Chemical Analysis Report

SW-DIST-2019-04-10-02

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

Event Description: **Flint**
Request ID: **RQ-2019-04-08-08**
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: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 30-APR-2019 13:57

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: 04/09/2019 10:00**

Field ID: G2SW0004 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2076993	EPA 180.1 Rev. 2.0	Turbidity	14		NTU	P361923	
	EPA 300.0 Rev. 2.1	Chloride	26		mg Cl/L	P362269	
	SM 2120 B	Color (true)	80		PCU	P361955	
	SM 2320 B-97	Total Alkalinity	59		mg CaCO3/L	P362274	
	SM 2540 C-97	TDS	125		mg/L	P362518	
	SM 2540 D-97	TSS	20		mg/L	P362235	
	SM 4500 F-C-97	Fluoride	0.29		mg F/L	P362277	
2076994	EPA 350.1 Rev. 2.0	Ammonia-N	0.51		mg N/L	P362292	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.3		mg N/L	P362340	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.056		mg N/L	P362416	
	EPA 365.1 Rev. 2.0	Total-P	0.59		mg P/L	P362246	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P362107	
2076995	EPA 300.0 Rev. 2.1 dissolved	Sulfate	9.0		mg SO4/L	P362272	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.32		mg P/L	P361932	
2077002	EPA 200.7 Rev. 4.4	Barium	5.2		ug/L	P362012	
		Calcium	24.3		mg/L	P362012	
		Iron	340		ug/L	P362012	
		Magnesium	3.86		mg/L	P362012	
		Potassium	3.4		mg/L	P362012	
		Sodium	14.4		mg/L	P362012	
		Zinc	5.0	U	ug/L	P362012	
	EPA 200.8 Rev. 5.4	Aluminum	165		ug/L	P362012	
		Antimony	0.13	I	ug/L	P362012	
		Arsenic	1.20		ug/L	P362012	
		Boron**	35.1		ug/L	P362012	
		Cadmium	0.020	U	ug/L	P362012	
		Chromium	0.60	I	ug/L	P362012	
		Copper	0.95		ug/L	P362012	
		Lead	0.31	I	ug/L	P362012	
		Nickel	0.58	I	ug/L	P362012	
		Selenium	0.20	U	ug/L	P362012	
		Silver	0.010	U	ug/L	P362012	
		Thallium	0.10	U	ug/L	P362012	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: FLINT CREEK @ KNIGHTS GRIFFIN RD **Collection Date/Time: 04/09/2019 10:25**

Field ID: G2SW0066 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2076996	EPA 180.1 Rev. 2.0	Turbidity	13		NTU	P361923	
	EPA 300.0 Rev. 2.1	Chloride	26		mg Cl/L	P362269	
	SM 2120 B	Color (true)	79		PCU	P361955	
	SM 2320 B-97	Total Alkalinity	60		mg CaCO3/L	P362274	
	SM 2540 C-97	TDS	133		mg/L	P362518	
	SM 2540 D-97	TSS	23		mg/L	P362235	
	SM 4500 F-C-97	Fluoride	0.28		mg F/L	P362277	
2076997	EPA 350.1 Rev. 2.0	Ammonia-N	0.42		mg N/L	P362292	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.6		mg N/L	P362341	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.045		mg N/L	P362416	
	EPA 365.1 Rev. 2.0	Total-P	0.57		mg P/L	P362246	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P362107	
2076998	EPA 300.0 Rev. 2.1 dissolved	Sulfate	8.9		mg SO4/L	P362272	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.31		mg P/L	P361932	

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: P361923

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362012

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: P362012

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: P362269

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P362272

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362292

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: P362340

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362341

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362416

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362246

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P361932

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

Reference Method: SM 2120 B
Batch ID: P361955

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P362274

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

Reference Method: SM 2540 C-97
Batch ID: P362518

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P362235

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P362277

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P362107

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: P362012

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	103		P	85 - 115
Iron	103		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	98.8		P	85 - 115
Sodium	98.9		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P362012

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	92.3		P	85 - 115
Antimony	94.7		P	85 - 115
Arsenic	96.8		P	85 - 115
Boron	92.1		P	85 - 115
Cadmium	97.0		P	85 - 115
Chromium	88.5		P	85 - 115
Copper	102		P	85 - 115
Lead	99.0		P	85 - 115
Nickel	101		P	85 - 115
Selenium	101		P	85 - 115
Silver	110		P	85 - 115
Thallium	96.8		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362269

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

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P362272

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	108		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362292

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: P362340

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362341

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362416

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: P362246

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P361932

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

Reference Method: SM 2120 B
Batch ID: P361955

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	104		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P362274

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P362277

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.1		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P362107

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.6		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362012

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077023	Barium	101		P	80 - 120
2077023	Calcium	101		P	80 - 120
2077023	Iron	102		P	80 - 120
2077023	Magnesium	102		P	80 - 120
2077023	Potassium	99.3		P	80 - 120
2077023	Sodium	100		P	80 - 120
2077023	Zinc	101		P	80 - 120
2077340	Barium	105	106	P/P	80 - 120
2077340	Calcium	103	104	P/P	80 - 120
2077340	Iron	112	106	P/P	80 - 120
2077340	Magnesium	106	106	P/P	80 - 120
2077340	Potassium	108	107	P/P	80 - 120
2077340	Sodium	105	103	P/P	80 - 120
2077340	Zinc	103	105	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P362012

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077023	Aluminum	91.3		P	80 - 120
2077023	Antimony	95.3		P	80 - 120
2077023	Arsenic	97.1		P	80 - 120
2077023	Boron	92.7		P	80 - 120
2077023	Cadmium	96.8		P	80 - 120
2077023	Chromium	88.7		P	80 - 120
2077023	Copper	102		P	80 - 120
2077023	Lead	101		P	80 - 120
2077023	Nickel	98.1		P	80 - 120
2077023	Selenium	101		P	80 - 120
2077023	Silver	110		P	80 - 120
2077023	Thallium	96.3		P	80 - 120
2077340	Aluminum	94.8	96.8	P/P	80 - 120
2077340	Antimony	94.3	97.7	P/P	80 - 120
2077340	Arsenic	97.6	101	P/P	80 - 120
2077340	Boron	97.2	98.1	P/P	80 - 120
2077340	Cadmium	97.1	99.7	P/P	80 - 120
2077340	Chromium	90.4	93.0	P/P	80 - 120
2077340	Copper	107	110	P/P	80 - 120
2077340	Lead	101	108	P/P	80 - 120
2077340	Nickel	104	107	P/P	80 - 120
2077340	Selenium	99.4	103	P/P	80 - 120
2077340	Silver	111	111	P/P	80 - 120
2077340	Thallium	95.2	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362269

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076818	Chloride	107		P	90 - 110
2077011	Chloride	106		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P362272

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076818	Sulfate	107		P	90 - 110
2077011	Sulfate	107		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362292

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076991	Ammonia-N	100	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362340

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076931	Kjeldahl Nitrogen	102	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362341

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077008	Kjeldahl Nitrogen	106	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362416

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076924	NO2NO3-N	100	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362246

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076991	Total-P	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P361932

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076992	O-Phosphate-P	97.4	99.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P362277

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077321	Fluoride	99.0	99.5	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P362107

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076905	Organic Carbon	99.3	102	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P361923

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076923	Turbidity	1.19	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362012

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077340	Barium	1.08	Spike	P	0 - 20
2077340	Calcium	0.416	Spike	P	0 - 20
2077340	Iron	6.20	Spike	P	0 - 20
2077340	Magnesium	0.596	Spike	P	0 - 20
2077340	Potassium	0.575	Spike	P	0 - 20
2077340	Sodium	1.08	Spike	P	0 - 20
2077340	Zinc	1.69	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P362012

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077340	Aluminum	1.97	Spike	P	0 - 20
2077340	Antimony	3.57	Spike	P	0 - 20
2077340	Arsenic	3.11	Spike	P	0 - 20
2077340	Boron	0.784	Spike	P	0 - 20
2077340	Cadmium	2.60	Spike	P	0 - 20
2077340	Chromium	2.86	Spike	P	0 - 20
2077340	Copper	2.83	Spike	P	0 - 20
2077340	Lead	6.48	Spike	P	0 - 20
2077340	Nickel	3.36	Spike	P	0 - 20
2077340	Selenium	3.56	Spike	P	0 - 20
2077340	Silver	0.282	Spike	P	0 - 20
2077340	Thallium	6.24	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362269

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076818	Chloride	0.626	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P362272

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076818	Sulfate	0.398	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362292

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076991	Ammonia-N	1.66	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362340

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076931	Kjeldahl Nitrogen	0.574	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362341

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077008	Kjeldahl Nitrogen	2.06	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362416

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076924	NO2NO3-N	0.382	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362246

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076991	Total-P	0.211	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P361932

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076992	O-Phosphate-P	2.43	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P361955

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076979	Color (true)	1.48	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P362274

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077321	Total Alkalinity	2.79	Sample	P	0 - 2.8

Quality Assurance Report
Precision

Reference Method: SM 2540 C-97
Batch ID: P362518

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076979	TDS	5.48	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P362277

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077321	Fluoride	0.487	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P362107

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076905	Organic Carbon	1.37	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: A90588
Included Lab Sample IDs: 2076993, 2076996

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	100	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A90589
Included Lab Sample IDs: 2076995, 2076998

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.7	96.0	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A90600
Included Lab Sample IDs: 2076993, 2076996

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A90680
Included Lab Sample IDs: 2077002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	103	P/P	90 - 110
Calcium	102	102	P/P	90 - 110
Iron	101	102	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Potassium	97.8	98.5	P/P	90 - 110
Sodium	99.1	100	P/P	90 - 110
Zinc	102	102	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A90701
Included Lab Sample IDs: 2076994, 2076997

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	101	98.2	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A90759
Included Lab Sample IDs: 2076993, 2076996

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	99.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A90759
Included Lab Sample IDs: 2076993, 2076996

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.5	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A90760
Included Lab Sample IDs: 2076993, 2076996

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	104	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Run ID: A90760
Included Lab Sample IDs: 2076995, 2076998

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sulfate	102	106	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A90764
Included Lab Sample IDs: 2076994, 2076997

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A90796
Included Lab Sample IDs: 2076994, 2076997

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A90815
Included Lab Sample IDs: 2076994, 2076997

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A90817
Included Lab Sample IDs: 2076994

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.6	95.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A90860
Included Lab Sample IDs: 2076997

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.8	97.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A90862
Included Lab Sample IDs: 2077002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	94.2	96.2	P/P	90 - 110
Antimony	94.8	94.6	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A90862
Included Lab Sample IDs: 2077002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	97.2	96.3	P/P	90 - 110
Boron	90.0	100	P/P	90 - 110
Cadmium	96.2	96.8	P/P	90 - 110
Chromium	93.1	94.9	P/P	90 - 110
Lead	102	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A90943
Included Lab Sample IDs: 2077002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	95.0	94.4	P/P	90 - 110
Nickel	95.5	94.0	P/P	90 - 110
Selenium	95.4	94.0	P/P	90 - 110
Silver	103	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A91043
Included Lab Sample IDs: 2077002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Thallium	91.7	91.4	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						1.19	
EPA 200.7 Rev. 4.4	Barium	102	101	105	106			1.08
	Calcium	103	101	103	104			0.416
	Iron	103	102	112	106			6.20
	Magnesium	104	102	106	106			0.596
	Potassium	98.8	99.3	108	107			0.575
	Sodium	98.9	100	105	103			1.08
	Zinc	102	101	103	105			1.69
EPA 200.8 Rev. 5.4	Aluminum	92.3	91.3	94.8	96.8			1.97
	Antimony	94.7	95.3	94.3	97.7			3.57
	Arsenic	96.8	97.1	97.6	101			3.11
	Boron	92.1	92.7	97.2	98.1			0.784
	Cadmium	97.0	96.8	97.1	99.7			2.60
	Chromium	88.5	88.7	90.4	93.0			2.86
	Copper	102	102	107	110			2.83
	Lead	99.0	101	101	108			6.48
	Nickel	101	98.1	104	107			3.36
	Selenium	101	101	99.4	103			3.56
	Silver	110	110	111	111			0.282
	Thallium	96.8	96.3	95.2	101			6.24
EPA 300.0 Rev. 2.1	Chloride	106	107	106			0.626	
EPA 300.0 Rev. 2.1 dissolved	Sulfate	108	107	107			0.398	
EPA 350.1 Rev. 2.0	Ammonia-N	100	100	102				1.66
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	102	103				0.574
	Kjeldahl Nitrogen	104	106	103				2.06
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	99.5	100				0.382
EPA 365.1 Rev. 2.0	Total-P	101	102	103				0.211
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	97.4	99.8				2.43
SM 2120 B	Color (true)	104					1.48	
SM 2320 B-97	Total Alkalinity	101					2.79	
SM 2540 C-97	TDS						5.48	
SM 4500 F-C-97	Fluoride	96.1	99.0	99.5				0.487
SM 5310 B-00	Organic Carbon	99.6	99.3	102				1.37

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2076993, 2076996
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2077002
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2077002
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2076993, 2076996
EPA 300.0 Rev. 2.1 dissolved / E31780	Sulfate, dissolved, in filtered, aqueous matrices	2076995, 2076998
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2076994, 2076997
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2076994, 2076997
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2076994, 2076997
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2076994, 2076997

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2076995, 2076998
SM 2120 B / E31780	True Color measured at 450 nm	2076993, 2076996
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2076993, 2076996
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2076993, 2076996
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2076993, 2076996
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2076993, 2076996
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2076994, 2076997

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	04/10/2019			04/10/2019 17:05	Adrian Shelby	2076993, 2076996
EPA 200.7 Rev. 4.4	04/10/2019	04/11/2019 17:20	Elliott D. Healy	04/12/2019 13:52	Betina Topolski	2077002
EPA 200.8 Rev. 5.4	04/10/2019	04/11/2019 17:20	Elliott D. Healy	04/20/2019 02:08	Robert K Palmer	2077002
	04/10/2019	04/11/2019 17:20	Elliott D. Healy	04/23/2019 17:01	Robert K Palmer	2077002
	04/10/2019	04/11/2019 17:20	Elliott D. Healy	04/26/2019 16:39	Robert K Palmer	2077002
EPA 300.0 Rev. 2.1	04/10/2019			04/16/2019 10:30	Julia Storbeck	2076993
	04/10/2019			04/16/2019 10:42	Julia Storbeck	2076996
EPA 300.0 Rev. 2.1 dissolved	04/10/2019			04/16/2019 12:19	Julia Storbeck	2076995
	04/10/2019			04/16/2019 12:32	Julia Storbeck	2076998
EPA 350.1 Rev. 2.0	04/10/2019			04/16/2019 14:15	Ping Hua	2076994
	04/10/2019			04/16/2019 14:17	Ping Hua	2076997
EPA 351.2 Rev. 2.0	04/10/2019	04/17/2019 12:45	Adrian Shelby	04/18/2019 12:41	Joseph Suarez	2076994
	04/10/2019	04/17/2019 12:45	Adrian Shelby	04/18/2019 15:05	Joseph Suarez	2076997
EPA 353.2 Rev. 2.0	04/10/2019			04/18/2019 10:32	Beverly Y. Sanders	2076994
	04/10/2019			04/18/2019 10:33	Beverly Y. Sanders	2076997
EPA 365.1 Rev. 2.0	04/10/2019	04/16/2019 13:55	Sima Feizi	04/17/2019 15:16	Rosalyn Ballman	2076994
	04/10/2019	04/16/2019 13:55	Sima Feizi	04/17/2019 15:17	Rosalyn Ballman	2076997
EPA 365.1 Rev. 2.0 dissolved	04/10/2019			04/10/2019 18:44	Jhamieka S. Greenwood	2076995
	04/10/2019			04/10/2019 18:45	Jhamieka S. Greenwood	2076998
SM 2120 B	04/10/2019			04/10/2019 16:07	Mariam Hanna	2076993
	04/10/2019			04/10/2019 16:08	Mariam Hanna	2076996
SM 2320 B-97	04/10/2019			04/16/2019 03:14	Samantha Davila	2076993
	04/10/2019			04/16/2019 03:27	Samantha Davila	2076996
SM 2540 C-97	04/10/2019			04/11/2019 16:14	Yijie Li	2076993, 2076996
SM 2540 D-97	04/10/2019			04/11/2019 16:14	Yijie Li	2076993, 2076996
SM 4500 F-C-97	04/10/2019			04/16/2019 03:14	Samantha Davila	2076993
	04/10/2019			04/16/2019 03:27	Samantha Davila	2076996
SM 5310 B-00	04/10/2019			04/13/2019 06:58	Julia Storbeck	2076994
	04/10/2019			04/13/2019 07:11	Julia Storbeck	2076997