

Chemical Analysis Report

NW-DIST-2022-11-18-02

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Escambia River Run**
Request ID: **RQ-2022-11-14-31**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
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Certified by: Colin Wright, Program Administrator

Date Certified: 08-DEC-2022 11:01

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light pink rectangular background.

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Escambia River downstream of Cotton Lake

Collection Date/Time: 11/17/2022 09:25

Field ID: G4NW0403

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2370971	DEP SOP: NU-094-1	Color (true)	35		PCU	P422591	
	EPA 180.1 Rev. 2.0	Turbidity	7.2		NTU	P422602	
	EPA 300.0 Rev. 2.1	Chloride	8.5		mg Cl/L	P423087	
		Sulfate	13		mg SO4/L	P423089	
	SM 2320 B-2011	Total Alkalinity	32		mg CaCO3/L	P422891	
	SM 2540 C-2015	TDS	78		mg/L	P423109	
	SM 2540 D-2015	TSS	9	I	mg/L	P422926	
	SM 4500-F- C-2011	Fluoride	0.033	I	mg F/L	P422895	
2370973	EPA 350.1 Rev. 2.0	Ammonia-N	0.11		mg N/L	P423181	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.34		mg N/L	P423020	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.46		mg N/L	P422802	
	EPA 365.1 Rev. 2.0	Total-P	0.052		mg P/L	P422691	
	SM 5310 B-2011	Organic Carbon	3.8		mg C/L	P422887	
2370981	EPA 200.7 Rev. 4.4	Calcium	10.9		mg/L	P422595	
		Iron	830		ug/L	P422595	
		Magnesium	1.43		mg/L	P422595	
		Potassium	1.2	I	mg/L	P422595	
		Sodium	12.0		mg/L	P422595	
		Strontium	38.6		ug/L	P422595	
		Tin	3.0	U	ug/L	P422595	
		Titanium	2.0	I	ug/L	P422595	
		Vanadium	2.0	U	ug/L	P422595	
		Zinc	5.0	U	ug/L	P422595	
	EPA 200.8 Rev. 5.4	Aluminum	197		ug/L	P422595	
		Antimony	0.050	U	ug/L	P422595	
		Arsenic	0.43		ug/L	P422595	
		Barium	27.8		ug/L	P422595	
		Beryllium	0.050		ug/L	P422595	
		Boron	11.8		ug/L	P422595	
		Cadmium	0.020	U	ug/L	P422595	
		Chromium	0.55	I	ug/L	P422595	
		Cobalt	0.384		ug/L	P422595	
		Copper	0.40	U	ug/L	P422595	
		Lead	0.20	I	ug/L	P422595	
		Manganese	39.9		ug/L	P422595	
		Molybdenum	0.15	U	ug/L	P422595	
		Nickel	0.54	I	ug/L	P422595	
		Selenium	0.20	U	ug/L	P422595	
		Silver	0.010	U	ug/L	P422595	
		Thallium	0.10	U	ug/L	P422595	
		Hardness	33.2		mg/L	P422595	

Ref. Method and Comment:

SM 2540 D-2015: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Escambia River upstream of Mitchell Creek

Collection Date/Time: 11/17/2022 10:10

Field ID: G4NW0404

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2370972	DEP SOP: NU-094-1	Color (true)	37	A	PCU	P422592	
	EPA 180.1 Rev. 2.0	Turbidity	6.5		NTU	P422602	
	EPA 300.0 Rev. 2.1	Chloride	8.2		mg Cl/L	P423087	
		Sulfate	13		mg SO4/L	P423089	
	SM 2320 B-2011	Total Alkalinity	30		mg CaCO3/L	P422891	
	SM 2540 C-2015	TDS	77		mg/L	P423110	
	SM 2540 D-2015	TSS	8	I	mg/L	P422927	
	SM 4500-F- C-2011	Fluoride	0.032	I	mg F/L	P422895	
2370974	EPA 350.1 Rev. 2.0	Ammonia-N	0.12		mg N/L	P423181	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.35		mg N/L	P423020	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.37		mg N/L	P422802	
	EPA 365.1 Rev. 2.0	Total-P	0.066		mg P/L	P422691	
	SM 5310 B-2011	Organic Carbon	3.7		mg C/L	P422887	
2370982	EPA 200.7 Rev. 4.4	Calcium	11.0		mg/L	P422595	
		Iron	920		ug/L	P422595	
		Magnesium	1.45		mg/L	P422595	
		Potassium	1.2		mg/L	P422595	
		Sodium	12.7		mg/L	P422595	
		Strontium	39.0		ug/L	P422595	
		Tin	3.0	U	ug/L	P422595	
		Titanium	1.7	I	ug/L	P422595	
	EPA 200.8 Rev. 5.4	Vanadium	2.0	U	ug/L	P422595	
		Zinc	5.0	U	ug/L	P422595	
		Aluminum	183		ug/L	P422595	
		Antimony	0.050	U	ug/L	P422595	
		Arsenic	0.46		ug/L	P422595	
		Barium	26.7		ug/L	P422595	
		Beryllium	0.048		ug/L	P422595	
		Boron	11.2		ug/L	P422595	
		Cadmium	0.020	U	ug/L	P422595	
		Chromium	0.58	I	ug/L	P422595	
		Cobalt	0.402		ug/L	P422595	
		Copper	0.40	U	ug/L	P422595	
		Lead	0.20	U	ug/L	P422595	
		Manganese	42.7		ug/L	P422595	
		Molybdenum	0.15	U	ug/L	P422595	
		Nickel	0.57	I	ug/L	P422595	
		Selenium	0.20	U	ug/L	P422595	
		Silver	0.010	U	ug/L	P422595	
		Thallium	0.10	U	ug/L	P422595	
	SM 2340 B-2011	Hardness	33.5		mg/L	P422595	

Ref. Method and Comment:

SM 2540 D-2015: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: FB

Collection Date/Time: 11/17/2022 10:20

Field ID: FB_11172022

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2370975	DEP SOP: NU-094-1	Color (true)	2.5	U	PCU	P422591	
	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P422602	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P423087	
		Sulfate	0.20	U	mg SO4/L	P423089	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P422891	
	SM 2540 C-2015	TDS	15	U	mg/L	P423109	
	SM 2540 D-2015	TSS	2	U	mg/L	P422926	
2370976	SM 4500-F- C-2011	Fluoride	0.025	U	mg F/L	P422895	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P423181	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P423020	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P422802	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P422691	
2370983	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P422887	
	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P422595	
		Iron	30	U	ug/L	P422595	
		Magnesium	0.040	U	mg/L	P422595	
		Potassium	0.30	U	mg/L	P422595	
		Sodium	0.50	U	mg/L	P422595	
		Strontium	2.0	U	ug/L	P422595	
		Tin	3.0	U	ug/L	P422595	
		Titanium	0.75	U	ug/L	P422595	
		Vanadium	2.0	U	ug/L	P422595	
		Zinc	5.0	U	ug/L	P422595	
		Aluminum	5.0	U	ug/L	P422595	
		Antimony	0.050	U	ug/L	P422595	
		Arsenic	0.050	U	ug/L	P422595	
		Barium	0.20	U	ug/L	P422595	
		Beryllium	0.010	U	ug/L	P422595	
		Boron	2.0	U	ug/L	P422595	
		Cadmium	0.020	U	ug/L	P422595	
		Chromium	0.40	U	ug/L	P422595	
		Cobalt	0.020	U	ug/L	P422595	
		Copper	0.40	U	ug/L	P422595	
		Lead	0.20	U	ug/L	P422595	
		Manganese	0.10	U	ug/L	P422595	
		Molybdenum	0.15	U	ug/L	P422595	
		Nickel	0.50	U	ug/L	P422595	
		Selenium	0.20	U	ug/L	P422595	
		Silver	0.010	U	ug/L	P422595	
		Thallium	0.10	U	ug/L	P422595	
	SM 2340 B-2011	Hardness	0.35	U	mg/L	P422595	

Ref. Method and Comment:

SM 2540 D-2015: 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: P422591

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: DEP SOP: NU-094-1
Batch ID: P422592

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P422602

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P422595

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: P422595

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423087

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423089

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P423181

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423020

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P422802

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P422691

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

Reference Method: SM 2320 B-2011
Batch ID: P422891

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

Reference Method: SM 2540 C-2015
Batch ID: P423109

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-2015
Batch ID: P423110

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-2015
Batch ID: P422926

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-2015
Batch ID: P422927

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P422895

Component	Result	Code	Units
Fluoride	0.025	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P422887

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: P422591

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	101		P	90 - 110

Reference Method: DEP SOP: NU-094-1
Batch ID: P422592

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.8		P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P422602

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P422595

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	109		P	85 - 115
Magnesium	110		P	85 - 115
Potassium	106		P	85 - 115
Sodium	103		P	85 - 115
Strontium	111		P	85 - 115
Tin	108		P	85 - 115
Titanium	107		P	85 - 115
Vanadium	106		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P422595

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.9		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	103		P	85 - 115
Barium	106		P	85 - 115
Beryllium	99.0		P	85 - 115
Boron	99.2		P	85 - 115
Cadmium	98.8		P	85 - 115
Chromium	101		P	85 - 115
Cobalt	100		P	85 - 115
Copper	102		P	85 - 115
Lead	93.7		P	85 - 115
Manganese	102		P	85 - 115
Molybdenum	98.3		P	85 - 115
Nickel	101		P	85 - 115
Selenium	101		P	85 - 115
Silver	98.7		P	85 - 115
Thallium	98.6		P	85 - 115

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423087

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423089

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P423181

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423020

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P422802

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P422691

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

Reference Method: SM 2320 B-2011
Batch ID: P422891

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	97.5		P	94 - 106

Reference Method: SM 2540 C-2015
Batch ID: P423109

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TDS	97.7		P	90 - 110

Reference Method: SM 2540 C-2015
Batch ID: P423110

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 2540 D-2015
Batch ID: P422926

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TSS	93.6		P	85 - 106

Reference Method: SM 2540 D-2015
Batch ID: P422927

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TSS	98.1		P	85 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P422895

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	102		P	96 - 104

Reference Method: SM 5310 B-2011
Batch ID: P422887

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.1		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P422595

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370981	Calcium	107		P	80 - 120
2370981	Iron	103	109	P/P	80 - 120
2370981	Magnesium	103	109	P/P	80 - 120
2370981	Potassium	99.0	105	P/P	80 - 120
2370981	Sodium	105		P	80 - 120
2370981	Strontium	104	108	P/P	80 - 120
2370981	Tin	107	106	P/P	80 - 120
2370981	Titanium	104	105	P/P	80 - 120
2370981	Vanadium	106	107	P/P	80 - 120
2370981	Zinc	103	104	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P422595

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370981	Aluminum	103	104	P/P	80 - 120
2370981	Antimony	102	102	P/P	80 - 120
2370981	Arsenic	102	103	P/P	80 - 120
2370981	Barium	105	106	P/P	80 - 120
2370981	Beryllium	99.6	95.9	P/P	80 - 120
2370981	Boron	105	105	P/P	80 - 120
2370981	Cadmium	101	101	P/P	80 - 120
2370981	Chromium	101	101	P/P	80 - 120
2370981	Cobalt	100	99.9	P/P	80 - 120
2370981	Copper	102	102	P/P	80 - 120
2370981	Lead	94.8	95.0	P/P	80 - 120
2370981	Manganese	105	104	P/P	80 - 120
2370981	Molybdenum	100	101	P/P	80 - 120
2370981	Nickel	99.8	102	P/P	80 - 120
2370981	Selenium	101	101	P/P	80 - 120
2370981	Silver	98.9	98.9	P/P	80 - 120
2370981	Thallium	101	103	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P423087

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2371156	Chloride	101		P	90 - 110
2371157	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P423089

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2371156	Sulfate	97.2		P	90 - 110
2371157	Sulfate	96.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P423181

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2369475	Ammonia-N	98.0	98.0	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423020

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370945	Kjeldahl Nitrogen	99.6	99.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P422802

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370945	NO2NO3-N	96.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P422691

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370992	Total-P	109	106	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P422895

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370883	Fluoride	101	101	P/P	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P422887

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370974	Organic Carbon	96.2	96.4	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P422591

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370944	Color (true)	6.02	Sample	P	0 - 20

Reference Method: DEP SOP: NU-094-1
Batch ID: P422592

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370972	Color (true)	0.819	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P422602

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370920	Turbidity	5.70	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P422595

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370981	Calcium	2.75	Spike	P	0 - 20
2370981	Iron	4.68	Spike	P	0 - 20
2370981	Magnesium	4.56	Spike	P	0 - 20
2370981	Potassium	4.67	Spike	P	0 - 20
2370981	Sodium	2.74	Spike	P	0 - 20
2370981	Strontium	3.70	Spike	P	0 - 20
2370981	Tin	1.16	Spike	P	0 - 20
2370981	Titanium	0.896	Spike	P	0 - 20
2370981	Vanadium	1.07	Spike	P	0 - 20
2370981	Zinc	1.25	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P422595

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370981	Aluminum	0.0935	Spike	P	0 - 20
2370981	Antimony	0.575	Spike	P	0 - 20
2370981	Arsenic	0.678	Spike	P	0 - 20
2370981	Barium	0.875	Spike	P	0 - 20
2370981	Beryllium	3.31	Spike	P	0 - 20
2370981	Boron	0.159	Spike	P	0 - 20
2370981	Cadmium	0.911	Spike	P	0 - 20
2370981	Chromium	0.201	Spike	P	0 - 20
2370981	Cobalt	0.208	Spike	P	0 - 20
2370981	Copper	0.130	Spike	P	0 - 20
2370981	Lead	0.262	Spike	P	0 - 20
2370981	Manganese	0.415	Spike	P	0 - 20
2370981	Molybdenum	1.08	Spike	P	0 - 20
2370981	Nickel	1.82	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P422595

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370981	Selenium	0.132	Spike	P	0 - 20
2370981	Silver	0.0395	Spike	P	0 - 20
2370981	Thallium	1.56	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423087

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2371156	Chloride	0.296	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423089

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2371156	Sulfate	0.332	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P423181

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2369475	Ammonia-N	0.0	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423020

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370945	Kjeldahl Nitrogen	0.160	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P422802

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370945	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P422691

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370992	Total-P	2.69	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P422891

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
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Quality Assurance Report Precision

Reference Method: SM 2320 B-2011
Batch ID: P422891

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370883	Total Alkalinity	0.595	Sample	P	0 - 3.8

Reference Method: SM 2540 C-2015
Batch ID: P423109

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370586	TDS	1.97	Sample	P	0 - 10

Reference Method: SM 2540 C-2015
Batch ID: P423110

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370855	TDS	3.09	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P422895

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370883	Fluoride	0.0	Spike	P	0 - 1.6

Reference Method: SM 5310 B-2011
Batch ID: P422887

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370974	Organic Carbon	0.218	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: A116036

Included Lab Sample IDs: 2370971, 2370972, 2370975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	100	P/P	90 - 110
Color (true)	102	101	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A116038

Included Lab Sample IDs: 2370971, 2370972, 2370975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	100	P/P	95 - 105
Turbidity	99.5	100	P/P	95 - 105

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A116084

Included Lab Sample IDs: 2370981, 2370982, 2370983

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	96.7	98.3	P/P	90 - 110
Aluminum	97.2	96.7	P/P	90 - 110
Antimony	96.6	97.6	P/P	90 - 110
Antimony	98.2	96.6	P/P	90 - 110
Arsenic	101	99.8	P/P	90 - 110
Arsenic	99.8	99.5	P/P	90 - 110
Barium	101	102	P/P	90 - 110
Barium	103	101	P/P	90 - 110
Beryllium	101	100	P/P	90 - 110
Beryllium	103	101	P/P	90 - 110
Boron	95.6	99.3	P/P	90 - 110
Boron	99.3	98.7	P/P	90 - 110
Cadmium	100	98.1	P/P	90 - 110
Cadmium	98.1	100	P/P	90 - 110
Chromium	100	98.0	P/P	90 - 110
Chromium	98.0	99.9	P/P	90 - 110
Cobalt	97.5	97.7	P/P	90 - 110
Cobalt	99.9	97.5	P/P	90 - 110
Copper	101	98.4	P/P	90 - 110
Copper	98.4	98.5	P/P	90 - 110
Lead	92.7	93.6	P/P	90 - 110
Lead	93.6	92.7	P/P	90 - 110
Manganese	101	99.0	P/P	90 - 110
Manganese	99.0	100	P/P	90 - 110
Molybdenum	96.5	97.3	P/P	90 - 110
Molybdenum	97.6	96.5	P/P	90 - 110
Nickel	101	98.3	P/P	90 - 110
Nickel	98.3	98.4	P/P	90 - 110
Selenium	100	99.5	P/P	90 - 110
Selenium	99.5	100	P/P	90 - 110
Silver	95.9	96.6	P/P	90 - 110
Silver	96.9	95.9	P/P	90 - 110
Thallium	97.9	99.5	P/P	90 - 110
Thallium	99.3	97.9	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A116111

Included Lab Sample IDs: 2370973, 2370974

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A116114

Included Lab Sample IDs: 2370976

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A116148

Included Lab Sample IDs: 2370973, 2370974, 2370976

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	103	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A116179

Included Lab Sample IDs: 2370973, 2370974, 2370976

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.0	99.0	P/P	90 - 110
Organic Carbon	99.0	98.4	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A116180

Included Lab Sample IDs: 2370971, 2370972, 2370975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	96.9	95.5	P/P	90 - 110

Reference Method: SM 4500-F- C-2011

Run ID: A116180

Included Lab Sample IDs: 2370971, 2370972, 2370975

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A116199

Included Lab Sample IDs: 2370981, 2370982, 2370983

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	104	106	P/P	90 - 110
Calcium	110	104	P/P	90 - 110
Iron	105	105	P/P	90 - 110
Iron	108	105	P/P	90 - 110
Magnesium	105	105	P/P	90 - 110
Magnesium	108	105	P/P	90 - 110
Potassium	103	103	P/P	90 - 110
Potassium	105	103	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A116199

Included Lab Sample IDs: 2370981, 2370982, 2370983

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sodium	103	105	P/P	90 - 110
Sodium	108	103	P/P	90 - 110
Strontium	105	109	P/P	90 - 110
Strontium	109	103	P/P	90 - 110
Tin	104	106	P/P	90 - 110
Tin	106	102	P/P	90 - 110
Titanium	103	105	P/P	90 - 110
Titanium	105	101	P/P	90 - 110
Vanadium	103	104	P/P	90 - 110
Vanadium	104	100	P/P	90 - 110
Zinc	104	105	P/P	90 - 110
Zinc	105	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A116259

Included Lab Sample IDs: 2370971, 2370972, 2370975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	104	105	P/P	90 - 110
Sulfate	104	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A116263

Included Lab Sample IDs: 2370973, 2370974, 2370976

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.1	95.2	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A116287

Included Lab Sample IDs: 2370973, 2370974, 2370976

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	102	101	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		LCS	Precision	MS
						SMP	
DEP SOP: NU-094-1	Color (true)	101				6.02	
	Color (true)	97.8				0.819	
EPA 180.1 Rev. 2.0	Turbidity	101				5.70	
EPA 200.7 Rev. 4.4	Calcium	105	107				2.75
	Iron	109	103	109			4.68
	Magnesium	110	103	109			4.56
	Potassium	106	99.0	105			4.67
	Sodium	103	105				2.74
	Strontium	111	104	108			3.70
	Tin	108	107	106			1.16
	Titanium	107	104	105			0.896
	Vanadium	106	106	107			1.07
	Zinc	104	103	104			1.25
EPA 200.8 Rev. 5.4	Aluminum	98.9	103	104			0.0935
	Antimony	102	102	102			0.575
	Arsenic	103	102	103			0.678
	Barium	106	105	106			0.875
	Beryllium	99.0	99.6	95.9			3.31
	Boron	99.2	105	105			0.159
	Cadmium	98.8	101	101			0.911
	Chromium	101	101	101			0.201
	Cobalt	100	100	99.9			0.208
	Copper	102	102	102			0.130
	Lead	93.7	94.8	95.0			0.262
	Manganese	102	105	104			0.415
	Molybdenum	98.3	100	101			1.08
	Nickel	101	99.8	102			1.82
	Selenium	101	101	101			0.132
	Silver	98.7	98.9	98.9			0.0395
	Thallium	98.6	101	103			1.56
EPA 300.0 Rev. 2.1	Chloride	104	101	101		0.296	
	Sulfate	103	97.2	96.2		0.332	
EPA 350.1 Rev. 2.0	Ammonia-N	101	98.0	98.0			0.0
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	99.6	99.8			0.160
EPA 353.2 Rev. 2.0	NO2NO3-N	104	96.2				0.0
EPA 365.1 Rev. 2.0	Total-P	105	109	106			2.69
SM 2320 B-2011	Total Alkalinity	97.5				0.595	
SM 2540 C-2015	TDS	97.7				1.97	
	TDS	103				3.09	
SM 2540 D-2015	TSS	93.6					
	TSS	98.1					
SM 4500-F- C-2011	Fluoride	102	101	101			0.0
SM 5310 B-2011	Organic Carbon	97.1	96.2	96.4			0.218

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2370971, 2370972, 2370975
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2370971, 2370972, 2370975
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2370981, 2370982, 2370983
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2370981, 2370982, 2370983

Reference Method Descriptions

Method	Description	Associated Samples
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2370971, 2370972, 2370975
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2370971, 2370972, 2370975
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2370973, 2370974, 2370976
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2370973, 2370974, 2370976
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2370973, 2370974, 2370976
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2370973, 2370974, 2370976
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2370971, 2370972, 2370975
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2370981, 2370982, 2370983
SM 2540 C-2015	Total Dissolved Solids in aqueous matrices	2370971, 2370972, 2370975
SM 2540 D-2015	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2370971, 2370972, 2370975
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2370971, 2370972, 2370975
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2370973, 2370974, 2370976

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	11/18/2022			11/18/2022 14:37	Chandler E Cox	2370971, 2370975
	11/18/2022			11/18/2022 14:42	Chandler E Cox	2370972
	11/18/2022			11/18/2022 14:28	Khloe J Berg	2370971
EPA 180.1 Rev. 2.0	11/18/2022			11/18/2022 14:30	Khloe J Berg	2370972
	11/18/2022			11/18/2022 14:32	Khloe J Berg	2370975
	11/18/2022	11/18/2022 16:20	George D Taylor	12/01/2022 01:44	McKinley C Carter	2370983
EPA 200.7 Rev. 4.4	11/18/2022	11/18/2022 16:20	George D Taylor	12/01/2022 03:31	McKinley C Carter	2370981
	11/18/2022	11/18/2022 16:20	George D Taylor	12/01/2022 03:58	McKinley C Carter	2370982
	11/18/2022	11/18/2022 16:20	George D Taylor	11/21/2022 15:13	Megan Whitefoot	2370983
EPA 200.8 Rev. 5.4	11/18/2022	11/18/2022 16:20	George D Taylor	11/21/2022 15:59	Megan Whitefoot	2370981
	11/18/2022	11/18/2022 16:20	George D Taylor	11/21/2022 17:38	Megan Whitefoot	2370982
	11/18/2022	11/18/2022 16:20	George D Taylor	12/03/2022 02:28	Anna M. Plaviak	2370971
EPA 300.0 Rev. 2.1	11/18/2022			12/03/2022 02:43	Anna M. Plaviak	2370972
	11/18/2022			12/03/2022 02:58	Anna M. Plaviak	2370975
	11/18/2022			12/06/2022 15:46	Judith K. Clark	2370973
EPA 350.1 Rev. 2.0	11/18/2022			12/06/2022 15:47	Judith K. Clark	2370974
	11/18/2022			12/06/2022 15:48	Judith K. Clark	2370976
	11/18/2022	12/02/2022 13:20	Simonne.V. Calhoun	12/05/2022 14:36	Judith K. Clark	2370973
EPA 351.2 Rev. 2.0	11/18/2022	12/02/2022 13:20	Simonne.V. Calhoun	12/05/2022 14:38	Judith K. Clark	2370974
	11/18/2022	12/02/2022 13:20	Simonne.V. Calhoun	12/05/2022 14:40	Judith K. Clark	2370976
EPA 353.2 Rev. 2.0	11/18/2022			11/28/2022 11:52	Beverly Y. Sanders	2370973
	11/18/2022			11/28/2022 11:53	Beverly Y. Sanders	2370974
	11/18/2022			11/28/2022 11:54	Beverly Y. Sanders	2370976
EPA 365.1 Rev. 2.0	11/18/2022	11/22/2022 12:22	Adam P Silver	11/22/2022 16:01	James L Waggeberby	2370973
	11/18/2022	11/22/2022 12:22	Adam P Silver	11/22/2022 16:02	James L Waggeberby	2370974
	11/18/2022	11/22/2022 12:22	Adam P Silver	11/22/2022 18:00	James L Waggeberby	2370976
SM 2320 B-2011	11/18/2022			11/30/2022 04:54	Dale L. Simmons	2370971
	11/18/2022			11/30/2022 05:07	Dale L. Simmons	2370972
	11/18/2022			11/30/2022 05:16	Dale L. Simmons	2370975
SM 2340 B-2011	11/18/2022			12/01/2022 01:44	McKinley C Carter	2370983
	11/18/2022			12/01/2022 03:31	McKinley C Carter	2370981
	11/18/2022			12/01/2022 03:58	McKinley C Carter	2370982
SM 2540 C-2015	11/18/2022			11/22/2022 16:06	Yijie Li	2370971, 2370972, 2370975
SM 2540 D-2015	11/18/2022			11/22/2022 16:06	Yijie Li	2370971, 2370972, 2370975
SM 4500-F- C-2011	11/18/2022			11/30/2022 04:54	Dale L. Simmons	2370971
	11/18/2022			11/30/2022 05:07	Dale L. Simmons	2370972
	11/18/2022			11/30/2022 05:16	Dale L. Simmons	2370975
SM 5310 B-2011	11/18/2022			11/29/2022 22:43	Khloe J Berg	2370974
	11/18/2022			11/30/2022 02:13	Khloe J Berg	2370973
	11/18/2022			11/30/2022 02:28	Khloe J Berg	2370976