Chemical Analysis Report

SE-DIST-2016-03-11-01

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

Event Description: **SMP with March TREND**
Request ID: **RQ-2016-03-07-12**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

For additional information please contact
Timothy W. Fitzpatrick
Liang-Tsair Lin, Ph.D.
Colin Wright, Ph.D.
Thekkekalathil Chandrasekhar, PhD, QA Officer
Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 29-MAR-2016 10:46

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 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: FLORIDA CITY CANAL (FC-15 MIAMI-DADE) **Collection Date/Time: 03/10/2016 08:45**

Field ID: G4SEFC15-03/10/2016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1779167	EPA 180.1 Rev. 2.0	Turbidity	0.95		NTU	P300240	
	EPA 300.0 Rev. 2.1	Chloride	39		mg Cl/L	P300481	
	SM 2120 B	Color (true)	6.0	I	PCU	P300229	
	SM 2320 B-97	Total Alkalinity	189		mg CaCO3/L	P300587	
	SM 2540 C-97	TDS	282		mg/L	P300823	
	SM 2540 D-97	TSS	2	U	mg/L	P300448	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P300590	
1779168	EPA 350.1 Rev. 2.0	Ammonia-N	0.032		mg N/L	P300852	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.44		mg N/L	P300743	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.42		mg N/L	P300703	
	EPA 365.1 Rev. 2.0	Total-P	0.009		mg P/L	P300697	
	SM 5310 B-00	Organic Carbon	3.0		mg C/L	P300650	
1779169	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P300239	
1779198	EPA 200.7 Rev. 4.4	Calcium	76.6		mg/L	P300499	
		Iron	30	U	ug/L	P300499	
		Magnesium	5.14		mg/L	P300499	
		Potassium	6.8		mg/L	P300499	
		Sodium	24.7		mg/L	P300499	
		Zinc	5.0	U	ug/L	P300499	
	EPA 200.8 Rev. 5.4	Arsenic	0.89		ug/L	P300499	
		Cadmium	0.020	U	ug/L	P300499	
		Chromium	0.050	U	ug/L	P300499	
		Copper	0.37	I	ug/L	P300499	
		Lead	0.10	I	ug/L	P300499	
		Nickel	0.76		ug/L	P300499	
		Silver	0.0050	U	ug/L	P300499	

Ref. Method and Comment:
SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.
EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: L-5 @ G-206 **Collection Date/Time: 03/10/2016 11:50**

Field ID: G5SE0002-03/10/2016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1779161	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P300240	
	EPA 300.0 Rev. 2.1	Chloride	33		mg Cl/L	P300481	
		Sulfate	3.5		mg SO4/L	P300484	
	SM 2120 B	Color (true)	120		PCU	P300229	
	SM 2320 B-97	Total Alkalinity	135	A	mg CaCO3/L	P300587	
	SM 2540 C-97	TDS	218		mg/L	P300823	
	SM 2540 D-97	TSS	2	I	mg/L	P300448	
	SM 4500 F-C-97	Fluoride	0.17		mg F/L	P300590	
1779163	EPA 350.1 Rev. 2.0	Ammonia-N	0.073		mg N/L	P300852	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P300743	

Field ID: G5SE0002-03/10/2016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1779163	EPA 353.2 Rev. 2.0	NO2NO3-N	0.034		mg N/L	P300703	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P300697	
	SM 5310 B-00	Organic Carbon	24		mg C/L	P300650	
1779165	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P300239	

Ref. Method and Comment:
SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.
EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: L-5 @ G-205 **Collection Date/Time: 03/10/2016 12:10**

Field ID: G5SE0032-03/10/2016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1779162	EPA 180.1 Rev. 2.0	Turbidity	1.7		NTU	P300240	
	EPA 300.0 Rev. 2.1	Chloride	50		mg Cl/L	P300481	
		Sulfate	7.6		mg SO4/L	P300484	
	SM 2120 B	Color (true)	100		PCU	P300229	
	SM 2320 B-97	Total Alkalinity	194		mg CaCO3/L	P300587	
	SM 2540 C-97	TDS	324		mg/L	P300823	
	SM 2540 D-97	TSS	3	I	mg/L	P300448	
	SM 4500 F-C-97	Fluoride	0.25		mg F/L	P300590	
1779164	EPA 350.1 Rev. 2.0	Ammonia-N	0.050		mg N/L	P300852	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P300743	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.073		mg N/L	P300703	
	EPA 365.1 Rev. 2.0	Total-P	0.019		mg P/L	P300697	
	SM 5310 B-00	Organic Carbon	22		mg C/L	P300650	
1779166	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P300239	

Ref. Method and Comment:
SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.
EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P300240

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P300499

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P300499

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300481

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300484

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P300852

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300743

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300703

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P300697

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P300239

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2120 B
Batch ID: P300229

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P300587

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

Reference Method: SM 2540 C-97
Batch ID: P300823

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P300448

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P300590

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P300650

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: P300499

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	106		P	85 - 115
Iron	107		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	103		P	85 - 115
Sodium	103		P	85 - 115
Zinc	99.3		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P300499

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	97.5		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P300499

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cadmium	96.0		P	85 - 115
Chromium	95.8		P	85 - 115
Copper	92.2		P	85 - 115
Lead	88.7		P	85 - 115
Nickel	95.5		P	85 - 115
Silver	92.4		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300481

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300484

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P300852

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300743

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.9		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300703

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: P300697

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	97.1		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P300239

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-97
Batch ID: P300587

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

Reference Method: SM 4500 F-C-97
Batch ID: P300590

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.4		P	94 - 108

Reference Method: SM 5310 B-00
Batch ID: P300650

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.0		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P300499

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1779198	Calcium	103		P	80 - 120
1779198	Iron	106	106	P/P	80 - 120
1779198	Magnesium	102		P	80 - 120
1779198	Potassium	102		P	80 - 120
1779198	Sodium	102		P	80 - 120
1779198	Zinc	99.2	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P300499

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1779198	Arsenic	100	99.5	P/P	80 - 120
1779198	Cadmium	98.8	97.5	P/P	80 - 120
1779198	Chromium	94.7	94.6	P/P	80 - 120
1779198	Copper	90.1	88.9	P/P	80 - 120
1779198	Lead	90.6	90.8	P/P	80 - 120
1779198	Nickel	92.7	91.5	P/P	80 - 120
1779198	Silver	92.6	92.4	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300481

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1779117	Chloride	100	101	P/P	90 - 110
1779155	Chloride	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300484

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300484

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1779117	Sulfate	99.9	99.8	P/P	90 - 110
1779155	Sulfate	97.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300743

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1779118	Kjeldahl Nitrogen	106	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300703

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1779178	NO2NO3-N	100	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P300697

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1779023	Total-P	96.4	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P300239

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1779157	O-Phosphate-P	96.1	96.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P300590

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1779161	Fluoride	100	101	P/P	94 - 107

Reference Method: SM 5310 B-00
Batch ID: P300650

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1778926	Organic Carbon	93.4	93.4	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P300240

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779155	Turbidity	6.51	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P300499

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779198	Calcium	2.59	Spike	P	0 - 20
1779198	Iron	0.197	Spike	P	0 - 20
1779198	Magnesium	0.735	Spike	P	0 - 20
1779198	Potassium	1.10	Spike	P	0 - 20
1779198	Sodium	2.79	Spike	P	0 - 20
1779198	Zinc	0.813	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P300499

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779198	Arsenic	0.928	Spike	P	0 - 20
1779198	Cadmium	1.37	Spike	P	0 - 20
1779198	Chromium	0.126	Spike	P	0 - 20
1779198	Copper	1.36	Spike	P	0 - 20
1779198	Lead	0.273	Spike	P	0 - 20
1779198	Nickel	1.28	Spike	P	0 - 20
1779198	Silver	0.223	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300481

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779117	Chloride	0.396	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300484

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779117	Sulfate	0.0735	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P300852

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779163	Ammonia-N	0.334	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300743

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779118	Kjeldahl Nitrogen	2.39	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300703

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779178	NO2NO3-N	0.926	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P300697

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779023	Total-P	3.56	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P300239

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779157	O-Phosphate-P	0.568	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P300229

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779176	Color (true)	0.233	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P300587

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779161	Total Alkalinity	0.262	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P300823

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779155	TDS	0.0	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P300590

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1779161	Fluoride	0.470	Spike	P	0 - 3.7

Reference Method: SM 5310 B-00
Batch ID: P300650

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1778926	Organic Carbon	0.0556	Spike	P	0 - 20

Quality Assurance Report
Precision

* 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: SM 2120 B
Run ID: A68172
Included Lab Sample IDs: 1779161, 1779162, 1779167

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.9	99.0	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A68175
Included Lab Sample IDs: 1779165, 1779166, 1779169

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.0	99.7	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A68177
Included Lab Sample IDs: 1779161, 1779162, 1779167

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A68261
Included Lab Sample IDs: 1779161, 1779162, 1779167

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.4	101	P/P	90 - 110
Sulfate	96.6	99.1	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A68295
Included Lab Sample IDs: 1779161, 1779162, 1779167

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	103	P/P	90 - 110
Total Alkalinity	102	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A68295
Included Lab Sample IDs: 1779161, 1779162, 1779167

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A68306
Included Lab Sample IDs: 1779198

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.9	98.6	P/P	90 - 110
Cadmium	98.8	99.4	P/P	90 - 110
Chromium	97.2	97.7	P/P	90 - 110
Copper	95.0	95.1	P/P	90 - 110
Lead	97.3	96.6	P/P	90 - 110
Nickel	96.1	95.8	P/P	90 - 110
Silver	92.8	92.9	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A68315
Included Lab Sample IDs: 1779163, 1779164, 1779168

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.8	98.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A68335
Included Lab Sample IDs: 1779163, 1779164, 1779168

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A68346
Included Lab Sample IDs: 1779198

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	103	P/P	90 - 110
Iron	100	101	P/P	90 - 110
Magnesium	99.6	100	P/P	90 - 110
Potassium	101	99.1	P/P	90 - 110
Sodium	100	101	P/P	90 - 110
Zinc	99.2	99.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A68389
Included Lab Sample IDs: 1779163, 1779164, 1779168

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A68399
Included Lab Sample IDs: 1779163, 1779164, 1779168

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	108	104	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A68404
Included Lab Sample IDs: 1779163, 1779164, 1779168

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.5	97.8	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					6.51	
EPA 200.7 Rev. 4.4	Calcium	106	103				2.59
	Iron	107	106	106			0.197
	Magnesium	103	102				0.735
	Potassium	103	102				1.10
	Sodium	103	102				2.79
	Zinc	99.3	99.2	100			0.813
EPA 200.8 Rev. 5.4	Arsenic	97.5	100	99.5			0.928
	Cadmium	96.0	98.8	97.5			1.37
	Chromium	95.8	94.7	94.6			0.126
	Copper	92.2	90.1	88.9			1.36
	Lead	88.7	90.6	90.8			0.273
	Nickel	95.5	92.7	91.5			1.28
	Silver	92.4	92.6	92.4			0.223
EPA 300.0 Rev. 2.1	Chloride	99.9	100	101	100		0.396
	Sulfate	99.8	99.9	99.8	97.4		0.0735
EPA 350.1 Rev. 2.0	Ammonia-N	102					0.334
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.9	106	104			2.39
EPA 353.2 Rev. 2.0	NO2NO3-N	100	100	99.0			0.926
EPA 365.1 Rev. 2.0	Total-P	97.1	96.4	100			3.56
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	96.1	96.8			0.568
SM 2120 B	Color (true)					0.233	
SM 2320 B-97	Total Alkalinity	102				0.262	
SM 2540 C-97	TDS					0.0	
SM 4500 F-C-97	Fluoride	99.4	100	101			0.470
SM 5310 B-00	Organic Carbon	95.0	93.4	93.4			0.0556

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1779161, 1779162, 1779167
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1779198
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1779198
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1779161, 1779162, 1779167

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1779161, 1779162
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1779163, 1779164, 1779168
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1779163, 1779164, 1779168
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1779163, 1779164, 1779168
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1779163, 1779164, 1779168
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1779165, 1779166, 1779169
SM 2120 B / E31780	True Color measured at 450 nm	1779161, 1779162, 1779167
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1779161, 1779162, 1779167
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1779161, 1779162, 1779167
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1779161, 1779162, 1779167
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1779161, 1779162, 1779167
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1779163, 1779164, 1779168

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	03/11/2016			03/11/2016 14:18	Sima Feizi	1779161, 1779162, 1779167
EPA 200.7 Rev. 4.4	03/11/2016	03/16/2016	Elliott D. Healy	03/21/2016	Joshua Ayres	1779198
EPA 200.8 Rev. 5.4	03/11/2016	03/16/2016	Elliott D. Healy	03/18/2016	Charles J. Peterson	1779198
EPA 300.0 Rev. 2.1	03/11/2016			03/16/2016	Ping Hua	1779161, 1779162
EPA 350.1 Rev. 2.0	03/11/2016			03/22/2016	Diana M. Turner	1779163, 1779164, 1779168
EPA 351.2 Rev. 2.0	03/11/2016	03/22/2016	Sofia Elnemr	03/23/2016	Rochelle Y Jackson	1779163, 1779164, 1779168
EPA 353.2 Rev. 2.0	03/11/2016			03/18/2016	Diana M. Turner	1779163, 1779164, 1779168
EPA 365.1 Rev. 2.0	03/11/2016	03/21/2016	Christopher Armour	03/23/2016	Lipi Saha	1779163, 1779164, 1779168
EPA 365.1 Rev. 2.0 dissolved	03/11/2016			03/11/2016 14:34	Ping Hua	1779165
	03/11/2016			03/11/2016 14:35	Ping Hua	1779166
	03/11/2016			03/11/2016 14:36	Ping Hua	1779169
SM 2120 B	03/11/2016			03/11/2016 14:21	Rochelle Y Jackson	1779161
	03/11/2016			03/11/2016 14:22	Rochelle Y Jackson	1779162
	03/11/2016			03/11/2016 14:23	Rochelle Y Jackson	1779167
SM 2320 B-97	03/11/2016			03/16/2016	Dale L. Simmons	1779161
	03/11/2016			03/17/2016	Dale L. Simmons	1779162, 1779167
SM 2540 C-97	03/11/2016			03/15/2016	Christopher Armour	1779161, 1779162, 1779167
SM 2540 D-97	03/11/2016			03/15/2016	Christopher Armour	1779161, 1779162, 1779167
SM 4500 F-C-97	03/11/2016			03/16/2016	Dale L. Simmons	1779161
	03/11/2016			03/17/2016	Dale L. Simmons	1779162, 1779167
SM 5310 B-00	03/11/2016			03/17/2016	Sofia Elnemr	1779163, 1779164, 1779168