Chemical Analysis Report

NW-DIST-2022-05-20-01

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-2022-05-16-30**
Customer: **NW-DIST**
Project ID: **SMP**

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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: 05/19/2022 11:05**

Field ID: G4NW0404 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2328824	DEP SOP: NU-094-1	Color (true)**	14		PCU	P414186	
	EPA 180.1 Rev. 2.0	Turbidity	16		NTU	P414189	
	EPA 300.0 Rev. 2.1	Chloride	5.0		mg Cl/L	P414529	
		Sulfate	10		mg SO4/L	P414533	
	SM 2320 B-2011	Total Alkalinity	33		mg CaCO3/L	P414537	
	SM 2540 C-2011	TDS	74		mg/L	P414655	
	SM 2540 D-2011	TSS	14		mg/L	P414658	
	SM 4500-F- C-2011	Fluoride	0.035	U	mg F/L	P415141	
2328826	EPA 350.1 Rev. 2.0	Ammonia-N	0.035		mg N/L	P414652	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.30		mg N/L	P414561	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.40		mg N/L	P414438	
	EPA 365.1 Rev. 2.0	Total-P	0.050		mg P/L	P414405	
	SM 5310 B-2011	Organic Carbon	3.4		mg C/L	P414515	
2328834	EPA 200.7 Rev. 4.4	Calcium	13.5		mg/L	P414208	
		Iron	1.15E+03		ug/L	P414208	
		Magnesium	1.39		mg/L	P414208	
		Potassium	1.1	I	mg/L	P414208	
		Sodium	8.9		mg/L	P414208	
		Strontium	44.8		ug/L	P414208	
		Tin	3.0	U	ug/L	P414208	
		Titanium	1.3	I	ug/L	P414208	
		Vanadium	2.0	U	ug/L	P414208	
		Zinc	5.0	U	ug/L	P414208	
	EPA 200.8 Rev. 5.4	Aluminum	120		ug/L	P414208	
		Antimony	0.050	U	ug/L	P414208	
		Arsenic	0.63		ug/L	P414208	
		Barium	27.1		ug/L	P414208	
		Beryllium	0.058		ug/L	P414208	
		Boron**	11.8		ug/L	P414208	
		Cadmium	0.020	U	ug/L	P414208	
		Chromium	0.40	U	ug/L	P414208	
		Cobalt	0.586		ug/L	P414208	
		Copper	0.40	U	ug/L	P414208	
		Lead	0.39	I	ug/L	P414208	
		Manganese	68.2		ug/L	P414208	
		Molybdenum	0.15	U	ug/L	P414208	
		Nickel	0.66	I	ug/L	P414208	
		Selenium	0.20	U	ug/L	P414208	
		Silver	0.010	U	ug/L	P414208	
		Thallium	0.10	U	ug/L	P414208	
	SM 2340 B-2011	Hardness	39.5		mg/L	P414208	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Escambia River downstream of Cotton Lake **Collection Date/Time: 05/19/2022 10:10**

Field ID: G4NW0403 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2328825	DEP SOP: NU-094-1	Color (true)**	13	A	PCU	P414186	
	EPA 180.1 Rev. 2.0	Turbidity	16		NTU	P414189	
	EPA 300.0 Rev. 2.1	Chloride	4.9	A	mg Cl/L	P414529	
		Sulfate	9.4	A	mg SO4/L	P414533	
	SM 2320 B-2011	Total Alkalinity	37		mg CaCO3/L	P414537	
	SM 2540 C-2011	TDS	69		mg/L	P414655	
	SM 2540 D-2011	TSS	17		mg/L	P414658	
	SM 4500-F- C-2011	Fluoride	0.035	U	mg F/L	P415141	
2328827	EPA 350.1 Rev. 2.0	Ammonia-N	0.022		mg N/L	P414590	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.32		mg N/L	P414559	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.37		mg N/L	P414437	
	EPA 365.1 Rev. 2.0	Total-P	0.048		mg P/L	P414405	
	SM 5310 B-2011	Organic Carbon	3.3		mg C/L	P414506	
2328835	EPA 200.7 Rev. 4.4	Calcium	14.5		mg/L	P414208	
		Iron	1.19E+03		ug/L	P414208	
		Magnesium	1.43		mg/L	P414208	
		Potassium	1.0	I	mg/L	P414208	
		Sodium	8.1		mg/L	P414208	
		Strontium	44.6		ug/L	P414208	
		Tin	3.0	U	ug/L	P414208	
		Titanium	1.3	I	ug/L	P414208	
		Vanadium	2.0	U	ug/L	P414208	
		Zinc	5.0	U	ug/L	P414208	
	EPA 200.8 Rev. 5.4	Aluminum	126		ug/L	P414208	
		Antimony	0.050	U	ug/L	P414208	
		Arsenic	0.66		ug/L	P414208	
		Barium	27.4		ug/L	P414208	
		Beryllium	0.054		ug/L	P414208	
		Boron**	11.3		ug/L	P414208	
		Cadmium	0.020	U	ug/L	P414208	
		Chromium	0.40	U	ug/L	P414208	
		Cobalt	0.600		ug/L	P414208	
		Copper	0.40	U	ug/L	P414208	
		Lead	0.39	I	ug/L	P414208	
		Manganese	73.6		ug/L	P414208	
		Molybdenum	0.15	U	ug/L	P414208	
		Nickel	0.65	I	ug/L	P414208	
		Selenium	0.20	U	ug/L	P414208	
		Silver	0.010	U	ug/L	P414208	
		Thallium	0.10	U	ug/L	P414208	
	SM 2340 B-2011	Hardness	42.1		mg/L	P414208	

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

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P414186

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P414189

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P414208

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: P414208

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P414529

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: P414533

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414590

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414652

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P414559

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P414561

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414437

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414438

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414405

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

Reference Method: SM 2320 B-2011
Batch ID: P414537

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 C-2011
Batch ID: P414655

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P414658

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P415141

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P414506

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Reference Method: SM 5310 B-2011
Batch ID: P414515

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: DEP SOP: NU-094-1
Batch ID: P414186

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.2		P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P414189

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	96.8		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P414208

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	108		P	85 - 115
Iron	104		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	103		P	85 - 115
Sodium	104		P	85 - 115
Strontium	101		P	85 - 115
Tin	103		P	85 - 115
Titanium	103		P	85 - 115
Vanadium	97.0		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P414208

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.8		P	85 - 115
Antimony	97.1		P	85 - 115
Arsenic	96.8		P	85 - 115
Barium	101		P	85 - 115
Beryllium	92.6		P	85 - 115
Boron	101		P	85 - 115
Cadmium	94.3		P	85 - 115
Chromium	94.6		P	85 - 115
Cobalt	100		P	85 - 115
Copper	93.5		P	85 - 115
Lead	97.9		P	85 - 115
Manganese	96.5		P	85 - 115
Molybdenum	96.6		P	85 - 115
Nickel	95.7		P	85 - 115
Selenium	95.8		P	85 - 115
Silver	101		P	85 - 115
Thallium	95.9		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P414529

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P414533

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414590

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414652

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P414559

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.7		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P414561

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414437

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414438

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414405

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

Reference Method: SM 2320 B-2011
Batch ID: P414537

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	95.9		P	94 - 106

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500-F- C-2011
Batch ID: P415141

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.2		P	96 - 104

Reference Method: SM 5310 B-2011
Batch ID: P414506

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.2		P	85 - 115

Reference Method: SM 5310 B-2011
Batch ID: P414515

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P414208

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328449	Calcium	110	111	P/P	80 - 120
2328449	Iron	105	107	P/P	80 - 120
2328449	Magnesium	106	107	P/P	80 - 120
2328449	Potassium	108	109	P/P	80 - 120
2328449	Sodium	108	109	P/P	80 - 120
2328449	Strontium	102	103	P/P	80 - 120
2328449	Tin	104	102	P/P	80 - 120
2328449	Titanium	103	102	P/P	80 - 120
2328449	Vanadium	97.2	96.4	P/P	80 - 120
2328449	Zinc	103	102	P/P	80 - 120
2328450	Calcium	106		P	80 - 120
2328450	Iron	105		P	80 - 120
2328450	Magnesium	105		P	80 - 120
2328450	Potassium	104		P	80 - 120
2328450	Sodium	106		P	80 - 120
2328450	Strontium	101		P	80 - 120
2328450	Tin	103		P	80 - 120
2328450	Titanium	103		P	80 - 120
2328450	Vanadium	98.1		P	80 - 120
2328450	Zinc	102		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P414208

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328449	Aluminum	110	106	P/P	80 - 120
2328449	Antimony	97.7	95.3	P/P	80 - 120
2328449	Arsenic	99.7	97.1	P/P	80 - 120
2328449	Barium	102	100	P/P	80 - 120
2328449	Beryllium	92.7	90.0	P/P	80 - 120
2328449	Boron	104	101	P/P	80 - 120
2328449	Cadmium	98.2	94.9	P/P	80 - 120
2328449	Chromium	99.6	96.8	P/P	80 - 120
2328449	Cobalt	101	98.7	P/P	80 - 120
2328449	Copper	95.7	93.6	P/P	80 - 120
2328449	Lead	101	98.9	P/P	80 - 120
2328449	Manganese	99.7	96.3	P/P	80 - 120
2328449	Molybdenum	99.7	96.9	P/P	80 - 120
2328449	Nickel	97.8	94.8	P/P	80 - 120
2328449	Selenium	96.7	96.0	P/P	80 - 120
2328449	Silver	104	102	P/P	80 - 120
2328449	Thallium	100	98.7	P/P	80 - 120
2328450	Aluminum	99.5		P	80 - 120
2328450	Antimony	98.5		P	80 - 120
2328450	Arsenic	97.1		P	80 - 120
2328450	Barium	100		P	80 - 120
2328450	Beryllium	97.0		P	80 - 120
2328450	Boron	106		P	80 - 120
2328450	Cadmium	96.9		P	80 - 120
2328450	Chromium	99.0		P	80 - 120
2328450	Cobalt	100		P	80 - 120
2328450	Copper	91.2		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P414208

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328450	Lead	99.1		P	80 - 120
2328450	Manganese	102		P	80 - 120
2328450	Molybdenum	100		P	80 - 120
2328450	Nickel	94.9		P	80 - 120
2328450	Selenium	94.1		P	80 - 120
2328450	Silver	104		P	80 - 120
2328450	Thallium	100		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P414529

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328825	Chloride	94.7		P	90 - 110
2329252	Chloride	96.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P414533

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328825	Sulfate	97.3		P	90 - 110
2329252	Sulfate	98.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414590

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328163	Ammonia-N	92.8	97.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414652

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328651	Ammonia-N	95.8	96.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P414559

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328400	Kjeldahl Nitrogen	104	99.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414437

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328707	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414438

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328826	NO2NO3-N	96.0	96.5	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414405

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328767	Total-P	97.2	101	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P415141

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328785	Fluoride	98.8	99.4	P/P	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P414506

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328839	Organic Carbon	95.9	95.9	P/P	85 - 115

Reference Method: SM 5310 B-2011
Batch ID: P414515

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2328666	Organic Carbon	96.8	95.5	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P414186

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328825	Color (true)	4.21	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P414189

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328736	Turbidity	2.65	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P414208

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328449	Calcium	0.197	Spike	P	0 - 20
2328449	Iron	1.31	Spike	P	0 - 20
2328449	Magnesium	0.774	Spike	P	0 - 20
2328449	Potassium	0.664	Spike	P	0 - 20
2328449	Sodium	0.944	Spike	P	0 - 20
2328449	Strontium	1.13	Spike	P	0 - 20
2328449	Tin	1.95	Spike	P	0 - 20
2328449	Titanium	0.816	Spike	P	0 - 20
2328449	Vanadium	0.795	Spike	P	0 - 20
2328449	Zinc	1.32	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P414208

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328449	Aluminum	3.36	Spike	P	0 - 20
2328449	Antimony	2.42	Spike	P	0 - 20
2328449	Arsenic	2.61	Spike	P	0 - 20
2328449	Barium	1.85	Spike	P	0 - 20
2328449	Beryllium	2.82	Spike	P	0 - 20
2328449	Boron	3.39	Spike	P	0 - 20
2328449	Cadmium	3.44	Spike	P	0 - 20
2328449	Chromium	2.90	Spike	P	0 - 20
2328449	Cobalt	2.67	Spike	P	0 - 20
2328449	Copper	2.23	Spike	P	0 - 20
2328449	Lead	2.57	Spike	P	0 - 20
2328449	Manganese	2.97	Spike	P	0 - 20
2328449	Molybdenum	2.78	Spike	P	0 - 20
2328449	Nickel	3.11	Spike	P	0 - 20
2328449	Selenium	0.777	Spike	P	0 - 20
2328449	Silver	2.30	Spike	P	0 - 20
2328449	Thallium	1.48	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P414529

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328825	Chloride	0.202	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P414533

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328825	Sulfate	0.776	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414590

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328163	Ammonia-N	3.97	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414652

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328651	Ammonia-N	0.568	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P414559

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328400	Kjeldahl Nitrogen	4.35	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P414561

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328842	Kjeldahl Nitrogen	0.945	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414437

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328707	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414438

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328826	NO2NO3-N	0.256	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414405

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328767	Total-P	1.89	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P414537

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328785	Total Alkalinity	2.07	Sample	P	0 - 3.8

Reference Method: SM 2540 C-2011
Batch ID: P414655

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328739	TDS	2.41	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P415141

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328785	Fluoride	0.495	Spike	P	0 - 1.6

Reference Method: SM 5310 B-2011
Batch ID: P414506

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328839	Organic Carbon	0.0439	Spike	P	0 - 20

Reference Method: SM 5310 B-2011
Batch ID: P414515

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2328666	Organic Carbon	0.917	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: DEP SOP: NU-094-1
Run ID: A112300
Included Lab Sample IDs: 2328824, 2328825

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.3	99.0	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A112301
Included Lab Sample IDs: 2328824, 2328825

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A112350
Included Lab Sample IDs: 2328834, 2328835

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.3	99.2	P/P	90 - 110
Antimony	96.3	97.6	P/P	90 - 110
Arsenic	99.0	97.4	P/P	90 - 110
Barium	97.5	96.7	P/P	90 - 110
Boron	99.3	102	P/P	90 - 110
Cadmium	96.6	98.2	P/P	90 - 110
Chromium	97.6	99.4	P/P	90 - 110
Cobalt	100	99.8	P/P	90 - 110
Copper	94.1	93.5	P/P	90 - 110
Lead	98.2	98.9	P/P	90 - 110
Manganese	97.5	97.8	P/P	90 - 110
Molybdenum	97.1	97.7	P/P	90 - 110
Nickel	95.8	95.6	P/P	90 - 110
Selenium	99.4	97.7	P/P	90 - 110
Silver	104	105	P/P	90 - 110
Thallium	96.5	97.4	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A112361
Included Lab Sample IDs: 2328824, 2328825

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.7	99.0	P/P	90 - 110
Sulfate	101	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A112379
Included Lab Sample IDs: 2328834, 2328835

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Beryllium	95.8	95.3	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A112406
Included Lab Sample IDs: 2328835

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A112406
Included Lab Sample IDs: 2328835

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	106	106	P/P	90 - 110
Iron	103	104	P/P	90 - 110
Magnesium	103	104	P/P	90 - 110
Potassium	103	104	P/P	90 - 110
Sodium	105	106	P/P	90 - 110
Strontium	103	103	P/P	90 - 110
Tin	102	100	P/P	90 - 110
Titanium	101	103	P/P	90 - 110
Vanadium	103	103	P/P	90 - 110
Zinc	104	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A112432
Included Lab Sample IDs: 2328826, 2328827

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A112455
Included Lab Sample IDs: 2328834

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	102	P/P	95 - 105
Iron	102	102	P/P	95 - 105
Magnesium	102	101	P/P	95 - 105
Potassium	102	102	P/P	95 - 105
Sodium	103	103	P/P	95 - 105
Strontium	102	103	P/P	95 - 105
Tin	102	103	P/P	95 - 105
Titanium	99.9	99.7	P/P	95 - 105
Vanadium	101	102	P/P	95 - 105
Zinc	101	101	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A112465
Included Lab Sample IDs: 2328826

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.4	98.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A112467
Included Lab Sample IDs: 2328827

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 5310 B-2011
Run ID: A112482
Included Lab Sample IDs: 2328827

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.6	97.4	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A112488
Included Lab Sample IDs: 2328826

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.0	96.5	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A112501
Included Lab Sample IDs: 2328824, 2328825

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	91.2	94.1	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A112546
Included Lab Sample IDs: 2328827

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A112570
Included Lab Sample IDs: 2328826

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.6	98.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A112613
Included Lab Sample IDs: 2328826, 2328827

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	97.9	P/P	90 - 110
Kjeldahl Nitrogen	99.7	100	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A112796
Included Lab Sample IDs: 2328824, 2328825

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	96.5	97.6	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
DEP SOP: NU-094-1	Color (true)	97.2					4.21	
EPA 180.1 Rev. 2.0	Turbidity	96.8					2.65	
EPA 200.7 Rev. 4.4	Calcium	108	110	111	106			0.197
	Iron	104	105	107	105			1.31
	Magnesium	104	106	107	105			0.774
	Potassium	103	108	109	104			0.664
	Sodium	104	108	109	106			0.944
	Strontium	101	102	103	101			1.13
	Tin	103	104	102	103			1.95
	Titanium	103	103	102	103			0.816
	Vanadium	97.0	97.2	96.4	98.1			0.795
	Zinc	102	103	102	102			1.32
EPA 200.8 Rev. 5.4	Aluminum	98.8	110	106	99.5			3.36
	Antimony	97.1	97.7	95.3	98.5			2.42
	Arsenic	96.8	99.7	97.1	97.1			2.61
	Barium	101	102	100	100			1.85
	Beryllium	92.6	92.7	90.0	97.0			2.82
	Boron	101	104	101	106			3.39
	Cadmium	94.3	98.2	94.9	96.9			3.44
	Chromium	94.6	99.6	96.8	99.0			2.90
	Cobalt	100	101	98.7	100			2.67
	Copper	93.5	95.7	93.6	91.2			2.23
	Lead	97.9	101	98.9	99.1			2.57
	Manganese	96.5	99.7	96.3	102			2.97
	Molybdenum	96.6	99.7	96.9	100			2.78
	Nickel	95.7	97.8	94.8	94.9			3.11
	Selenium	95.8	96.7	96.0	94.1			0.777
	Silver	101	104	102	104			2.30
	Thallium	95.9	100	98.7	100			1.48
EPA 300.0 Rev. 2.1	Chloride	98.1	94.7	96.8			0.202	
	Sulfate	99.7	97.3	98.0			0.776	
EPA 350.1 Rev. 2.0	Ammonia-N	96.0	92.8	97.0				3.97
	Ammonia-N	97.0	95.8	96.4				0.568
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.7	104	99.1				4.35
	Kjeldahl Nitrogen	102						0.945
EPA 353.2 Rev. 2.0	NO2NO3-N	101	101	101				0.0
	NO2NO3-N	100	96.0	96.5				0.256
EPA 365.1 Rev. 2.0	Total-P	97.8	97.2	101				1.89
SM 2320 B-2011	Total Alkalinity	95.9					2.07	
SM 2540 C-2011	TDS						2.41	
SM 4500-F- C-2011	Fluoride	96.2	98.8	99.4				0.495
SM 5310 B-2011	Organic Carbon	95.2	95.9	95.9				0.0439
	Organic Carbon	95.4	96.8	95.5				0.917

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2328824, 2328825
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2328824, 2328825
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2328834, 2328835
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2328834, 2328835

Reference Method Descriptions

Method	Description	Associated Samples
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2328824, 2328825
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2328824, 2328825
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2328826, 2328827
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2328826, 2328827
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2328826, 2328827
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2328826, 2328827
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2328824, 2328825
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2328834, 2328835
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2328824, 2328825
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2328824, 2328825
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2328824, 2328825
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2328826, 2328827

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP: NU-094-1	05/20/2022			05/20/2022 16:11	Anna M. Plaviak	2328824
	05/20/2022			05/20/2022 16:12	Anna M. Plaviak	2328825
EPA 180.1 Rev. 2.0	05/20/2022			05/20/2022 15:54	Sarah A Nixon	2328824
	05/20/2022			05/20/2022 15:57	Sarah A Nixon	2328825
EPA 200.7 Rev. 4.4	05/20/2022	05/23/2022 10:00	Megan Whitefoot	05/25/2022 19:13	McKinley C Carter	2328835
	05/20/2022	05/23/2022 10:00	Megan Whitefoot	05/26/2022 17:29	Josef B Mick	2328834
EPA 200.8 Rev. 5.4	05/20/2022	05/23/2022 10:00	Megan Whitefoot	05/23/2022 19:58	Emily M Philpot	2328834
	05/20/2022	05/23/2022 10:00	Megan Whitefoot	05/23/2022 20:07	Emily M Philpot	2328835
	05/20/2022	05/23/2022 10:00	Megan Whitefoot	05/24/2022 13:40	Alexander Thompson	2328834
	05/20/2022	05/23/2022 10:00	Megan Whitefoot	05/24/2022 13:46	Alexander Thompson	2328835
EPA 300.0 Rev. 2.1	05/20/2022			05/27/2022 18:56	Anna M. Plaviak	2328825
	05/20/2022			05/27/2022 19:44	Anna M. Plaviak	2328824
EPA 350.1 Rev. 2.0	05/20/2022			06/01/2022 12:44	Ping Hua	2328827
	05/20/2022			06/02/2022 13:25	Ping Hua	2328826
EPA 351.2 Rev. 2.0	05/20/2022	06/02/2022 15:43	Samantha L Bates	06/03/2022 12:56	Alexandra J Mattheus	2328827
	05/20/2022	06/02/2022 15:43	Samantha L Bates	06/03/2022 13:51	Alexandra J Mattheus	2328826
EPA 353.2 Rev. 2.0	05/20/2022			05/26/2022 11:36	Beverly Y. Sanders	2328827
	05/20/2022			05/26/2022 11:45	Beverly Y. Sanders	2328826
EPA 365.1 Rev. 2.0	05/20/2022	05/26/2022 15:35	Simonne.V. Calhoun	05/27/2022 13:40	Sarah A Nixon	2328826
	05/20/2022	05/26/2022 15:35	Simonne.V. Calhoun	05/27/2022 14:58	James L Waggerby	2328827
SM 2320 B-2011	05/20/2022			05/27/2022 02:38	Dale L. Simmons	2328824
	05/20/2022			05/27/2022 02:49	Dale L. Simmons	2328825
SM 2340 B-2011	05/20/2022			05/25/2022 19:13	McKinley C Carter	2328835
	05/20/2022			05/26/2022 17:29	Josef B Mick	2328834
SM 2540 C-2011	05/20/2022			05/25/2022 15:29	Yijie Li	2328824, 2328825
SM 2540 D-2011	05/20/2022			05/25/2022 15:29	Yijie Li	2328824, 2328825
SM 4500-F- C-2011	05/20/2022			06/14/2022 05:04	Dale L. Simmons	2328824
	05/20/2022			06/14/2022 05:09	Dale L. Simmons	2328825
SM 5310 B-2011	05/20/2022			05/27/2022 00:52	Khloe J Berg	2328827
	05/20/2022			05/28/2022 04:00	Khloe J Berg	2328826