

Chemical Analysis Report

NW-DIST-2020-06-18-02

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

Event Description: **Defuniak Crestview Run**
Request ID: **RQ-2020-06-15-60**
Customer: **NW-DIST**
Project ID: **SMP**

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

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Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 08-JUL-2020 11:41



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: Deadfall Creek upstream of Old River Rd.

Collection Date/Time: 06/17/2020 10:30

Field ID: G4NW0491

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2177652	EPA 180.1 Rev. 2.0	Turbidity	1.9		NTU	P383411	
	EPA 300.0 Rev. 2.1	Chloride	3.2		mg Cl/L	P383737	
		Sulfate	0.94		mg SO4/L	P383740	
		Color (true)	34	A	PCU	P383423	
	SM 2320 B-2011	Total Alkalinity	1.4	I	mg CaCO3/L	P383552	
	SM 2540 C-2011	TDS	25		mg/L	P383592	
	SM 2540 D-2011	TSS	2	U	mg/L	P383586	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P383556	
2177654	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P383475	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.17	I	mg N/L	P383659	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.21		mg N/L	P383428	
	EPA 365.1 Rev. 2.0	Total-P	0.006		mg P/L	P383507	
	SM 5310 B-2011	Organic Carbon	3.5		mg C/L	P383708	
2177656	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P383421	
2177668	EPA 200.7 Rev. 4.4	Barium	13.3		ug/L	P383574	
		Calcium	1.04		mg/L	P383574	
		Iron	380		ug/L	P383574	
		Magnesium	0.59		mg/L	P383574	
		Potassium	0.30	U	mg/L	P383574	
		Sodium	1.8	I	mg/L	P383574	
		Zinc	5.0	U	ug/L	P383574	
		Aluminum	97		ug/L	P383574	
		Antimony	0.050	U	ug/L	P383574	
		Arsenic	0.23		ug/L	P383574	
	EPA 200.8 Rev. 5.4	Boron**	8.4		ug/L	P383574	
		Cadmium	0.020	U	ug/L	P383845	
		Chromium	0.40	U	ug/L	P383574	
		Copper	0.40	U	ug/L	P383574	
		Lead	0.20	U	ug/L	P383845	
		Nickel	0.51	I	ug/L	P383574	
		Selenium	0.20	U	ug/L	P383574	
		Silver	0.010	U	ug/L	P383574	
		Thallium	0.10	U	ug/L	P383574	
		Hardness	5.0		mg/L	P383574	

Ref. Method and Comment:

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

Sample Location: Horsehead Creek upstream of Steele Mill Creek Rd **Collection Date/Time: 06/17/2020 11:10**

Field ID: G4NW0428

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2177658	EPA 180.1 Rev. 2.0	Turbidity	3.6	A	NTU	P383411	
	EPA 300.0 Rev. 2.1	Chloride	4.4		mg Cl/L	P383737	
		Sulfate	1.4		mg SO4/L	P383740	
	SM 2120 B-2011	Color (true)	67		PCU	P383423	
	SM 2320 B-2011	Total Alkalinity	7.2		mg CaCO3/L	P383552	
	SM 2540 C-2011	TDS	43		mg/L	P383592	
	SM 2540 D-2011	TSS	2	I	mg/L	P383586	
	SM 4500 F-C-2011	Fluoride	0.040	I	mg F/L	P383556	
2177660	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P383475	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.33		mg N/L	P383659	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.26		mg N/L	P383428	
	EPA 365.1 Rev. 2.0	Total-P	0.057		mg P/L	P383507	
	SM 5310 B-2011	Organic Carbon	5.4		mg C/L	P383708	
2177662	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.034		mg P/L	P383421	

Ref. Method and Comment:

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

Sample Location: Poverty Creek upstream of Poverty Creek Rd Collection Date/Time: 06/17/2020 11:40

Field ID: G4NW0427

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2177659	EPA 180.1 Rev. 2.0	Turbidity	2.9		NTU	P383411	
	EPA 300.0 Rev. 2.1	Chloride	2.8		mg Cl/L	P383737	
		Sulfate	2.4		mg SO4/L	P383740	
	SM 2120 B-2011	Color (true)	22		PCU	P383423	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P383552	
	SM 2540 C-2011	TDS	19	I	mg/L	P383592	
	SM 2540 D-2011	TSS	4	I	mg/L	P383586	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P383556	
2177661	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P383475	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.14	I	mg N/L	P383659	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.15		mg N/L	P383428	
	EPA 365.1 Rev. 2.0	Total-P	0.005		mg P/L	P383507	
	SM 5310 B-2011	Organic Carbon	2.5		mg C/L	P383708	
2177663	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P383421	

Ref. Method and Comment:

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

Sample Location: Bay Branch upstream of Hwy 331

Collection Date/Time: 06/17/2020 12:30

Field ID: G3NW0171

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2177653	EPA 180.1 Rev. 2.0	Turbidity	4.4		NTU	P383411	
	EPA 300.0 Rev. 2.1	Chloride	4.0		mg Cl/L	P383737	
		Sulfate	0.60		mg SO4/L	P383740	
		Color (true)	120		PCU	P383423	
	SM 2320 B-2011	Total Alkalinity	7.2		mg CaCO3/L	P383552	
	SM 2540 C-2011	TDS	45		mg/L	P383592	
	SM 2540 D-2011	TSS	4	I	mg/L	P383586	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P383556	
2177655	EPA 350.1 Rev. 2.0	Ammonia-N	0.035		mg N/L	P383475	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.45		mg N/L	P383659	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.012		mg N/L	P383428	
	EPA 365.1 Rev. 2.0	Total-P	0.021		mg P/L	P383507	
	SM 5310 B-2011	Organic Carbon	9.7		mg C/L	P383708	
2177657	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P383421	
2177669	EPA 200.7 Rev. 4.4	Barium	13.0		ug/L	P383574	
		Calcium	3.74		mg/L	P383574	
		Iron	1.31E+03		ug/L	P383574	
		Magnesium	0.82		mg/L	P383574	
		Potassium	0.30	U	mg/L	P383574	
		Sodium	2.5		mg/L	P383574	
		Zinc	5.3	I	ug/L	P383574	
	EPA 200.8 Rev. 5.4	Aluminum	255		ug/L	P383574	
		Antimony	0.050	U	ug/L	P383574	
		Arsenic	0.65		ug/L	P383574	
		Boron**	9.7		ug/L	P383574	
		Cadmium	0.020	U	ug/L	P383845	
		Chromium	0.43	I	ug/L	P383574	
		Copper	1.77		ug/L	P383574	
		Lead	0.42		ug/L	P383845	
		Nickel	0.50	U	ug/L	P383574	
		Selenium	0.20	U	ug/L	P383574	
		Silver	0.010	U	ug/L	P383574	
		Thallium	0.10	U	ug/L	P383574	
	SM 2340B	Hardness	12.7		mg/L	P383574	

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: EPA 180.1 Rev. 2.0
Batch ID: P383411

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P383574

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
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P383574

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	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 200.8 Rev. 5.4
Batch ID: P383845

Component	Result	Code	Units
Cadmium	0.020	U	ug/L
Lead	0.20	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P383737

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P383740

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P383475

Component	Result	Code	Units
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Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P383475

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P383659

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P383428

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P383507

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P383421

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

Reference Method: SM 2120 B-2011
Batch ID: P383423

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P383552

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

Reference Method: SM 2540 C-2011
Batch ID: P383592

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P383586

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P383556

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P383708

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: P383574

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	105		P	85 - 115
Iron	102		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	99.1		P	85 - 115
Sodium	103		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P383574

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.1		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	101		P	85 - 115
Boron	96.0		P	85 - 115
Chromium	100		P	85 - 115
Copper	101		P	85 - 115
Nickel	100		P	85 - 115
Selenium	98.5		P	85 - 115
Silver	104		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P383845

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cadmium	101		P	85 - 115
Lead	104		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P383737

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P383740

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P383475

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P383659

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P383659

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: P383428

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P383507

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: P383421

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

Reference Method: SM 2120 B-2011
Batch ID: P383423

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.9		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P383552

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.2		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P383556

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.1		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P383708

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.1		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P383574

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177348	Barium	105		P	80 - 120
2177348	Calcium	102		P	80 - 120
2177348	Iron	102		P	80 - 120
2177348	Magnesium	103		P	80 - 120
2177348	Potassium	98.6		P	80 - 120
2177348	Sodium	100		P	80 - 120
2177348	Zinc	105		P	80 - 120
2177938	Barium	104	103	P/P	80 - 120
2177938	Calcium	108	107	P/P	80 - 120
2177938	Iron	104	105	P/P	80 - 120
2177938	Magnesium	104	106	P/P	80 - 120
2177938	Potassium	105	105	P/P	80 - 120
2177938	Sodium	103	103	P/P	80 - 120
2177938	Zinc	105	106	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P383574

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177348	Aluminum	98.6		P	80 - 120
2177348	Antimony	100		P	80 - 120
2177348	Arsenic	101		P	80 - 120
2177348	Boron	100		P	80 - 120
2177348	Chromium	103		P	80 - 120
2177348	Copper	103		P	80 - 120
2177348	Nickel	99.0		P	80 - 120
2177348	Selenium	99.8		P	80 - 120
2177348	Silver	105		P	80 - 120
2177348	Thallium	103		P	80 - 120
2177938	Aluminum	96.7	94.6	P/P	80 - 120
2177938	Antimony	98.9	99.1	P/P	80 - 120
2177938	Arsenic	99.8	99.0	P/P	80 - 120
2177938	Boron	95.7	94.9	P/P	80 - 120
2177938	Chromium	98.9	100	P/P	80 - 120
2177938	Copper	101	102	P/P	80 - 120
2177938	Nickel	98.3	98.8	P/P	80 - 120
2177938	Selenium	95.7	95.6	P/P	80 - 120
2177938	Silver	103	103	P/P	80 - 120
2177938	Thallium	99.2	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P383845

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177311	Cadmium	103	105	P/P	80 - 120
2177311	Lead	107	110	P/P	80 - 120
2177347	Cadmium	101		P	80 - 120
2177347	Lead	106		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P383737

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177487	Chloride	101		P	90 - 110
2177628	Chloride	107		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P383740

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177487	Sulfate	102		P	90 - 110
2177628	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P383475

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177553	Ammonia-N	103	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P383659

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177631	Kjeldahl Nitrogen	103	110	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P383428

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177577	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P383507

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177654	Total-P	107	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P383421

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177663	O-Phosphate-P	99.5	99.2	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P383556

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177783	Fluoride	99.4	97.9	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P383708

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2177691	Organic Carbon	96.0	98.1	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P383411

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177658	Turbidity	2.49	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P383574

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177938	Barium	0.658	Spike	P	0 - 20
2177938	Calcium	0.157	Spike	P	0 - 20
2177938	Iron	1.11	Spike	P	0 - 20
2177938	Magnesium	1.38	Spike	P	0 - 20
2177938	Potassium	0.489	Spike	P	0 - 20
2177938	Sodium	0.142	Spike	P	0 - 20
2177938	Zinc	0.525	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P383574

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177938	Aluminum	1.98	Spike	P	0 - 20
2177938	Antimony	0.232	Spike	P	0 - 20
2177938	Arsenic	0.718	Spike	P	0 - 20
2177938	Boron	0.767	Spike	P	0 - 20
2177938	Chromium	1.17	Spike	P	0 - 20
2177938	Copper	0.998	Spike	P	0 - 20
2177938	Nickel	0.536	Spike	P	0 - 20
2177938	Selenium	0.171	Spike	P	0 - 20
2177938	Silver	0.497	Spike	P	0 - 20
2177938	Thallium	1.13	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P383845

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177311	Cadmium	2.52	Spike	P	0 - 20
2177311	Lead	2.20	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P383737

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177487	Chloride	0.106	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P383740

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P383740

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177487	Sulfate	0.342	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P383475

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177553	Ammonia-N	0.631	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P383659

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177631	Kjeldahl Nitrogen	3.85	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P383428

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177577	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P383507

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177654	Total-P	3.59	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P383421

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177663	O-Phosphate-P	0.302	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P383423

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177652	Color (true)	1.75	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P383552

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177783	Total Alkalinity	1.13	Sample	P	0 - 8.1

Quality Assurance Report Precision

Reference Method: SM 2540 C-2011
Batch ID: P383592

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177629	TDS	0.930	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P383556

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177783	Fluoride	0.965	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P383708

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2177691	Organic Carbon	1.28	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A99407

Included Lab Sample IDs: 2177652, 2177653, 2177658, 2177659

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	102	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A99408

Included Lab Sample IDs: 2177656, 2177657, 2177662, 2177663

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.2	97.6	P/P	90 - 110
O-Phosphate-P	98.8	98.2	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A99409

Included Lab Sample IDs: 2177652, 2177653, 2177658, 2177659

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.7	99.3	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A99414

Included Lab Sample IDs: 2177654, 2177655, 2177660, 2177661

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A99435

Included Lab Sample IDs: 2177654, 2177655, 2177660, 2177661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	104	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A99462

Included Lab Sample IDs: 2177652, 2177653, 2177658, 2177659

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.7	99.2	P/P	90 - 110
Total Alkalinity	99.2	97.6	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A99462

Included Lab Sample IDs: 2177652, 2177653, 2177658, 2177659

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A99463

Included Lab Sample IDs: 2177660

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A99483

Included Lab Sample IDs: 2177654, 2177655, 2177661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	93.8	93.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A99503

Included Lab Sample IDs: 2177668, 2177669

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	100	101	P/P	90 - 110
Barium	102	100	P/P	90 - 110
Calcium	101	101	P/P	90 - 110
Calcium	102	101	P/P	90 - 110
Iron	102	101	P/P	90 - 110
Iron	103	102	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Magnesium	102	101	P/P	90 - 110
Potassium	101	98.6	P/P	90 - 110
Potassium	98.6	98.5	P/P	90 - 110
Sodium	102	101	P/P	90 - 110
Sodium	103	102	P/P	90 - 110
Zinc	101	101	P/P	90 - 110
Zinc	102	101	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A99535

Included Lab Sample IDs: 2177654, 2177655, 2177660, 2177661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.2	99.1	P/P	90 - 110
Organic Carbon	98.3	98.2	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A99546

Included Lab Sample IDs: 2177652, 2177653, 2177658, 2177659

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	97.6	97.8	P/P	90 - 110
Sulfate	98.8	98.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A99554

Included Lab Sample IDs: 2177654, 2177655, 2177660, 2177661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	93.8	96.4	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A99559

Included Lab Sample IDs: 2177668, 2177669

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.9	99.8	P/P	90 - 110
Antimony	99.9	100	P/P	90 - 110
Arsenic	101	101	P/P	90 - 110
Boron	97.9	99.6	P/P	90 - 110
Chromium	97.3	99.5	P/P	90 - 110
Copper	98.8	100	P/P	90 - 110
Nickel	98.9	100	P/P	90 - 110
Selenium	99.6	100	P/P	90 - 110
Silver	102	105	P/P	90 - 110
Thallium	98.5	99.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A99666

Included Lab Sample IDs: 2177668, 2177669

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	100	100	P/P	90 - 110
Lead	103	103	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					2.49	
EPA 200.7 Rev. 4.4	Barium	102	105	104	103		0.658
	Calcium	105	102	108	107		0.157
	Iron	102	102	104	105		1.11
	Magnesium	103	103	104	106		1.38
	Potassium	99.1	98.6	105	105		0.489
	Sodium	103	100	103	103		0.142
	Zinc	103	105	105	106		0.525
EPA 200.8 Rev. 5.4	Aluminum	96.1	96.7	94.6	98.6		1.98
	Antimony	100	98.9	99.1	100		0.232
	Arsenic	101	99.8	99.0	101		0.718
	Boron	96.0	95.7	94.9	100		0.767
	Cadmium	101	103	105	101		2.52
	Chromium	100	98.9	100	103		1.17
	Copper	101	101	102	103		0.998
	Lead	104	107	110	106		2.20
	Nickel	100	98.3	98.8	99.0		0.536
	Selenium	98.5	95.7	95.6	99.8		0.171
	Silver	104	103	103	105		0.497
	Thallium	100	99.2	100	103		1.13
EPA 300.0 Rev. 2.1	Chloride	100	101	107		0.106	
	Sulfate	101	102	101		0.342	
EPA 350.1 Rev. 2.0	Ammonia-N	100	103	102			0.631
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	103	110			3.85
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.5	100	100			0.0
EPA 365.1 Rev. 2.0	Total-P	104	107	103			3.59
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.4	99.5	99.2			0.302
SM 2120 B-2011	Color (true)	97.9				1.75	
SM 2320 B-2011	Total Alkalinity	99.2				1.13	
SM 2540 C-2011	TDS					0.930	
SM 4500 F-C-2011	Fluoride	97.1	99.4	97.9			0.965
SM 5310 B-2011	Organic Carbon	96.1	96.0	98.1			1.28

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2177652, 2177653, 2177658, 2177659
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2177668, 2177669
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2177668, 2177669
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2177652, 2177653, 2177658, 2177659
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2177652, 2177653, 2177658, 2177659
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2177654, 2177655, 2177660, 2177661
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2177654, 2177655, 2177660, 2177661
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2177654, 2177655, 2177660, 2177661
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2177654, 2177655, 2177660, 2177661
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2177656, 2177657, 2177662, 2177663
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2177652, 2177653, 2177658, 2177659
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2177652, 2177653, 2177658, 2177659
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2177668, 2177669
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2177652, 2177653, 2177658, 2177659

Reference Method Descriptions

Method	Description	Associated Samples
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2177652, 2177653, 2177658, 2177659
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2177652, 2177653, 2177658, 2177659
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2177654, 2177655, 2177660, 2177661

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	06/18/2020			06/18/2020 14:56	Yen Ta	2177652, 2177653, 2177658, 2177659
EPA 200.7 Rev. 4.4	06/18/2020	06/23/2020 14:45	Elliott D. Healy	06/24/2020 17:04	Betina Topolski	2177668
	06/18/2020	06/23/2020 14:45	Elliott D. Healy	06/24/2020 17:38	Betina Topolski	2177669
EPA 200.8 Rev. 5.4	06/18/2020	06/23/2020 14:45	Elliott D. Healy	06/27/2020 01:42	Alexander Thompson	2177668
	06/18/2020	06/23/2020 14:45	Elliott D. Healy	06/27/2020 01:50	Alexander Thompson	2177669
	06/18/2020	06/30/2020 11:30	Alexander Thompson	07/02/2020 18:51	Alexander Thompson	2177668
	06/18/2020	06/30/2020 11:30	Alexander Thompson	07/02/2020 18:56	Alexander Thompson	2177669
EPA 300.0 Rev. 2.1	06/18/2020			06/24/2020 01:48	Elliott Rodriguez	2177652
	06/18/2020			06/24/2020 02:01	Elliott Rodriguez	2177653
	06/18/2020			06/24/2020 02:14	Elliott Rodriguez	2177658
	06/18/2020			06/24/2020 02:27	Elliott Rodriguez	2177659
EPA 350.1 Rev. 2.0	06/18/2020			06/21/2020 11:33	Ping Hua	2177654
	06/18/2020			06/21/2020 11:35	Ping Hua	2177655
	06/18/2020			06/21/2020 11:36	Ping Hua	2177660
	06/18/2020			06/21/2020 11:38	Ping Hua	2177661
EPA 351.2 Rev. 2.0	06/18/2020	06/25/2020 09:40	Sima Feizi	06/26/2020 15:07	Jhamieka S. Greenwood	2177654
	06/18/2020	06/25/2020 09:40	Sima Feizi	06/26/2020 15:09	Jhamieka S. Greenwood	2177655
	06/18/2020	06/25/2020 09:40	Sima Feizi	06/26/2020 15:10	Jhamieka S. Greenwood	2177660
	06/18/2020	06/25/2020 09:40	Sima Feizi	06/26/2020 15:12	Jhamieka S. Greenwood	2177661
EPA 353.2 Rev. 2.0	06/18/2020			06/19/2020 09:16	Beverly Y. Sanders	2177654
	06/18/2020			06/19/2020 09:17	Beverly Y. Sanders	2177655
	06/18/2020			06/19/2020 09:19	Beverly Y. Sanders	2177660
	06/18/2020			06/19/2020 09:20	Beverly Y. Sanders	2177661
EPA 365.1 Rev. 2.0	06/18/2020	06/22/2020 14:35	Yen Ta	06/23/2020 09:29	Benjamin T. Nordmann	2177660
	06/18/2020	06/22/2020 14:35	Yen Ta	06/24/2020 08:15	Lipi Saha	2177654
	06/18/2020	06/22/2020 14:35	Yen Ta	06/24/2020 08:23	Lipi Saha	2177655
	06/18/2020	06/22/2020 14:35	Yen Ta	06/24/2020 08:24	Lipi Saha	2177661
EPA 365.1 Rev. 2.0 dissolved	06/18/2020			06/18/2020 16:04	Jhamieka S. Greenwood	2177663
	06/18/2020			06/18/2020 16:07	Jhamieka S. Greenwood	2177656
	06/18/2020			06/18/2020 16:12	Jhamieka S. Greenwood	2177657
	06/18/2020			06/18/2020 16:13	Jhamieka S. Greenwood	2177662
SM 2120 B-2011	06/18/2020			06/18/2020 16:35	Madeline Gruver	2177652
	06/18/2020			06/18/2020 16:36	Madeline Gruver	2177653
	06/18/2020			06/18/2020 16:37	Madeline Gruver	2177658, 2177659
SM 2320 B-2011	06/18/2020			06/23/2020 00:54	Dale L. Simmons	2177652
	06/18/2020			06/23/2020 01:06	Dale L. Simmons	2177653
	06/18/2020			06/23/2020 01:49	Dale L. Simmons	2177658
	06/18/2020			06/23/2020 01:58	Dale L. Simmons	2177659
SM 2340B	06/18/2020			06/24/2020 17:04	Betina Topolski	2177668
	06/18/2020			06/24/2020 17:38	Betina Topolski	2177669

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 2540 C-2011	06/18/2020			06/19/2020 19:40	Madeline Gruver	2177652, 2177653, 2177658, 2177659
SM 2540 D-2011	06/18/2020			06/19/2020 20:20	Madeline Gruver	2177652, 2177653, 2177658, 2177659
SM 4500 F-C-2011	06/18/2020			06/23/2020 00:54	Dale L. Simmons	2177652
	06/18/2020			06/23/2020 01:06	Dale L. Simmons	2177653
	06/18/2020			06/23/2020 01:49	Dale L. Simmons	2177658
	06/18/2020			06/23/2020 01:58	Dale L. Simmons	2177659
SM 5310 B-2011	06/18/2020			06/25/2020 16:15	David Boose	2177654
	06/18/2020			06/25/2020 16:52	David Boose	2177655
	06/18/2020			06/25/2020 17:04	David Boose	2177660
	06/18/2020			06/25/2020 17:16	David Boose	2177661