Chemical Analysis Report

SE-DIST-2016-10-05-02

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

Event Description: **SMP-Everglades dry season Run**
Request ID: **RQ-2016-10-03-10**
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: Matthew Sewell

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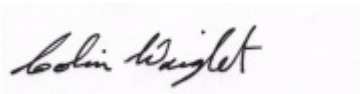
Certified by: Colin Wright, Environmental Administrator

Date Certified: 31-OCT-2016 13:19



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: WCA NORTH @ 3O1 **Collection Date/Time: 10/04/2016 10:45**

Field ID: G5SE0046 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1838333	EPA 180.1 Rev. 2.0	Turbidity	1.6		NTU	P312569	
	EPA 300.0 Rev. 2.1	Chloride	160		mg Cl/L	P313074	
		Sulfate	63		mg SO4/L	P313077	
	SM 2120 B	Color (true)	94		PCU	P312542	
	SM 2320 B-97	Total Alkalinity	205		mg CaCO3/L	P312765	
	SM 2540 C-97	TDS	552		mg/L	P313255	
	SM 2540 D-97	TSS	3	I	mg/L	P313279	
	SM 4500 F-C-97	Fluoride	0.30		mg F/L	P312769	
1838335	EPA 350.1 Rev. 2.0	Ammonia-N	0.057		mg N/L	P313471	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.9		mg N/L	P313197	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.097		mg N/L	P312970	
	EPA 365.1 Rev. 2.0	Total-P	0.032		mg P/L	P313371	
	SM 5310 B-00	Organic Carbon	26		mg C/L	P312728	
1838337	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.008	I	mg P/L	P312537	
1838383	EPA 200.7 Rev. 4.4	Calcium	73.2		mg/L	P312611	
		Iron	30	U	ug/L	P312611	
		Magnesium	18.9		mg/L	P312611	
		Potassium	7.7		mg/L	P312611	
		Sodium	103		mg/L	P312611	
		Zinc	5.0	U	ug/L	P312611	
	EPA 200.8 Rev. 5.4	Arsenic	1.64		ug/L	P312611	
		Beryllium	0.010	U	ug/L	P312611	
		Cadmium	0.020	U	ug/L	P312611	
		Chromium	0.15	I	ug/L	P312611	
		Copper	0.41		ug/L	P312611	
		Lead	0.053	I	ug/L	P312611	
		Nickel	0.27		ug/L	P312611	
		Silver	0.0050	U	ug/L	P312611	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: WPB CANAL @ THE ENR CANAL **Collection Date/Time: 10/04/2016 11:00**

Field ID: G5SE0012 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1838327	EPA 180.1 Rev. 2.0	Turbidity	28		NTU	P312569	
	EPA 300.0 Rev. 2.1	Chloride	260		mg Cl/L	P313074	
		Sulfate	150		mg SO4/L	P313077	
	SM 2120 B	Color (true)	180		PCU	P312542	
	SM 2320 B-97	Total Alkalinity	361		mg CaCO3/L	P312765	
	SM 2540 C-97	TDS	1.07E+03		mg/L	P313255	
	SM 2540 D-97	TSS	37		mg/L	P313279	
	SM 4500 F-C-97	Fluoride	0.53		mg F/L	P312769	

Field ID: G5SE0012 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1838329	EPA 350.1 Rev. 2.0	Ammonia-N	0.75		mg N/L	P313788	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	4.5		mg N/L	P313197	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.57		mg N/L	P312970	
	EPA 365.1 Rev. 2.0	Total-P	0.15		mg P/L	P313371	
	SM 5310 B-00	Organic Carbon	43		mg C/L	P312728	
1838331	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.069		mg P/L	P312537	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: HILLSCAN 0.25M SOUTH OF L-16 **Collection Date/Time: 10/04/2016 11:30**

Field ID: G5SE0005 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1838328	EPA 180.1 Rev. 2.0	Turbidity	38		NTU	P312569	
	EPA 300.0 Rev. 2.1	Chloride	100		mg Cl/L	P313074	
		Sulfate	120		mg SO4/L	P313077	
	SM 2120 B	Color (true)	140		PCU	P312542	
	SM 2320 B-97	Total Alkalinity	323		mg CaCO3/L	P312765	
	SM 2540 C-97	TDS	688		mg/L	P313255	
	SM 2540 D-97	TSS	45		mg/L	P313279	
	SM 4500 F-C-97	Fluoride	0.65		mg F/L	P312769	
1838330	EPA 350.1 Rev. 2.0	Ammonia-N	0.42		mg N/L	P313471	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	4.5		mg N/L	P313197	
	EPA 353.2 Rev. 2.0	NO2NO3-N	1.7		mg N/L	P312970	
	EPA 365.1 Rev. 2.0	Total-P	0.20		mg P/L	P313371	
	SM 5310 B-00	Organic Carbon	33		mg C/L	P312728	
1838332	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.067		mg P/L	P312537	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: WCA 1 SOUTH **Collection Date/Time: 10/04/2016 12:30**

Field ID: G5SE0047 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1838334	EPA 180.1 Rev. 2.0	Turbidity	1.1		NTU	P312569	
	EPA 300.0 Rev. 2.1	Chloride	130		mg Cl/L	P313074	
		Sulfate	55		mg SO4/L	P313077	
	SM 2120 B	Color (true)	86		PCU	P312542	
	SM 2320 B-97	Total Alkalinity	180		mg CaCO3/L	P312765	
	SM 2540 C-97	TDS	518		mg/L	P313255	
	SM 2540 D-97	TSS	2	I	mg/L	P313279	
	SM 4500 F-C-97	Fluoride	0.30		mg F/L	P312769	
1838336	EPA 350.1 Rev. 2.0	Ammonia-N	0.015		mg N/L	P313471	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.8		mg N/L	P313197	

Field ID: G5SE0047 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1838336	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P312970	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P313371	
	SM 5310 B-00	Organic Carbon	24		mg C/L	P312728	
1838338	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P312537	
1838384	EPA 200.7 Rev. 4.4	Calcium	66.1		mg/L	P312611	
		Iron	30	U	ug/L	P312611	
		Magnesium	17.3		mg/L	P312611	
		Potassium	6.7		mg/L	P312611	
		Sodium	88.7		mg/L	P312611	
		Zinc	5.0	U	ug/L	P312611	
	EPA 200.8 Rev. 5.4	Arsenic	1.31		ug/L	P312611	
		Beryllium	0.010	U	ug/L	P312611	
		Cadmium	0.020	U	ug/L	P312611	
		Chromium	0.10	I	ug/L	P312611	
		Copper	0.15	I	ug/L	P312611	
		Lead	0.050	U	ug/L	P312611	
		Nickel	0.15	I	ug/L	P312611	
		Silver	0.0050	U	ug/L	P312611	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P312569

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P312611

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: P312611

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Beryllium	0.010	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P312611

Component	Result	Code	Units
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: P313074

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313077

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313471

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313788

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P313197

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P312970

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313371

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P312537

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: P312542

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P312765

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

Reference Method: SM 2540 C-97
Batch ID: P313255

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P313279

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P312769

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P312728

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: P312611

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	102		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	97.6		P	85 - 115
Sodium	102		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P312611

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	98.7		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P312611

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Beryllium	97.8		P	85 - 115
Cadmium	97.6		P	85 - 115
Chromium	98.7		P	85 - 115
Copper	97.9		P	85 - 115
Lead	97.4		P	85 - 115
Nickel	98.8		P	85 - 115
Silver	95.5		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313074

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: P313077

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313471

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313788

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: P313197

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P312970

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: P313371

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.6		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P312537

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

Reference Method: SM 2320 B-97
Batch ID: P312765

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P312769

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P312728

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.4		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P312611

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1837764	Calcium	96.7		P	80 - 120
1837764	Iron	98.7		P	80 - 120
1837764	Magnesium	97.3		P	80 - 120
1837764	Potassium	96.1		P	80 - 120
1837764	Sodium	97.3		P	80 - 120
1837764	Zinc	98.8		P	80 - 120
1838241	Calcium	100		P	80 - 120
1838241	Iron	103	105	P/P	80 - 120
1838241	Magnesium	103	107	P/P	80 - 120
1838241	Potassium	95.5	97.4	P/P	80 - 120
1838241	Sodium	98.7		P	80 - 120
1838241	Zinc	102	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P312611

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1837764	Arsenic	101		P	80 - 120
1837764	Beryllium	96.4		P	80 - 120
1837764	Cadmium	101		P	80 - 120
1837764	Chromium	99.1		P	80 - 120
1837764	Copper	103		P	80 - 120
1837764	Lead	101		P	80 - 120
1837764	Nickel	97.3		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P312611

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1837764	Silver	96.9		P	80 - 120
1838241	Arsenic	100	99.6	P/P	80 - 120
1838241	Beryllium	101	99.3	P/P	80 - 120
1838241	Cadmium	99.4	100	P/P	80 - 120
1838241	Chromium	100	99.8	P/P	80 - 120
1838241	Copper	99.3	98.2	P/P	80 - 120
1838241	Lead	98.1	98.0	P/P	80 - 120
1838241	Nickel	99.7	98.1	P/P	80 - 120
1838241	Silver	96.1	97.0	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313074

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1838310	Chloride	102		P	90 - 110
1838411	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313077

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1838310	Sulfate	98.8		P	90 - 110
1838411	Sulfate	98.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313471

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1838314	Ammonia-N	97.4	99.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313788

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1837528	Ammonia-N	98.4	99.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P312970

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1838313	NO2NO3-N	106	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313371

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1838314	Total-P	98.1	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P312537

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P312537

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1838338	O-Phosphate-P	99.0	99.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P312769

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1838655	Fluoride	101	101	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P312728

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1838329	Organic Carbon	104		P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P312569

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838290	Turbidity	2.78	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P312611

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838241	Calcium	1.17	Spike	P	0 - 20
1838241	Iron	1.94	Spike	P	0 - 20
1838241	Magnesium	3.35	Spike	P	0 - 20
1838241	Potassium	1.52	Spike	P	0 - 20
1838241	Sodium	0.267	Spike	P	0 - 20
1838241	Zinc	1.93	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P312611

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838241	Arsenic	0.427	Spike	P	0 - 20
1838241	Beryllium	1.24	Spike	P	0 - 20
1838241	Cadmium	0.521	Spike	P	0 - 20
1838241	Chromium	0.436	Spike	P	0 - 20
1838241	Copper	1.05	Spike	P	0 - 20
1838241	Lead	0.0538	Spike	P	0 - 20
1838241	Nickel	1.49	Spike	P	0 - 20
1838241	Silver	0.904	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313074

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838310	Chloride	0.732	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313077

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838310	Sulfate	3.14	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313471

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838314	Ammonia-N	1.45	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313788

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1837528	Ammonia-N	0.847	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P313197

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838336	Kjeldahl Nitrogen	3.92	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P312970

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838313	NO2NO3-N	1.31	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313371

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838314	Total-P	3.63	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P312537

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838338	O-Phosphate-P	0.905	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2120 B
Batch ID: P312542

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838310	Color (true)	1.31	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P312765

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838655	Total Alkalinity	0.988	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P313255

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838309	TDS	3.88	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P312769

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838655	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P312728

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1838329	Organic Carbon	0.114	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 365.1 Rev. 2.0 dissolved
Run ID: A72038
Included Lab Sample IDs: 1838331, 1838332, 1838337, 1838338

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.6	99.0	P/P	90 - 110
O-Phosphate-P	99.7	100	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A72039
Included Lab Sample IDs: 1838327, 1838328, 1838333, 1838334

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	103	P/P	85 - 115

Quality Assurance Report
Calibration Verification

Reference Method: SM 2120 B
Run ID: A72039
Included Lab Sample IDs: 1838327, 1838328, 1838333, 1838334

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	103	105	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A72045
Included Lab Sample IDs: 1838327, 1838328, 1838333, 1838334

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

Reference Method: SM 5310 B-00
Run ID: A72091
Included Lab Sample IDs: 1838329, 1838330, 1838335, 1838336

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

Reference Method: SM 2320 B-97
Run ID: A72105
Included Lab Sample IDs: 1838327, 1838328, 1838333, 1838334

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

Reference Method: SM 4500 F-C-97
Run ID: A72105
Included Lab Sample IDs: 1838327, 1838328, 1838333, 1838334

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A72129
Included Lab Sample IDs: 1838383, 1838384

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	99.5	98.6	P/P	90 - 110
Iron	98.3	98.3	P/P	90 - 110
Magnesium	98.1	98.4	P/P	90 - 110
Potassium	97.3	98.1	P/P	90 - 110
Sodium	98.4	99.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72152
Included Lab Sample IDs: 1838383, 1838384

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.2	98.0	P/P	90 - 110
Beryllium	97.3	96.6	P/P	90 - 110
Cadmium	96.3	96.2	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72152
Included Lab Sample IDs: 1838383, 1838384

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	97.8	97.5	P/P	90 - 110
Copper	96.1	97.2	P/P	90 - 110
Lead	95.2	93.8	P/P	90 - 110
Silver	95.5	96.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A72155
Included Lab Sample IDs: 1838329, 1838330, 1838335, 1838336

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	102	P/P	90 - 110
NO2NO3-N	103	103	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A72171
Included Lab Sample IDs: 1838383, 1838384

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A72200
Included Lab Sample IDs: 1838327, 1838328, 1838333, 1838334

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.1	101	P/P	90 - 110
Sulfate	99.9	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72202
Included Lab Sample IDs: 1838383, 1838384

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	99.4	98.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A72298
Included Lab Sample IDs: 1838329, 1838330

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A72311
Included Lab Sample IDs: 1838330, 1838335, 1838336

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	96.6	98.7	P/P	90 - 110
Ammonia-N	98.6	97.9	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A72326
Included Lab Sample IDs: 1838329, 1838330, 1838335, 1838336

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.9	100	P/P	90 - 110
Kjeldahl Nitrogen	99.3	100	P/P	90 - 110
Kjeldahl Nitrogen	99.3	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A72345
Included Lab Sample IDs: 1838335, 1838336

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	99.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A72413
Included Lab Sample IDs: 1838329

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.4	99.1	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 180.1 Rev. 2.0	Turbidity						2.78	
EPA 200.7 Rev. 4.4	Calcium	103	96.7	100				1.17
	Iron	102	98.7	103	105			1.94
	Magnesium	104	97.3	103	107			3.35
	Potassium	97.6	96.1	95.5	97.4			1.52
	Sodium	102	97.3	98.7				0.267
	Zinc	101	98.8	102	100			1.93
EPA 200.8 Rev. 5.4	Arsenic	98.7	101	100	99.6			0.427
	Beryllium	97.8	96.4	101	99.3			1.24
	Cadmium	97.6	101	99.4	100			0.521
	Chromium	98.7	99.1	100	99.8			0.436
	Copper	97.9	103	99.3	98.2			1.05
	Lead	97.4	101	98.1	98.0			0.0538
	Nickel	98.8	97.3	99.7	98.1			1.49
	Silver	95.5	96.9	96.1	97.0			0.904
EPA 300.0 Rev. 2.1	Chloride	99.9	102	101			0.732	
	Sulfate	98.0	98.8	98.4			3.14	
EPA 350.1 Rev. 2.0	Ammonia-N	103	97.4	99.9				1.45
	Ammonia-N	100	98.4	99.8				0.847
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106						3.92
EPA 353.2 Rev. 2.0	NO2NO3-N	104	106	104				1.31
EPA 365.1 Rev. 2.0	Total-P	99.6	98.1	102				3.63
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	99.0	99.9				0.905

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
SM 2120 B	Color (true)					1.31	
SM 2320 B-97	Total Alkalinity	103				0.988	
SM 2540 C-97	TDS					3.88	
SM 4500 F-C-97	Fluoride	100	101	101			0.0
SM 5310 B-00	Organic Carbon	98.4	104				0.114

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1838327, 1838328, 1838333, 1838334
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1838383, 1838384
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1838383, 1838384
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1838327, 1838328, 1838333, 1838334
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1838327, 1838328, 1838333, 1838334
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1838329, 1838330, 1838335, 1838336
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1838329, 1838330, 1838335, 1838336
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1838329, 1838330, 1838335, 1838336
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1838329, 1838330, 1838335, 1838336
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1838331, 1838332, 1838337, 1838338
SM 2120 B / E31780	True Color measured at 450 nm	1838327, 1838328, 1838333, 1838334
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1838327, 1838328, 1838333, 1838334
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1838327, 1838328, 1838333, 1838334
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1838327, 1838328, 1838333, 1838334
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1838327, 1838328, 1838333, 1838334
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1838329, 1838330, 1838335, 1838336

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	10/05/2016			10/05/2016 16:18	Sima Feizi	1838327, 1838328, 1838333, 1838334
EPA 200.7 Rev. 4.4	10/05/2016	10/06/2016	Elliott D. Healy	10/10/2016	Joshua Ayres	1838383, 1838384
	10/05/2016	10/06/2016	Elliott D. Healy	10/11/2016	Joshua Ayres	1838383, 1838384
EPA 200.8 Rev. 5.4	10/05/2016	10/06/2016	Elliott D. Healy	10/08/2016	Charles J. Peterson	1838383, 1838384
	10/05/2016	10/06/2016	Elliott D. Healy	10/12/2016	Charles J. Peterson	1838383, 1838384
EPA 300.0 Rev. 2.1	10/05/2016			10/12/2016	Ping Hua	1838327, 1838328, 1838333, 1838334
EPA 350.1 Rev. 2.0	10/05/2016			10/18/2016	Sofia Elnemr	1838330, 1838335, 1838336
	10/05/2016			10/24/2016	Sofia Elnemr	1838329
EPA 351.2 Rev. 2.0	10/05/2016	10/14/2016	Adrian Shelby	10/18/2016	Joseph Suarez	1838329, 1838330, 1838335, 1838336
EPA 353.2 Rev. 2.0	10/05/2016			10/11/2016	Beverly Y. Sanders	1838329, 1838330, 1838335, 1838336
EPA 365.1 Rev. 2.0	10/05/2016	10/18/2016	Vijayalakshmi Reddy	10/18/2016	Lipi Saha	1838329, 1838330
	10/05/2016	10/18/2016	Vijayalakshmi Reddy	10/20/2016	Lipi Saha	1838335, 1838336
EPA 365.1 Rev. 2.0 dissolved	10/05/2016			10/05/2016 15:04	Julia Storbeck	1838338
	10/05/2016			10/05/2016 15:46	Julia Storbeck	1838331
	10/05/2016			10/05/2016 15:47	Julia Storbeck	1838332
	10/05/2016			10/05/2016 15:48	Julia Storbeck	1838337
SM 2120 B	10/05/2016			10/05/2016 17:11	Julie Michelle Frank	1838328
	10/05/2016			10/05/2016 17:12	Julie Michelle Frank	1838333
	10/05/2016			10/05/2016 17:13	Julie Michelle Frank	1838334
	10/05/2016			10/05/2016 17:36	Julie Michelle Frank	1838327
SM 2320 B-97	10/05/2016			10/09/2016	Dale L. Simmons	1838327, 1838328, 1838333, 1838334
SM 2540 C-97	10/05/2016			10/08/2016	Yijie Li	1838327, 1838328, 1838333, 1838334
SM 2540 D-97	10/05/2016			10/08/2016	Yijie Li	1838327, 1838328, 1838333, 1838334
SM 4500 F-C-97	10/05/2016			10/09/2016	Dale L. Simmons	1838327, 1838328, 1838333, 1838334
SM 5310 B-00	10/05/2016			10/07/2016	Julie Michelle Frank	1838329, 1838330, 1838335, 1838336