

Chemical Analysis Report

SO-DIST-2016-10-26-02

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

Event Description: **SMP: Myrtle & Myrtle**
Request ID: **RQ-2016-10-24-08**
Customer: **SO-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901
Attn: Ben Paswater

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Certified by: Colin Wright, Environmental Administrator

Date Certified: 21-NOV-2016 15:44

A handwritten signature in black ink, appearing to read "Colin Wright", is positioned on a light-colored rectangular background.

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited 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: Myrtle 1995 @ Pine Island St.

Collection Date/Time: 10/25/2016 08:52

Field ID: G3SD102516-1

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1844657	EPA 180.1 Rev. 2.0	Turbidity	6.1	A	NTU	P313979	
	EPA 300.0 Rev. 2.1	Chloride	130		mg Cl/L	P314988	
		Sulfate	65		mg SO4/L	P314991	
	SM 2120 B	Color (true)	59		PCU	P313992	
	SM 2320 B-97	Total Alkalinity	207		mg CaCO3/L	P314174	
	SM 2540 C-97	TDS	564		mg/L	P314602	
	SM 2540 D-97	TSS	5	I	mg/L	P314500	
	SM 4500 F-C-97	Fluoride	0.20		mg F/L	P314179	
1844660	EPA 350.1 Rev. 2.0	Ammonia-N	0.051		mg N/L	P314843	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.86		mg N/L	P315115	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.36		mg N/L	P314239	
	EPA 365.1 Rev. 2.0	Total-P	0.051		mg P/L	P314729	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P314146	
1844663	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.039		mg P/L	P313947	
1844678	EPA 200.7 Rev. 4.4	Calcium	109		mg/L	P314077	
		Iron	360		ug/L	P314077	
		Magnesium	11.7		mg/L	P314077	
		Potassium	8.6		mg/L	P314077	
		Sodium	61.7		mg/L	P314077	
		Zinc	5.0	U	ug/L	P314077	
	EPA 200.8 Rev. 5.4	Arsenic	0.56		ug/L	P314077	
		Cadmium	0.020	U	ug/L	P314077	
		Chromium	0.53		ug/L	P314077	
		Copper	1.29		ug/L	P314077	
		Lead	0.096	I	ug/L	P314077	
		Nickel	1.41		ug/L	P314077	
		Silver	0.0050	U	ug/L	P314077	

Ref. Method and Comment:

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for iron are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for arsenic are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: Myrtle slough @ SR 31

Collection Date/Time: 10/25/2016 09:15

Field ID: G3SD102516-2

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1844658	EPA 180.1 Rev. 2.0	Turbidity	3.6		NTU	P313979	
	EPA 300.0 Rev. 2.1	Chloride	33		mg Cl/L	P314988	
		Sulfate	12		mg SO4/L	P314991	
	SM 2120 B	Color (true)	150		PCU	P313992	
	SM 2320 B-97	Total Alkalinity	93		mg CaCO3/L	P314174	
	SM 2540 C-97	TDS	220		mg/L	P314602	
	SM 2540 D-97	TSS	4	I	mg/L	P314500	
	SM 4500 F-C-97	Fluoride	0.25		mg F/L	P314179	

Field ID: G3SD102516-2

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1844661	EPA 350.1 Rev. 2.0	Ammonia-N	0.15		mg N/L	P314843	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P315115	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.069		mg N/L	P314240	
	EPA 365.1 Rev. 2.0	Total-P	0.046		mg P/L	P314729	
	SM 5310 B-00	Organic Carbon	23		mg C/L	P314146	
1844664	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.026		mg P/L	P313947	
1844679	EPA 200.7 Rev. 4.4	Calcium	32.9		mg/L	P314077	
		Iron	640		ug/L	P314077	
		Magnesium	8.48		mg/L	P314077	
		Potassium	4.4		mg/L	P314077	
		Sodium	17.0		mg/L	P314077	
		Zinc	5.0	U	ug/L	P314077	
	EPA 200.8 Rev. 5.4	Arsenic	0.61		ug/L	P314077	
		Cadmium	0.020	U	ug/L	P314077	
		Chromium	0.31		ug/L	P314077	
		Copper	0.29	I	ug/L	P314077	
		Lead	0.12	I	ug/L	P314077	
		Nickel	0.16	I	ug/L	P314077	
		Silver	0.0050	U	ug/L	P314077	

Ref. Method and Comment:

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for iron are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for arsenic are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: G3SD-FieldBlank

Collection Date/Time: 10/25/2016 10:25

Field ID: FieldBlank

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1844659	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P313979	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P314988	
		Sulfate	0.20	U	mg SO4/L	P314991	
		Color (true)	2.5	U	PCU	P313992	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P314174	
	SM 2540 C-97	TDS	15	U	mg/L	P314600	
	SM 2540 D-97	TSS	2	U	mg/L	P314498	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P314179	
1844662	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P314843	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P315115	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P314240	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P314729	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P314146	
1844665	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P313947	
1844680	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P314077	
		Iron	30	U	ug/L	P314077	
		Magnesium	0.040	U	mg/L	P314077	

Field ID: FieldBlank

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1844680	EPA 200.7 Rev. 4.4	Potassium	0.30	U	mg/L	P314077	
		Sodium	0.50	U	mg/L	P314077	
		Zinc	5.0	U	ug/L	P314077	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P314077	
		Cadmium	0.020	U	ug/L	P314077	
		Chromium	0.050	U	ug/L	P314077	
		Copper	0.10	U	ug/L	P314821	
		Lead	0.050	U	ug/L	P314077	
		Nickel	0.050	U	ug/L	P314077	
		Silver	0.0050	U	ug/L	P314077	

Ref. Method and Comment:

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

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for iron are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for arsenic are unavailable for one of two spiked samples 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: P313979

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P314077

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: P314077

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 200.8 Rev. 5.4

Batch ID: P314821

Component	Result	Code	Units
Copper	0.10	U	ug/L

Quality Assurance Report

Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P314988

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P314991

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314843

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315115

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314239

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314240

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314729

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313947

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

Reference Method: SM 2120 B
Batch ID: P313992

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P314174

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 C-97
Batch ID: P314600

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P314602

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P314498

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P314500

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P314179

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P314146

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: P314077

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	97.8		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	96.6		P	85 - 115
Sodium	95.6		P	85 - 115
Zinc	99.4		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314077

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	97.9		P	85 - 115
Cadmium	96.5		P	85 - 115
Chromium	95.3		P	85 - 115
Copper	96.1		P	85 - 115
Lead	94.9		P	85 - 115
Nickel	98.3		P	85 - 115
Silver	94.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314821

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	96.2		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P314988

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P314991

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	93.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314843

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315115

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.8		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314239

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314240

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314729

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313947

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

Reference Method: SM 2320 B-97
Batch ID: P314174

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

Reference Method: SM 4500 F-C-97
Batch ID: P314179

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.5		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P314146

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314077

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1843940	Calcium	95.9		P	80 - 120
1843940	Iron	105		P	80 - 120
1843940	Magnesium	105		P	80 - 120
1843940	Potassium	97.1		P	80 - 120
1843940	Sodium	94.4		P	80 - 120
1843940	Zinc	104		P	80 - 120
1844919	Calcium	101	96.9	P/P	80 - 120
1844919	Magnesium	105	98.9	P/P	80 - 120
1844919	Potassium	95.3	92.8	P/P	80 - 120
1844919	Sodium	90.6		P	80 - 120
1844919	Zinc	101	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314077

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1843940	Arsenic	98.9		P	80 - 120
1843940	Cadmium	98.5		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314077

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1843940	Chromium	97.6		P	80 - 120
1843940	Copper	97.2		P	80 - 120
1843940	Lead	97.6		P	80 - 120
1843940	Nickel	98.1		P	80 - 120
1843940	Silver	95.6		P	80 - 120
1844919	Cadmium	98.7	99.4	P/P	80 - 120
1844919	Chromium	96.0	96.5	P/P	80 - 120
1844919	Copper	95.5	95.7	P/P	80 - 120
1844919	Lead	98.4	99.9	P/P	80 - 120
1844919	Nickel	95.3	96.8	P/P	80 - 120
1844919	Silver	95.3	95.2	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314821

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1846657	Copper	95.5		P	80 - 120
1847184	Copper	95.1	95.0	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P314988

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1844617	Chloride	95.2		P	90 - 110
1844622	Chloride	96.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P314991

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1844617	Sulfate	90.8		P	90 - 110
1844622	Sulfate	91.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314843

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1844631	Ammonia-N	99.8	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315115

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1844660	Kjeldahl Nitrogen	108	93.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314239

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1844606	NO2NO3-N	101	97.0	P/P	90 - 110
1844606	NO2NO3-N	99.0		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314240

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1844661	NO2NO3-N	96.4	95.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314729

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1844630	Total-P	94.8	98.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313947

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1844635	O-Phosphate-P	99.9	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P314179

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1844880	Fluoride	97.8	99.2	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P314146

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1844519	Organic Carbon	97.0	96.1	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P313979

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844657	Turbidity	1.48	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314077

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844919	Calcium	2.70	Spike	P	0 - 20
1844919	Iron	3.88	Spike	P	0 - 20
1844919	Magnesium	3.14	Spike	P	0 - 20
1844919	Potassium	1.83	Spike	P	0 - 20
1844919	Sodium	2.85	Spike	P	0 - 20
1844919	Zinc	0.215	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314077

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844919	Arsenic	2.18	Spike	P	0 - 20
1844919	Cadmium	0.690	Spike	P	0 - 20
1844919	Chromium	0.462	Spike	P	0 - 20
1844919	Copper	0.196	Spike	P	0 - 20
1844919	Lead	1.48	Spike	P	0 - 20
1844919	Nickel	1.47	Spike	P	0 - 20
1844919	Silver	0.0996	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314821

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847184	Copper	0.0429	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P314988

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844617	Chloride	0.407	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P314991

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844617	Sulfate	0.212	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314843

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844631	Ammonia-N	1.67	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315115

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844660	Kjeldahl Nitrogen	8.24	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314239

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844606	NO2NO3-N	1.11	Spike	P	0 - 15

Quality Assurance Report Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314240

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844661	NO2NO3-N	0.766	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314729

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844630	Total-P	3.13	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313947

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844635	O-Phosphate-P	0.897	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P313992

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844623	Color (true)	0.0775	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P314174

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844880	Total Alkalinity	0.134	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P314600

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844033	TDS	5.87	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P314602

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844589	TDS	4.65	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P314500

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844589	TSS	9.30	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P314179

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844880	Fluoride	0.946	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P314146

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1844519	Organic Carbon	0.731	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: A72445
Included Lab Sample IDs: 1844663, 1844664, 1844665

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	98.7	P/P	90 - 110
O-Phosphate-P	99.0	98.4	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A72457
Included Lab Sample IDs: 1844657, 1844658, 1844659

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	99.0	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A72462
Included Lab Sample IDs: 1844657, 1844659

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	103	P/P	85 - 115

Reference Method: SM 2120 B
Run ID: A72464
Included Lab Sample IDs: 1844658

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	99.4	P/P	85 - 115

Reference Method: SM 5310 B-00
Run ID: A72506
Included Lab Sample IDs: 1844660, 1844661, 1844662

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.4	96.6	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97

Run ID: A72515

Included Lab Sample IDs: 1844657, 1844658, 1844659

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	97.3	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A72515

Included Lab Sample IDs: 1844657, 1844658, 1844659

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A72533

Included Lab Sample IDs: 1844660, 1844661, 1844662

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.0	96.5	P/P	90 - 110
NO2NO3-N	98.5	98.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A72534

Included Lab Sample IDs: 1844678, 1844679, 1844680

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	96.9	96.9	P/P	90 - 110
Arsenic	96.9	98.6	P/P	90 - 110
Arsenic	97.3	96.9	P/P	90 - 110
Cadmium	94.1	95.1	P/P	90 - 110
Cadmium	95.1	96.1	P/P	90 - 110
Cadmium	96.1	97.2	P/P	90 - 110
Chromium	94.0	94.2	P/P	90 - 110
Chromium	94.2	96.1	P/P	90 - 110
Chromium	94.5	94.0	P/P	90 - 110
Copper	95.0	95.4	P/P	90 - 110
Copper	95.4	96.1	P/P	90 - 110
Lead	92.3	94.0	P/P	90 - 110
Lead	93.5	92.3	P/P	90 - 110
Lead	94.0	93.4	P/P	90 - 110
Nickel	96.5	97.0	P/P	90 - 110
Nickel	97.0	98.1	P/P	90 - 110
Nickel	97.6	96.5	P/P	90 - 110
Silver	92.7	94.2	P/P	90 - 110
Silver	94.2	95.1	P/P	90 - 110
Silver	95.1	95.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A72540

Included Lab Sample IDs: 1844678, 1844679, 1844680

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	95.5	95.0	P/P	90 - 110
Calcium	96.0	96.4	P/P	90 - 110
Calcium	96.4	95.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A72540

Included Lab Sample IDs: 1844678, 1844679, 1844680

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	97.1	98.2	P/P	90 - 110
Iron	97.5	97.1	P/P	90 - 110
Iron	98.2	96.0	P/P	90 - 110
Magnesium	97.5	98.1	P/P	90 - 110
Magnesium	97.5	97.5	P/P	90 - 110
Magnesium	98.1	96.6	P/P	90 - 110
Potassium	95.7	96.1	P/P	90 - 110
Potassium	96.1	95.9	P/P	90 - 110
Potassium	96.3	95.7	P/P	90 - 110
Sodium	95.0	95.8	P/P	90 - 110
Sodium	96.2	96.5	P/P	90 - 110
Sodium	96.5	95.0	P/P	90 - 110
Zinc	101	103	P/P	90 - 110
Zinc	101	101	P/P	90 - 110
Zinc	103	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A72705

Included Lab Sample IDs: 1844660, 1844661, 1844662

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A72715

Included Lab Sample IDs: 1844657, 1844658, 1844659

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	101	P/P	90 - 110
Sulfate	97.4	96.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A72726

Included Lab Sample IDs: 1844660, 1844661, 1844662

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A72785

Included Lab Sample IDs: 1844680

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	96.4	94.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A72832

Included Lab Sample IDs: 1844660, 1844661, 1844662

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	108	105	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
 Run ID: A72832
 Included Lab Sample IDs: 1844660, 1844661, 1844662

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	110	105	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	LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity				1.48	
EPA 200.7 Rev. 4.4	Calcium	101	95.9 101 96.9			2.70
	Iron	97.8	105			3.88
	Magnesium	103	105 105 98.9			3.14
	Potassium	96.6	97.1 95.3 92.8			1.83
	Sodium	95.6	94.4 90.6			2.85
	Zinc	99.4	104 101 101			0.215
EPA 200.8 Rev. 5.4	Arsenic	97.9	98.9			2.18
	Cadmium	96.5	98.5 98.7 99.4			0.690
	Chromium	95.3	97.6 96.0 96.5			0.462
	Copper	96.1	97.2 95.5 95.7			0.196
	Copper	96.2	95.5 95.1 95.0			0.0429
	Lead	94.9	97.6 98.4 99.9			1.48
	Nickel	98.3	98.1 95.3 96.8			1.47
	Silver	94.4	95.6 95.3 95.2			0.0996
EPA 300.0 Rev. 2.1	Chloride	97.7	95.2 96.7		0.407	
	Sulfate	93.2	90.8 91.7		0.212	
EPA 350.1 Rev. 2.0	Ammonia-N	103	99.8 103			1.67
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.8	108 93.5			8.24
EPA 353.2 Rev. 2.0	NO2NO3-N	101	101 99.0 97.0			1.11 RSD
	NO2NO3-N	100	96.4 95.4			0.766
EPA 365.1 Rev. 2.0	Total-P	97.6	94.8 98.1			3.13
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	99.9 101			0.897
SM 2120 B	Color (true)				0.0775	
SM 2320 B-97	Total Alkalinity	103			0.134	
SM 2540 C-97	TDS				5.87	
	TDS				4.65	
SM 2540 D-97	TSS				9.30	
SM 4500 F-C-97	Fluoride	98.5	97.8 99.2			0.946
SM 5310 B-00	Organic Carbon	98.6	97.0 96.1			0.731

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1844657, 1844658, 1844659
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1844678, 1844679, 1844680

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1844678, 1844679, 1844680
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1844657, 1844658, 1844659
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1844657, 1844658, 1844659
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1844660, 1844661, 1844662
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1844660, 1844661, 1844662
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1844660, 1844661, 1844662
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1844660, 1844661, 1844662
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1844663, 1844664, 1844665
SM 2120 B / E31780	True Color measured at 450 nm	1844657, 1844658, 1844659
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1844657, 1844658, 1844659
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1844657, 1844658, 1844659
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1844657, 1844658, 1844659
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1844657, 1844658, 1844659
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1844660, 1844661, 1844662

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	10/26/2016			10/26/2016 16:58	Sima Feizi	1844657, 1844658, 1844659
EPA 200.7 Rev. 4.4	10/26/2016	10/27/2016	Elliott D. Healy	10/31/2016	Joshua Ayres	1844678, 1844679, 1844680
EPA 200.8 Rev. 5.4	10/26/2016	10/27/2016	Elliott D. Healy	10/29/2016	Charles J. Peterson	1844678, 1844679, 1844680
	10/26/2016	11/08/2016	Elliott D. Healy	11/11/2016	Charles J. Peterson	1844680
EPA 300.0 Rev. 2.1	10/26/2016			11/10/2016	Elisa J Lutz	1844657, 1844658, 1844659
EPA 350.1 Rev. 2.0	10/26/2016			11/08/2016	Sofia Elnemr	1844660, 1844661, 1844662
EPA 351.2 Rev. 2.0	10/26/2016	11/15/2016	Adrian Shelby	11/16/2016	Joseph Suarez	1844660, 1844661, 1844662
EPA 353.2 Rev. 2.0	10/26/2016			10/31/2016	Beverly Y. Sanders	1844660, 1844661, 1844662
EPA 365.1 Rev. 2.0	10/26/2016	11/07/2016	Adrian Shelby	11/09/2016	Lipi Saha	1844660, 1844661, 1844662
EPA 365.1 Rev. 2.0 dissolved	10/26/2016			10/26/2016 15:43	Julia Storbeck	1844665
	10/26/2016			10/26/2016 16:08	Julia Storbeck	1844663
	10/26/2016			10/26/2016 16:09	Julia Storbeck	1844664
SM 2120 B	10/26/2016			10/26/2016 16:31	Julie Michelle Frank	1844657
	10/26/2016			10/26/2016 16:33	Julie Michelle Frank	1844659
	10/26/2016			10/26/2016 17:51	Julie Michelle Frank	1844658
SM 2320 B-97	10/26/2016			10/29/2016	Dale L. Simmons	1844657, 1844658, 1844659
SM 2540 C-97	10/26/2016			10/28/2016	Yijie Li	1844657, 1844658, 1844659
SM 2540 D-97	10/26/2016			10/28/2016	Yijie Li	1844657, 1844658, 1844659
SM 4500 F-C-97	10/26/2016			10/29/2016	Dale L. Simmons	1844657, 1844658, 1844659
SM 5310 B-00	10/26/2016			10/28/2016	Julie Michelle Frank	1844660, 1844661, 1844662