Chemical Analysis Report

WQ-ASSESS-2017-03-08-01

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

Event Description: **Wakulla BMAP**
Request ID: **RQ-2017-02-13-63**
Customer: **WQ-ASSESS**
Project ID: **BMAP**

Send Reports to:
FL Dept. of Environmental Protection
Division Of Water Facilities, FL DEP
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Tallahassee, FL 32399-2400
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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 05-APR-2017 13:22

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: Wakulla at Boat Tram **Collection Date/Time: 03/08/2017 10:00**

Field ID: 44059-03082017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1878632	EPA 180.1 Rev. 2.0	Turbidity	0.30		NTU	P321197	
	EPA 300.0 Rev. 2.1	Chloride	8.7		mg Cl/L	P321784	
		Sulfate	11		mg SO4/L	P321788	
	SM 2120 B	Color (true)	7.4		PCU	P321190	
	SM 2320 B-97	Total Alkalinity	143	A	mg CaCO3/L	P321528	
	SM 2540 C-97	TDS	168		mg/L	P321887	
	SM 2540 D-97	TSS	2	I	mg/L	P321819	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P321532	
1878634	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	I	mg N/L	P321449	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P321573	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.44		mg N/L	P321592	
	EPA 365.1 Rev. 2.0	Total-P	0.030		mg P/L	P321373	
	SM 5310 B-00	Organic Carbon	1.2		mg C/L	P321339	
1878636	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.026		mg P/L	P321191	
1878642	EPA 200.7 Rev. 4.4	Calcium	45.6		mg/L	P321458	
		Iron	30	U	ug/L	P321458	
		Magnesium	9.72		mg/L	P321458	
		Potassium	0.59	I	mg/L	P321458	
		Sodium	5.5		mg/L	P321458	
		Zinc	5.0	U	ug/L	P321458	
	EPA 200.8 Rev. 5.4	Arsenic	0.51		ug/L	P321458	
		Cadmium	0.020	U	ug/L	P321458	
		Chromium	0.68	I	ug/L	P321458	
		Copper	0.20	U	ug/L	P321458	
		Lead	0.050	U	ug/L	P321458	
		Nickel	0.20	U	ug/L	P321458	
		Silver	0.010	U	ug/L	P321458	

Ref. Method and Comment:
EPA 180.1 Rev. 2.0: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Wakulla at CR365 **Collection Date/Time: 03/08/2017 14:06**

Field ID: 34879-03082017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1878633	EPA 180.1 Rev. 2.0	Turbidity	0.75	A	NTU	P321197	
	EPA 300.0 Rev. 2.1	Chloride	8.7		mg Cl/L	P321784	
		Sulfate	11		mg SO4/L	P321788	
	SM 2120 B	Color (true)	7.1		PCU	P321190	
	SM 2320 B-97	Total Alkalinity	148		mg CaCO3/L	P321528	
	SM 2540 C-97	TDS	183		mg/L	P321887	
	SM 2540 D-97	TSS	4	I	mg/L	P321819	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P321532	
1878635	EPA 350.1 Rev. 2.0	Ammonia-N	0.01		mg N/L	P321449	

Field ID: 34879-03082017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1878635	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.14	I	mg N/L	P321573	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.37		mg N/L	P321592	
	EPA 365.1 Rev. 2.0	Total-P	0.031		mg P/L	P321373	
	SM 5310 B-00	Organic Carbon	1.3		mg C/L	P321339	
1878637	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.026		mg P/L	P321191	
1878643	EPA 200.7 Rev. 4.4	Calcium	45.6		mg/L	P321458	
		Iron	30	U	ug/L	P321458	
		Magnesium	9.68		mg/L	P321458	
		Potassium	0.57	I	mg/L	P321458	
		Sodium	5.4		mg/L	P321458	
		Zinc	5.0	U	ug/L	P321458	
	EPA 200.8 Rev. 5.4	Arsenic	0.55		ug/L	P321458	
		Cadmium	0.020	U	ug/L	P321458	
		Chromium	0.73	I	ug/L	P321458	
		Copper	0.20	U	ug/L	P321458	
		Lead	0.050	U	ug/L	P321458	
		Nickel	0.20	U	ug/L	P321458	
		Silver	0.010	U	ug/L	P321458	

Ref. Method and Comment:
EPA 180.1 Rev. 2.0: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
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: P321197

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P321458

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321458

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321458

Component	Result	Code	Units
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321784

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321788

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P321449

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P321573

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P321592

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P321373

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P321191

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

Reference Method: SM 2120 B
Batch ID: P321190

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P321528

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

Reference Method: SM 2540 C-97
Batch ID: P321887

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P321819

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P321532

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P321339

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: P321458

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	104		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	101		P	85 - 115
Sodium	105		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321458

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	104		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	105		P	85 - 115
Copper	102		P	85 - 115
Lead	89.8		P	85 - 115
Nickel	104		P	85 - 115
Silver	105		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321784

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321788

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P321449

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P321573

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.2		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P321592

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P321373

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P321191

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.3		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P321528

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P321532

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.1		P	92 - 103

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P321339

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.6		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P321458

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878250	Calcium	105		P	80 - 120
1878250	Iron	103		P	80 - 120
1878250	Magnesium	100		P	80 - 120
1878250	Potassium	99.2		P	80 - 120
1878250	Sodium	102		P	80 - 120
1878250	Zinc	99.5		P	80 - 120
1878643	Calcium	103		P	80 - 120
1878643	Iron	105	103	P/P	80 - 120
1878643	Magnesium	102		P	80 - 120
1878643	Potassium	102	102	P/P	80 - 120
1878643	Sodium	104		P	80 - 120
1878643	Zinc	99.8	97.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321458

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878250	Arsenic	91.0		P	80 - 120
1878250	Cadmium	88.6		P	80 - 120
1878250	Chromium	86.9		P	80 - 120
1878250	Copper	87.5		P	80 - 120
1878250	Lead	89.4		P	80 - 120
1878250	Nickel	88.4		P	80 - 120
1878250	Silver	87.8		P	80 - 120
1878643	Arsenic	91.3	93.3	P/P	80 - 120
1878643	Cadmium	88.3	91.8	P/P	80 - 120
1878643	Chromium	88.4	91.3	P/P	80 - 120
1878643	Copper	87.2	89.6	P/P	80 - 120
1878643	Lead	90.5	89.5	P/P	80 - 120
1878643	Nickel	88.4	90.8	P/P	80 - 120
1878643	Silver	89.1	91.9	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321784

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878351	Chloride	104		P	90 - 110
1878455	Chloride	104		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321788

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878351	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P321449

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878456	Ammonia-N	99.8	97.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P321573

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878635	Kjeldahl Nitrogen	98.1	98.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P321592

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878458	NO2NO3-N	104	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P321373

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878634	Total-P	99.4	99.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P321191

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878636	O-Phosphate-P	96.0	98.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P321532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878632	Fluoride	101	100	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P321339

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1878634	Organic Carbon	90.1	90.8	P/P	85 - 115

Quality Assurance Report
Precision

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P321458

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878643	Calcium	3.07	Spike	P	0 - 20
1878643	Iron	2.35	Spike	P	0 - 20
1878643	Magnesium	2.38	Spike	P	0 - 20
1878643	Potassium	0.197	Spike	P	0 - 20
1878643	Sodium	2.51	Spike	P	0 - 20
1878643	Zinc	2.05	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321458

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878643	Arsenic	2.13	Spike	P	0 - 20
1878643	Cadmium	3.91	Spike	P	0 - 20
1878643	Chromium	3.06	Spike	P	0 - 20
1878643	Copper	2.68	Spike	P	0 - 20
1878643	Lead	1.08	Spike	P	0 - 20
1878643	Nickel	2.60	Spike	P	0 - 20
1878643	Silver	3.08	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321784

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878351	Chloride	2.19	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P321449

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878456	Ammonia-N	1.80	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P321573

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878635	Kjeldahl Nitrogen	0.137	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P321592

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878458	NO2NO3-N	1.44	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P321373

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878634	Total-P	0.421	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P321191

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878636	O-Phosphate-P	2.34	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P321190

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878455	Color (true)	3.02	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P321528

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878632	Total Alkalinity	0.216	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P321887

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878414	TDS	8.00	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P321532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878632	Fluoride	0.480	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P321339

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1878634	Organic Carbon	0.777	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

Quality Assurance Report
Calibration Verification

Reference Method: SM 2120 B
Run ID: A74970
Included Lab Sample IDs: 1878632, 1878633

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.9	95.7	P/P	85 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A74971
Included Lab Sample IDs: 1878636, 1878637

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	96.9	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A74972
Included Lab Sample IDs: 1878632, 1878633

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

Reference Method: SM 5310 B-00
Run ID: A75012
Included Lab Sample IDs: 1878634, 1878635

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.0	95.8	P/P	90 - 110
Organic Carbon	95.8	95.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A75054
Included Lab Sample IDs: 1878634, 1878635

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A75081
Included Lab Sample IDs: 1878634, 1878635

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	99.2	P/P	90 - 110
Total-P	99.2	98.8	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A75091
Included Lab Sample IDs: 1878632, 1878633

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	103	101	P/P	90 - 110
Total Alkalinity	105	103	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 4500 F-C-97
Run ID: A75091
Included Lab Sample IDs: 1878632, 1878633

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	98.5	P/P	90 - 110
Fluoride	98.5	101	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A75109
Included Lab Sample IDs: 1878642, 1878643

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A75112
Included Lab Sample IDs: 1878634, 1878635

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A75123
Included Lab Sample IDs: 1878632, 1878633

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	105	104	P/P	90 - 110
Sulfate	102	98.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A75125
Included Lab Sample IDs: 1878642, 1878643

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.1	98.2	P/P	90 - 110
Cadmium	95.1	96.2	P/P	90 - 110
Chromium	98.2	98.2	P/P	90 - 110
Copper	100	99.8	P/P	90 - 110
Nickel	101	99.2	P/P	90 - 110
Silver	96.5	96.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A75141
Included Lab Sample IDs: 1878634, 1878635

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	92.5	93.9	P/P	90 - 110
Kjeldahl Nitrogen	93.9	95.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A75188
Included Lab Sample IDs: 1878642, 1878643

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	92.1	92.6	P/P	90 - 110
Lead	92.6	92.1	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 200.7 Rev. 4.4	Calcium	103	105	103				3.07
	Iron	104	103	105	103			2.35
	Magnesium	103	100	102				2.38
	Potassium	101	99.2	102	102			0.197
	Sodium	105	102	104				2.51
	Zinc	102	99.5	99.8	97.8			2.05
EPA 200.8 Rev. 5.4	Arsenic	104	91.0	91.3	93.3			2.13
	Cadmium	102	88.6	88.3	91.8			3.91
	Chromium	105	86.9	88.4	91.3			3.06
	Copper	102	87.5	87.2	89.6			2.68
	Lead	89.8	89.4	90.5	89.5			1.08
	Nickel	104	88.4	88.4	90.8			2.60
	Silver	105	87.8	89.1	91.9			3.08
EPA 300.0 Rev. 2.1	Chloride	103	104	104			2.19	
	Sulfate	99.5	101					
EPA 350.1 Rev. 2.0	Ammonia-N	104	99.8	97.8				1.80
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.2	98.1	98.2				0.137
EPA 353.2 Rev. 2.0	NO2NO3-N	104	104	105				1.44
EPA 365.1 Rev. 2.0	Total-P	99.8	99.4	99.9				0.421
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.3	96.0	98.9				2.34
SM 2120 B	Color (true)						3.02	
SM 2320 B-97	Total Alkalinity	104					0.216	
SM 2540 C-97	TDS						8.00	
SM 4500 F-C-97	Fluoride	97.1	101	100				0.480
SM 5310 B-00	Organic Carbon	95.6	90.1	90.8				0.777

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1878632, 1878633
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1878642, 1878643
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1878642, 1878643
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1878632, 1878633

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1878632, 1878633
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1878634, 1878635
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1878634, 1878635
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1878634, 1878635
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1878634, 1878635
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1878636, 1878637
SM 2120 B / E31780	True Color measured at 450 nm	1878632, 1878633
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1878632, 1878633
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1878632, 1878633
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1878632, 1878633
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1878632, 1878633
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1878634, 1878635

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	03/08/2017			03/08/2017 16:09	Sima Feizi	1878632, 1878633
EPA 200.7 Rev. 4.4	03/08/2017	03/13/2017	Elliott D. Healy	03/14/2017	Martin Acosta	1878642, 1878643
EPA 200.8 Rev. 5.4	03/08/2017	03/13/2017	Elliott D. Healy	03/15/2017	Betina Topolski	1878642, 1878643
	03/08/2017	03/13/2017	Elliott D. Healy	03/17/2017	Betina Topolski	1878642, 1878643
EPA 300.0 Rev. 2.1	03/08/2017			03/17/2017	Elisa J Lutz	1878632, 1878633
EPA 350.1 Rev. 2.0	03/08/2017			03/10/2017	Julie Michelle Frank	1878634, 1878635
EPA 351.2 Rev. 2.0	03/08/2017	03/15/2017	Adrian Shelby	03/16/2017	Joseph Suarez	1878634, 1878635
EPA 353.2 Rev. 2.0	03/08/2017			03/15/2017	Beverly Y. Sanders	1878634, 1878635
EPA 365.1 Rev. 2.0	03/08/2017	03/10/2017	Vijayalakshmi Reddy	03/13/2017	Lipi Saha	1878634, 1878635
EPA 365.1 Rev. 2.0 dissolved	03/08/2017			03/08/2017 16:23	Lipi Saha	1878636
	03/08/2017			03/08/2017 16:26	Lipi Saha	1878637
SM 2120 B	03/08/2017			03/08/2017 15:59	Julie Michelle Frank	1878632
	03/08/2017			03/08/2017 16:00	Julie Michelle Frank	1878633
SM 2320 B-97	03/08/2017			03/14/2017	Dale L. Simmons	1878632, 1878633
SM 2540 C-97	03/08/2017			03/10/2017	Yijie Li	1878632, 1878633
SM 2540 D-97	03/08/2017			03/10/2017	Yijie Li	1878632, 1878633
SM 4500 F-C-97	03/08/2017			03/14/2017	Dale L. Simmons	1878632, 1878633
SM 5310 B-00	03/08/2017			03/09/2017	Julie Michelle Frank	1878634
	03/08/2017			03/10/2017	Julie Michelle Frank	1878635