

Chemical Analysis Report

SW-DIST-2019-07-16-02

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

Event Description: **Flint**
Request ID: **RQ-2019-07-08-06**
Customer: **SW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926
Attn: Ben Paswater

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Colin Wright, Program Administrator

Date Certified: 01-AUG-2019 10:00

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray 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: Flint Creek @ US 301

Collection Date/Time: 07/15/2019 09:45

Field ID: G2SW0004

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2103373	EPA 180.1 Rev. 2.0	Turbidity	16	A	NTU	P367297	
	EPA 300.0 Rev. 2.1	Chloride	20		mg Cl/L	P367480	
	SM 2120 B	Color (true)	100		PCU	P367352	
	SM 2320 B-97	Total Alkalinity	49		mg CaCO3/L	P367673	
	SM 2540 C-97	TDS	139		mg/L	P367548	
	SM 2540 D-97	TSS	19	I	mg/L	P367575	
	SM 4500 F-C-97	Fluoride	0.26		mg F/L	P367674	
2103374	EPA 350.1 Rev. 2.0	Ammonia-N	0.038		mg N/L	P367773	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.7		mg N/L	P367336	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.008	I	mg N/L	P367592	
	EPA 365.1 Rev. 2.0	Total-P	0.58		mg P/L	P367379	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P367589	
2103375	EPA 300.0 Rev. 2.1 dissolved	Sulfate	7.8		mg SO4/L	P367542	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.38		mg P/L	P367308	
2103381	EPA 200.7 Rev. 4.4	Barium	6.9		ug/L	P367369	
		Calcium	21.6		mg/L	P367369	
		Iron	450		ug/L	P367369	
		Magnesium	3.55		mg/L	P367369	
		Potassium	3.4		mg/L	P367369	
		Sodium	12.3		mg/L	P367369	
		Zinc	5.0	U	ug/L	P367369	
	EPA 200.8 Rev. 5.4	Aluminum	236		ug/L	P367369	
		Antimony	0.13	I	ug/L	P367369	
		Arsenic	2.08		ug/L	P367369	
		Boron**	38.0		ug/L	P367369	
		Cadmium	0.020	U	ug/L	P367369	
		Chromium	0.84	I	ug/L	P367369	
		Copper	3.61		ug/L	P367369	
		Lead	0.35	I	ug/L	P367369	
		Nickel	0.90	I	ug/L	P367369	
		Selenium	0.20	U	ug/L	P367369	
		Silver	0.010	U	ug/L	P367369	
		Thallium	0.10	U	ug/L	P367369	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample. The PQL was elevated because of sample matrix interference.

Sample Location: Flint Creek @ Knights Griffin Rd

Collection Date/Time: 07/15/2019 10:15

Field ID: G2SW0066

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2103376	EPA 180.1 Rev. 2.0	Turbidity	16		NTU	P367297	
	EPA 300.0 Rev. 2.1	Chloride	20		mg Cl/L	P367480	
	SM 2120 B	Color (true)	92	A	PCU	P367352	
	SM 2320 B-97	Total Alkalinity	50		mg CaCO3/L	P367673	
	SM 2540 C-97	TDS	136		mg/L	P367548	
	SM 2540 D-97	TSS	7	I	mg/L	P367575	
	SM 4500 F-C-97	Fluoride	0.26		mg F/L	P367674	
2103377	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P367773	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.2		mg N/L	P367336	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P367592	
	EPA 365.1 Rev. 2.0	Total-P	0.56		mg P/L	P367379	
	SM 5310 B-00	Organic Carbon	17		mg C/L	P367589	
2103378	EPA 300.0 Rev. 2.1 dissolved	Sulfate	7.6		mg SO4/L	P367542	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.35		mg P/L	P367308	

Ref. Method and Comment:

SM 2540 D-97: 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: P367297

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P367369

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: P367369

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
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	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: P367480

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P367542

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P367773

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P367336

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P367592

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P367379

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P367308

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

Reference Method: SM 2120 B
Batch ID: P367352

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P367673

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

Reference Method: SM 2540 C-97
Batch ID: P367548

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P367575

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P367674

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P367589

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: P367369

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.8		P	85 - 115
Calcium	99.0		P	85 - 115
Iron	99.1		P	85 - 115
Magnesium	97.5		P	85 - 115
Potassium	101		P	85 - 115
Sodium	105		P	85 - 115
Zinc	97.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P367369

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.2		P	85 - 115
Antimony	98.1		P	85 - 115
Arsenic	101		P	85 - 115
Boron	100		P	85 - 115
Cadmium	99.8		P	85 - 115
Chromium	97.0		P	85 - 115
Copper	101		P	85 - 115
Lead	98.5		P	85 - 115
Nickel	102		P	85 - 115
Selenium	97.7		P	85 - 115
Silver	104		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P367480

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P367542

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P367773

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P367336

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	90.4		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P367592

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: P367379

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P367308

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

Reference Method: SM 2120 B
Batch ID: P367352

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P367673

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P367674

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.9		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P367589

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	101		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P367369

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2102932	Barium	96.9	99.4	P/P	80 - 120
2102932	Calcium	95.7		P	80 - 120
2102932	Iron	98.6	101	P/P	80 - 120
2102932	Magnesium	96.3		P	80 - 120
2102932	Potassium	103	108	P/P	80 - 120
2102932	Sodium	98.4	103	P/P	80 - 120
2102932	Zinc	95.6	98.2	P/P	80 - 120
2103154	Barium	101		P	80 - 120
2103154	Calcium	99.2		P	80 - 120
2103154	Iron	103		P	80 - 120
2103154	Magnesium	99.5		P	80 - 120
2103154	Potassium	99.5		P	80 - 120
2103154	Sodium	100		P	80 - 120
2103154	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P367369

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2102932	Aluminum	95.4	96.5	P/P	80 - 120
2102932	Antimony	98.3	101	P/P	80 - 120
2102932	Arsenic	100	101	P/P	80 - 120
2102932	Boron	98.0	97.9	P/P	80 - 120
2102932	Cadmium	101	102	P/P	80 - 120
2102932	Chromium	95.9	97.1	P/P	80 - 120
2102932	Copper	95.6	95.9	P/P	80 - 120
2102932	Lead	97.0	98.7	P/P	80 - 120
2102932	Nickel	98.9	100	P/P	80 - 120
2102932	Selenium	98.2	100	P/P	80 - 120
2102932	Silver	104	105	P/P	80 - 120
2102932	Thallium	102	104	P/P	80 - 120
2103154	Aluminum	101		P	80 - 120
2103154	Antimony	101		P	80 - 120
2103154	Arsenic	103		P	80 - 120
2103154	Boron	104		P	80 - 120
2103154	Cadmium	102		P	80 - 120
2103154	Chromium	99.9		P	80 - 120
2103154	Copper	99.4		P	80 - 120
2103154	Lead	102		P	80 - 120
2103154	Nickel	103		P	80 - 120
2103154	Selenium	100		P	80 - 120
2103154	Silver	107		P	80 - 120
2103154	Thallium	106		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P367480

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2103009	Chloride	98.4		P	90 - 110
2103289	Chloride	99.3		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P367542

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2103505	Sulfate	102		P	90 - 110
2103662	Sulfate	98.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P367773

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2103374	Ammonia-N	107	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P367336

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2103293	Kjeldahl Nitrogen	98.2	96.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P367592

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2103374	NO2NO3-N	97.5	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P367379

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2103293	Total-P	97.6	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P367308

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2103151	O-Phosphate-P	94.3	94.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P367674

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2100961	Fluoride	106	105	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P367589

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2103579	Organic Carbon	100	101	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P367297

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103373	Turbidity	0.612	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P367369

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2102932	Barium	2.41	Spike	P	0 - 20
2102932	Calcium	3.74	Spike	P	0 - 20
2102932	Iron	2.23	Spike	P	0 - 20
2102932	Magnesium	2.06	Spike	P	0 - 20
2102932	Potassium	3.64	Spike	P	0 - 20
2102932	Sodium	2.39	Spike	P	0 - 20
2102932	Zinc	2.64	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P367369

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2102932	Aluminum	1.09	Spike	P	0 - 20
2102932	Antimony	2.43	Spike	P	0 - 20
2102932	Arsenic	0.507	Spike	P	0 - 20
2102932	Boron	0.0782	Spike	P	0 - 20
2102932	Cadmium	1.11	Spike	P	0 - 20
2102932	Chromium	1.19	Spike	P	0 - 20
2102932	Copper	0.264	Spike	P	0 - 20
2102932	Lead	1.68	Spike	P	0 - 20
2102932	Nickel	1.59	Spike	P	0 - 20
2102932	Selenium	2.23	Spike	P	0 - 20
2102932	Silver	1.35	Spike	P	0 - 20
2102932	Thallium	2.14	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P367480

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103009	Chloride	0.140	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P367542

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103662	Sulfate	0.271	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P367773

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103374	Ammonia-N	1.55	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P367336

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103293	Kjeldahl Nitrogen	1.61	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P367592

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103374	NO2NO3-N	0.980	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P367379

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103293	Total-P	3.32	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P367308

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103151	O-Phosphate-P	0.106	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P367352

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103376	Color (true)	0.0937	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P367673

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2100961	Total Alkalinity	1.46	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P367548

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103068	TDS	6.85	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P367674

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2100961	Fluoride	0.511	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P367589

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2103579	Organic Carbon	0.157	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A92795

Included Lab Sample IDs: 2103373, 2103376

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A92796

Included Lab Sample IDs: 2103373, 2103376

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

Reference Method: EPA 300.0 Rev. 2.1 dissolved

Run ID: A92796

Included Lab Sample IDs: 2103375, 2103378

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sulfate	99.1	97.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A92797

Included Lab Sample IDs: 2103375, 2103378

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.9	95.5	P/P	90 - 110
O-Phosphate-P	97.1	96.9	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A92813

Included Lab Sample IDs: 2103373, 2103376

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	102	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A92847

Included Lab Sample IDs: 2103374, 2103377

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A92880

Included Lab Sample IDs: 2103374, 2103377

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.5	105	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A92881

Included Lab Sample IDs: 2103381

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A92881

Included Lab Sample IDs: 2103381

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	103	P/P	90 - 110
Calcium	98.3	99.7	P/P	90 - 110
Iron	97.9	98.6	P/P	90 - 110
Magnesium	98.3	99.9	P/P	90 - 110
Potassium	97.2	97.8	P/P	90 - 110
Sodium	101	99.5	P/P	90 - 110
Zinc	99.3	101	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A92899

Included Lab Sample IDs: 2103374, 2103377

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A92900

Included Lab Sample IDs: 2103374, 2103377

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	100	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A92919

Included Lab Sample IDs: 2103373, 2103376

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A92919

Included Lab Sample IDs: 2103373, 2103376

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	99.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A92961

Included Lab Sample IDs: 2103374, 2103377

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	104	P/P	90 - 110
Ammonia-N	106	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A93030

Included Lab Sample IDs: 2103381

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	99.4	P/P	90 - 110
Antimony	96.0	97.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A93030

Included Lab Sample IDs: 2103381

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.7	101	P/P	90 - 110
Boron	99.7	100	P/P	90 - 110
Cadmium	99.5	99.7	P/P	90 - 110
Chromium	100	102	P/P	90 - 110
Copper	102	101	P/P	90 - 110
Lead	101	102	P/P	90 - 110
Selenium	99.3	100	P/P	90 - 110
Silver	103	103	P/P	90 - 110
Thallium	98.0	99.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A93069

Included Lab Sample IDs: 2103381

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	99.5	99.3	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					0.612	
EPA 200.7 Rev. 4.4	Barium	99.8	96.9	99.4	101		2.41
	Calcium	99.0	95.7	99.2			3.74
	Iron	99.1	98.6	101	103		2.23
	Magnesium	97.5	96.3	99.5			2.06
	Potassium	101	103	108	99.5		3.64
	Sodium	105	98.4	103	100		2.39
	Zinc	97.5	95.6	98.2	101		2.64
EPA 200.8 Rev. 5.4	Aluminum	99.2	95.4	96.5	101		1.09
	Antimony	98.1	98.3	101	101		2.43
	Arsenic	101	100	101	103		0.507
	Boron	100	98.0	97.9	104		0.0782
	Cadmium	99.8	101	102	102		1.11
	Chromium	97.0	95.9	97.1	99.9		1.19
	Copper	101	95.6	95.9	99.4		0.264
	Lead	98.5	97.0	98.7	102		1.68
	Nickel	102	98.9	100	103		1.59
	Selenium	97.7	98.2	100	100		2.23
	Silver	104	104	105	107		1.35
	Thallium	102	102	104	106		2.14
EPA 300.0 Rev. 2.1	Chloride	99.0	98.4	99.3		0.140	
EPA 300.0 Rev. 2.1 dissolved	Sulfate	100	98.8	102		0.271	
EPA 350.1 Rev. 2.0	Ammonia-N	106	107	104			1.55
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	90.4	98.2	96.5			1.61
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	97.5	98.5			0.980
EPA 365.1 Rev. 2.0	Total-P	103	97.6	102			3.32
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.1	94.3	94.2			0.106
SM 2120 B	Color (true)	102				0.0937	
SM 2320 B-97	Total Alkalinity	103				1.46	
SM 2540 C-97	TDS					6.85	
SM 4500 F-C-97	Fluoride	96.9	106	105			0.511
SM 5310 B-00	Organic Carbon	101	100	101			0.157

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2103373, 2103376
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2103381
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2103381
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2103373, 2103376
EPA 300.0 Rev. 2.1 dissolved / E31780	Sulfate, dissolved, in filtered, aqueous matrices	2103375, 2103378
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2103374, 2103377
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2103374, 2103377
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2103374, 2103377
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2103374, 2103377

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2103375, 2103378
SM 2120 B / E31780	True Color measured at 450 nm	2103373, 2103376
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2103373, 2103376
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2103373, 2103376
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2103373, 2103376
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2103373, 2103376
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2103374, 2103377

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	07/16/2019			07/16/2019 16:25	Samantha Davila	2103373, 2103376
EPA 200.7 Rev. 4.4	07/16/2019	07/17/2019 14:30	Elliott D. Healy	07/18/2019 18:18	Betina Topolski	2103381
EPA 200.8 Rev. 5.4	07/16/2019	07/17/2019 14:30	Elliott D. Healy	07/25/2019 03:45	Robert K Palmer	2103381
	07/16/2019	07/17/2019 14:30	Elliott D. Healy	07/27/2019 01:00	Robert K Palmer	2103381
EPA 300.0 Rev. 2.1	07/16/2019			07/17/2019 23:24	Jhamieka S. Greenwood	2103373
	07/16/2019			07/17/2019 23:36	Jhamieka S. Greenwood	2103376
EPA 300.0 Rev. 2.1 dissolved	07/16/2019			07/18/2019 21:34	Jhamieka S. Greenwood	2103375
	07/16/2019			07/18/2019 21:46	Jhamieka S. Greenwood	2103378
EPA 350.1 Rev. 2.0	07/16/2019			07/23/2019 13:24	Virginia P. Brown	2103374
	07/16/2019			07/23/2019 13:35	Virginia P. Brown	2103377
EPA 351.2 Rev. 2.0	07/16/2019	07/17/2019 13:35	Sima Feizi	07/18/2019 11:42	Joseph Suarez	2103374
	07/16/2019	07/17/2019 13:35	Sima Feizi	07/18/2019 11:44	Joseph Suarez	2103377
EPA 353.2 Rev. 2.0	07/16/2019			07/19/2019 09:47	Beverly Y. Sanders	2103374
	07/16/2019			07/19/2019 09:53	Beverly Y. Sanders	2103377
EPA 365.1 Rev. 2.0	07/16/2019	07/17/2019 12:55	Sima Feizi	07/18/2019 08:19	Lipi Saha	2103374
	07/16/2019	07/17/2019 12:55	Sima Feizi	07/18/2019 08:23	Lipi Saha	2103377
EPA 365.1 Rev. 2.0 dissolved	07/16/2019			07/16/2019 18:15	Jhamieka S. Greenwood	2103375
	07/16/2019			07/16/2019 18:20	Jhamieka S. Greenwood	2103378
SM 2120 B	07/16/2019			07/16/2019 18:21	Madeline Funaro	2103373
	07/16/2019			07/16/2019 18:23	Madeline Funaro	2103376
SM 2320 B-97	07/16/2019			07/19/2019 19:46	Samantha Davila	2103373
	07/16/2019			07/19/2019 19:59	Samantha Davila	2103376
SM 2540 C-97	07/16/2019			07/16/2019 21:03	Yijie Li	2103373, 2103376
SM 2540 D-97	07/16/2019			07/16/2019 21:03	Yijie Li	2103373, 2103376
SM 4500 F-C-97	07/16/2019			07/19/2019 19:46	Samantha Davila	2103373
	07/16/2019			07/19/2019 19:59	Samantha Davila	2103376
SM 5310 B-00	07/16/2019			07/18/2019 23:36	Madeline Funaro	2103374
	07/16/2019			07/18/2019 23:48	Madeline Funaro	2103377