rev. 2.0	Ammonia-N	0.067		mg N/L	P406592	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.28		mg N/L	P406628	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.33		mg N/L	P406300	
	EPA 365.1 Rev. 2.0	Total-P	0.038		mg P/L	P406315	MS
	SM 5310 B-2011	Organic Carbon	3.7		mg C/L	P406623	
2288961	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.017		mg P/L	P406202	
2288965	EPA 200.7 Rev. 4.4	Barium	27.5		ug/L	P406216	
		Calcium	11.9		mg/L	P406216	
		Iron	920		ug/L	P406216	
		Magnesium	1.35		mg/L	P406216	
		Manganese	52.8		ug/L	P406216	
		Potassium	1.1	I	mg/L	P406216	
		Sodium	7.7		mg/L	P406216	
		Strontium	37.7		ug/L	P406216	
		Tin	3.0	U	ug/L	P406216	
		Titanium	1.2	I	ug/L	P406216	
		Vanadium	2.0	U	ug/L	P406216	
		Zinc	5.0	U	ug/L	P406216	
	EPA 200.8 Rev. 5.4	Aluminum	81		ug/L	P406216	
		Antimony	0.050	U	ug/L	P406216	
		Arsenic	0.44		ug/L	P406216	
		Beryllium	0.049		ug/L	P406216	
		Boron**	11.1		ug/L	P406216	
		Cadmium	0.020	U	ug/L	P406216	
		Chromium	0.40	U	ug/L	P406216	
		Cobalt	0.386		ug/L	P406216	
		Copper	0.40	U	ug/L	P406216	
		Lead	0.21	I	ug/L	P406216	
		Molybdenum	0.15	U	ug/L	P406216	
		Nickel	0.53	I	ug/L	P406549	
		Selenium	0.20	U	ug/L	P406216	
		Silver	0.010	U	ug/L	P406216	
		Thallium	0.10	U	ug/L	P406216	
	SM 2340B	Hardness	35.2		mg/L	P406216	

Field ID: G4NW0403 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for molybdenum are unavailable for one of two spiked samples 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: P406210

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406216

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: P406216

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
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

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

Component	Result	Code	Units
Nickel	0.50	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406347

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: P406350

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P406592

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406628

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406300

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406315

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406202

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

Reference Method: SM 2120 B-2011
Batch ID: P406206

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P406439

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

Reference Method: SM 2540 C-2011
Batch ID: P406559

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-2011
Batch ID: P406565

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P406441

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P406623

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: P406216

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	105		P	85 - 115
Calcium	104		P	85 - 115
Iron	106		P	85 - 115
Magnesium	109		P	85 - 115
Manganese	105		P	85 - 115
Potassium	99.2		P	85 - 115
Sodium	101		P	85 - 115
Strontium	102		P	85 - 115
Tin	104		P	85 - 115
Titanium	105		P	85 - 115
Vanadium	103		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406216

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	110		P	80 - 120
Antimony	115		P	80 - 120
Arsenic	104		P	80 - 120
Beryllium	109		P	80 - 120
Boron	105		P	80 - 120
Cadmium	107		P	80 - 120
Chromium	108		P	80 - 120
Cobalt	110		P	80 - 120
Copper	104		P	80 - 120
Lead	105		P	80 - 120
Molybdenum	106		P	85 - 115
Selenium	108		P	80 - 120
Silver	107		P	80 - 120
Thallium	107		P	80 - 120

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

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Nickel	97.9		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406347

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406350

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P406592

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	92.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406628

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406300

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: P406315

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: P406202

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.9		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P406206

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.7		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P406439

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P406441

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.4		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P406623

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.6		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406216

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2288155	Barium	106	106	P/P	80 - 120
2288155	Calcium	103	102	P/P	80 - 120
2288155	Iron	106	105	P/P	80 - 120
2288155	Magnesium	108	108	P/P	80 - 120
2288155	Manganese	105	105	P/P	80 - 120
2288155	Potassium	99.4	98.9	P/P	80 - 120
2288155	Sodium	103		P	80 - 120
2288155	Strontium	103	102	P/P	80 - 120
2288155	Tin	103	105	P/P	80 - 120
2288155	Titanium	106	106	P/P	80 - 120
2288155	Vanadium	104	104	P/P	80 - 120
2288155	Zinc	104	104	P/P	80 - 120
2288360	Barium	105		P	80 - 120
2288360	Calcium	101		P	80 - 120
2288360	Iron	107		P	80 - 120
2288360	Magnesium	108		P	80 - 120
2288360	Manganese	106		P	80 - 120
2288360	Potassium	99.2		P	80 - 120
2288360	Sodium	100		P	80 - 120
2288360	Strontium	102		P	80 - 120
2288360	Tin	109		P	80 - 120
2288360	Titanium	107		P	80 - 120
2288360	Vanadium	104		P	80 - 120
2288360	Zinc	106		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406216

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2288155	Aluminum	111	112	P/P	80 - 120
2288155	Antimony	115	117	P/P	80 - 120
2288155	Arsenic	102	102	P/P	80 - 120
2288155	Beryllium	104	102	P/P	80 - 120
2288155	Boron	106	106	P/P	80 - 120
2288155	Cadmium	108	107	P/P	80 - 120
2288155	Chromium	112	106	P/P	80 - 120
2288155	Cobalt	107	107	P/P	80 - 120
2288155	Copper	102	102	P/P	80 - 120
2288155	Lead	105	105	P/P	80 - 120
2288155	Molybdenum	107	106	P/P	80 - 120
2288155	Selenium	87.0	87.4	P/P	80 - 120
2288155	Silver	105	105	P/P	80 - 120
2288155	Thallium	106	108	P/P	80 - 120
2288360	Aluminum	114		P	80 - 120
2288360	Antimony	112		P	80 - 120
2288360	Arsenic	102		P	80 - 120
2288360	Beryllium	105		P	80 - 120
2288360	Boron	103		P	80 - 120
2288360	Cadmium	109		P	80 - 120
2288360	Chromium	108		P	80 - 120
2288360	Cobalt	108		P	80 - 120
2288360	Copper	103		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406216

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2288360	Lead	105		P	80 - 120
2288360	Selenium	108		P	80 - 120
2288360	Silver	104		P	80 - 120
2288360	Thallium	106		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	Nickel	96.8		P	80 - 120
2290216	Nickel	96.9	96.5	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406347

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2288840	Chloride	101		P	90 - 110
2288950	Chloride	98.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406350

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2288840	Sulfate	101		P	90 - 110
2288950	Sulfate	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P406592

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2288903	Ammonia-N	94.2	95.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406628

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2288850	Kjeldahl Nitrogen	104	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406300

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2288958	NO2NO3-N	95.8	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406315

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2288951	Total-P	108	111	P/F	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406202

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2288960	O-Phosphate-P	98.3	97.0	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P406441

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2289025	Fluoride	105	104	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P406623

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2289012	Organic Carbon	97.6	97.7	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P406210

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288957	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406216

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288155	Barium	0.164	Spike	P	0 - 20
2288155	Calcium	1.00	Spike	P	0 - 20
2288155	Iron	0.540	Spike	P	0 - 20
2288155	Magnesium	0.617	Spike	P	0 - 20
2288155	Manganese	0.266	Spike	P	0 - 20
2288155	Potassium	0.444	Spike	P	0 - 20
2288155	Sodium	0.586	Spike	P	0 - 20
2288155	Strontium	0.698	Spike	P	0 - 20
2288155	Tin	1.89	Spike	P	0 - 20
2288155	Titanium	0.159	Spike	P	0 - 20
2288155	Vanadium	0.395	Spike	P	0 - 20
2288155	Zinc	0.274	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406216

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288155	Aluminum	0.869	Spike	P	0 - 20
2288155	Antimony	1.06	Spike	P	0 - 20
2288155	Arsenic	0.287	Spike	P	0 - 20
2288155	Beryllium	1.72	Spike	P	0 - 20
2288155	Boron	0.198	Spike	P	0 - 20
2288155	Cadmium	1.29	Spike	P	0 - 20
2288155	Chromium	5.19	Spike	P	0 - 20
2288155	Cobalt	0.0742	Spike	P	0 - 20
2288155	Copper	0.377	Spike	P	0 - 20
2288155	Lead	0.0904	Spike	P	0 - 20
2288155	Molybdenum	0.940	Spike	P	0 - 20
2288155	Selenium	0.455	Spike	P	0 - 20
2288155	Silver	0.206	Spike	P	0 - 20
2288155	Thallium	2.36	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	Nickel	0.385	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406347

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288840	Chloride	0.134	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P406350

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288840	Sulfate	1.49	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P406592

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288903	Ammonia-N	0.726	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406628

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288850	Kjeldahl Nitrogen	1.27	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406300

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288958	NO2NO3-N	0.187	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406315

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288951	Total-P	2.52	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406202

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288960	O-Phosphate-P	1.14	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P406206

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288841	Color (true)	1.66	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-2011
Batch ID: P406439

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289025	Total Alkalinity	3.07	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P406559

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2288354	TDS	5.08	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P406441

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289025	Fluoride	0.542	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P406623

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289012	Organic Carbon	0.116	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: A108806
Included Lab Sample IDs: 2288960, 2288961

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.4	100	P/P	90 - 110
O-Phosphate-P	98.9	98.4	P/P	90 - 110

Reference Method: SM 2120 B-2011
Run ID: A108807
Included Lab Sample IDs: 2288956, 2288957

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.8	101	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A108808
Included Lab Sample IDs: 2288956, 2288957

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A108873
Included Lab Sample IDs: 2288958, 2288959

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A108907
Included Lab Sample IDs: 2288956, 2288957

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.5	101	P/P	90 - 110
Sulfate	101	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A108908
Included Lab Sample IDs: 2288964, 2288965

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	105	105	P/P	90 - 110
Calcium	98.5	98.2	P/P	90 - 110
Iron	101	100	P/P	90 - 110
Magnesium	100	100	P/P	90 - 110
Manganese	105	105	P/P	90 - 110
Potassium	96.2	96.0	P/P	90 - 110
Sodium	100	100	P/P	90 - 110
Strontium	103	103	P/P	90 - 110
Tin	102	101	P/P	90 - 110
Titanium	100	101	P/P	90 - 110
Vanadium	101	101	P/P	90 - 110
Zinc	98.8	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A108934
Included Lab Sample IDs: 2288964, 2288965

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	107	109	P/P	90 - 110
Arsenic	98.5	97.5	P/P	90 - 110
Boron	102	103	P/P	90 - 110
Cadmium	104	105	P/P	90 - 110
Chromium	101	103	P/P	90 - 110
Cobalt	99.9	101	P/P	90 - 110
Copper	95.2	95.8	P/P	90 - 110
Lead	97.8	97.4	P/P	90 - 110
Selenium	105	107	P/P	90 - 110
Silver	94.4	93.8	P/P	90 - 110
Thallium	98.5	97.3	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A108946
Included Lab Sample IDs: 2288956, 2288957

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.4	99.6	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A108946
Included Lab Sample IDs: 2288956, 2288957

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	102	99.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A108985
Included Lab Sample IDs: 2288964, 2288965

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	101	101	P/P	90 - 110
Antimony	101	101	P/P	90 - 110
Beryllium	100	96.9	P/P	90 - 110
Beryllium	96.9	96.4	P/P	90 - 110
Molybdenum	101	101	P/P	90 - 110
Molybdenum	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A108996
Included Lab Sample IDs: 2288958, 2288959

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.5	97.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A109005
Included Lab Sample IDs: 2288958, 2288959

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.1	97.8	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 5310 B-2011
Run ID: A109023
Included Lab Sample IDs: 2288958, 2288959

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.0	97.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A109036
Included Lab Sample IDs: 2288964, 2288965

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	93.6	92.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A109055
Included Lab Sample IDs: 2288958, 2288959

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.6	107	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						0.0	
EPA 200.7 Rev. 4.4	Barium	105	106	106	105			0.164
	Calcium	104	103	102	101			1.00
	Iron	106	106	105	107			0.540
	Magnesium	109	108	108	108			0.617
	Manganese	105	105	105	106			0.266
	Potassium	99.2	99.4	98.9	99.2			0.444
	Sodium	101	103	100				0.586
	Strontium	102	103	102	102			0.698
	Tin	104	103	105	109			1.89
	Titanium	105	106	106	107			0.159
	Vanadium	103	104	104	104			0.395
	Zinc	102	104	104	106			0.274
EPA 200.8 Rev. 5.4	Aluminum	110	111	112	114			0.869
	Antimony	115	112	115	117			1.06
	Arsenic	104	102	102	102			0.287
	Beryllium	109	104	102	105			1.72
	Boron	105	106	106	103			0.198
	Cadmium	107	108	107	109			1.29
	Chromium	108	112	106	108			5.19
	Cobalt	110	107	107	108			0.0742
	Copper	104	102	102	103			0.377
	Lead	105	105	105	105			0.0904
	Molybdenum	106	107	106				0.940
	Nickel	97.9	96.9	96.5	96.8			0.385
	Selenium	108	87.0	87.4	108			0.455
	Silver	107	105	105	104			0.206
	Thallium	107	106	108	106			2.36
EPA 300.0 Rev. 2.1	Chloride	98.6	101	98.6			0.134	
	Sulfate	99.9	101	103			1.49	
EPA 350.1 Rev. 2.0	Ammonia-N	92.6	94.2	95.0				0.726
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	104	102				1.27
EPA 353.2 Rev. 2.0	NO2NO3-N	101	97.5	95.8				0.187
EPA 365.1 Rev. 2.0	Total-P	104	108	111				2.52
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.9	98.3	97.0				1.14
SM 2120 B-2011	Color (true)	99.7					1.66	
SM 2320 B-2011	Total Alkalinity	100					3.07	
SM 2540 C-2011	TDS						5.08	
SM 4500 F-C-2011	Fluoride	98.4	105	104				0.542
SM 5310 B-2011	Organic Carbon	96.6	97.6	97.7				0.116

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2288956, 2288957
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2288964, 2288965
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2288964, 2288965
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2288956, 2288957
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2288956, 2288957
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2288958, 2288959
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2288958, 2288959

Reference Method Descriptions

Method	Description	Associated Samples
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2288958, 2288959
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2288958, 2288959
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2288960, 2288961
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2288956, 2288957
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2288956, 2288957
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2288964, 2288965
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2288956, 2288957
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2288956, 2288957
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2288956, 2288957
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2288958, 2288959

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	11/09/2021			11/09/2021 16:05	Khloe J Berg	2288956, 2288957
EPA 200.7 Rev. 4.4	11/09/2021	11/10/2021 10:45	Emily M Philpot	11/15/2021 22:31	Josef B Mick	2288964
	11/09/2021	11/10/2021 10:45	Emily M Philpot	11/15/2021 22:39	Josef B Mick	2288965
EPA 200.8 Rev. 5.4	11/09/2021	11/10/2021 10:45	Emily M Philpot	11/16/2021 18:57	McKinley C Carter	2288964
	11/09/2021	11/10/2021 10:45	Emily M Philpot	11/16/2021 19:06	McKinley C Carter	2288965
	11/09/2021	11/10/2021 10:45	Emily M Philpot	11/18/2021 16:59	Alexander Thompson	2288964
	11/09/2021	11/10/2021 10:45	Emily M Philpot	11/18/2021 17:55	Alexander Thompson	2288965
	11/09/2021	11/19/2021 10:30	Emily M Philpot	11/22/2021 17:52	Alexander Thompson	2288964
	11/09/2021	11/19/2021 10:30	Emily M Philpot	11/22/2021 18:01	Alexander Thompson	2288965
EPA 300.0 Rev. 2.1	11/09/2021			11/13/2021 01:30	James L Waggerby	2288956
	11/09/2021			11/13/2021 01:43	James L Waggerby	2288957
EPA 350.1 Rev. 2.0	11/09/2021			11/19/2021 14:08	Ping Hua	2288958
	11/09/2021			11/19/2021 14:10	Ping Hua	2288959
EPA 351.2 Rev. 2.0	11/09/2021	11/22/2021 12:12	Benjamin T. Nordmann	11/23/2021 13:04	Alexandra J Mattheus	2288958
	11/09/2021	11/22/2021 12:12	Benjamin T. Nordmann	11/23/2021 13:05	Alexandra J Mattheus	2288959
EPA 353.2 Rev. 2.0	11/09/2021			11/12/2021 10:01	Beverly Y. Sanders	2288958
	11/09/2021			11/12/2021 10:15	Beverly Y. Sanders	2288959
EPA 365.1 Rev. 2.0	11/09/2021	11/16/2021 19:16	Simonne.V. Calhoun	11/17/2021 16:50	Sarah A Nixon	2288958
	11/09/2021	11/16/2021 19:16	Simonne.V. Calhoun	11/17/2021 16:51	Sarah A Nixon	2288959
EPA 365.1 Rev. 2.0 dissolved	11/09/2021			11/09/2021 14:47	James L Waggerby	2288960
	11/09/2021			11/09/2021 14:59	James L Waggerby	2288961
SM 2120 B-2011	11/09/2021			11/09/2021 16:22	Benjamin T. Nordmann	2288956
	11/09/2021			11/09/2021 16:23	Benjamin T. Nordmann	2288957
SM 2320 B-2011	11/09/2021			11/16/2021 17:32	Dale L. Simmons	2288956
	11/09/2021			11/16/2021 17:44	Dale L. Simmons	2288957
SM 2340B	11/09/2021			11/15/2021 22:31	Josef B Mick	2288964
	11/09/2021			11/15/2021 22:39	Josef B Mick	2288965
SM 2540 C-2011	11/09/2021			11/10/2021 13:21	Yijie Li	2288956, 2288957
SM 2540 D-2011	11/09/2021			11/10/2021 13:21	Yijie Li	2288956, 2288957
SM 4500 F-C-2011	11/09/2021			11/16/2021 17:32	Dale L. Simmons	2288956
	11/09/2021			11/16/2021 17:44	Dale L. Simmons	2288957
SM 5310 B-2011	11/09/2021			11/19/2021 17:30	Khloe J Berg	2288958
	11/09/2021			11/19/2021 18:09	Khloe J Berg	2288959