

Chemical Analysis Report

SO-DIST-2016-06-21-02

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-2016-06-13-39**

Customer: **SO-DIST**

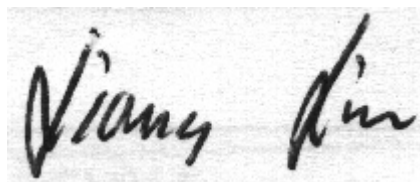
Project ID: **SMP**

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: Liang Lin, Environmental Administrator

Date Certified: 14-JUL-2016 18:40

A handwritten signature in black ink, appearing to read "Liang Lin", is written on a light-colored, textured 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 Slough @ SR 31

Collection Date/Time: 06/20/2016 09:25

Field ID: G3SD06202016-2

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1809685	EPA 180.1 Rev. 2.0	Turbidity	3.8		NTU	P306572	
	EPA 300.0 Rev. 2.1	Chloride	130		mg Cl/L	P307236	
		Sulfate	60		mg SO4/L	P307238	
	SM 2120 B	Color (true)	120		PCU	P306576	
	SM 2320 B-97	Total Alkalinity	158		mg CaCO3/L	P307277	
	SM 2540 C-97	TDS	497		mg/L	P307014	
	SM 2540 D-97	TSS	5	I	mg/L	P306992	
	SM 4500 F-C-97	Fluoride	0.22		mg F/L	P307284	
1809687	EPA 350.1 Rev. 2.0	Ammonia-N	0.28		mg N/L	P307355	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P306606	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.083		mg N/L	P306944	
	EPA 365.1 Rev. 2.0	Total-P	0.32		mg P/L	P306715	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P307066	
1809689	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.25		mg P/L	P306561	
1809701	EPA 200.7 Rev. 4.4	Calcium	89.0		mg/L	P306589	
		Iron	520		ug/L	P306589	
		Magnesium	12.2		mg/L	P306589	
		Potassium	12.5		mg/L	P306589	
		Sodium	57.2		mg/L	P306589	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P306737	
		Arsenic	0.97		ug/L	P306589	
		Cadmium	0.020	U	ug/L	P306589	
		Chromium	0.57		ug/L	P306589	
		Copper	0.82		ug/L	P306589	
		Lead	0.074	I	ug/L	P306589	
		Nickel	1.29		ug/L	P306589	
		Silver	0.0050	U	ug/L	P306589	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

EPA 200.7 Rev. 4.4: The calcium and potassium matrix spike recoveries are unavailable due to high analyte concentration in the QC sample.

Sample Location: Field Blank

Collection Date/Time: 06/20/2016 10:00

Field ID: G3SD-BLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1809686	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P306572	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P307236	
		Sulfate	0.20	U	mg SO4/L	P307238	
	SM 2120 B	Color (true)	2.5	U	PCU	P306576	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P307277	
	SM 2540 C-97	TDS	15	U	mg/L	P307010	
	SM 2540 D-97	TSS	2	U	mg/L	P306988	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P307284	
1809688	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P306897	

Field ID: G3SD-BLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1809688	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P306606	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P306944	
	EPA 365.1 Rev. 2.0	Total-P	0.002	I	mg P/L	P306715	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P307066	
1809690	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P306561	
1809702	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P306737	
		Iron	30	U	ug/L	P306737	
		Magnesium	0.040	U	mg/L	P306737	
		Potassium	0.30	U	mg/L	P306737	
		Sodium	0.50	U	mg/L	P306737	
		Zinc	5.0	U	ug/L	P306737	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P306737	
		Cadmium	0.020	U	ug/L	P306737	
		Chromium	0.050	U	ug/L	P306737	
		Copper	0.34	I	ug/L	P306737	
		Lead	0.050	U	ug/L	P306737	
		Nickel	0.050	U	ug/L	P307460	
		Silver	0.0050	U	ug/L	P306737	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

EPA 200.7 Rev. 4.4: The sodium matrix spike recovery data for one of two spiked samples is unavailable due to high analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: The copper result was confirmed in the undigested sample on 06/28/2016.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P306572

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P306589

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

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P306737

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P306737

Component	Result	Code	Units
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306589

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: P306737

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
Silver	0.0050	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307460

Component	Result	Code	Units
Nickel	0.050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307236

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307238

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306897

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P307355

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306606

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306944

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306715

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306561

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

Reference Method: SM 2120 B
Batch ID: P306576

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P307277

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

Reference Method: SM 2540 C-97
Batch ID: P307010

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P307014

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P306988

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P306992

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P307284

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P307066

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: P306589

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	105		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	99.2		P	85 - 115
Sodium	101		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P306737

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	105		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	101		P	85 - 115
Sodium	104		P	85 - 115
Zinc	99.3		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306589

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	96.9		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	103		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306589

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	94.6		P	85 - 115
Lead	99.9		P	85 - 115
Nickel	95.5		P	85 - 115
Silver	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306737

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	99.5		P	85 - 115
Cadmium	98.6		P	85 - 115
Chromium	98.2		P	85 - 115
Copper	96.0		P	85 - 115
Lead	96.4		P	85 - 115
Silver	96.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307460

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Nickel	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307236

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307238

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306897

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	93.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P307355

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.9		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306606

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	107		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P306944

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	97.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P306715

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P306561

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

Reference Method: SM 2320 B-97
 Batch ID: P307277

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

Reference Method: SM 4500 F-C-97
 Batch ID: P307284

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.0		P	92 - 103

Reference Method: SM 5310 B-00
 Batch ID: P307066

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	101		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P306589

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1809701	Iron	103	106	P/P	80 - 120
1809701	Magnesium	104		P	80 - 120
1809701	Sodium	103		P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P306737

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810049	Calcium	105		P	80 - 120
1810049	Iron	105		P	80 - 120
1810049	Magnesium	105		P	80 - 120
1810049	Potassium	104		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P306737

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810049	Zinc	108		P	80 - 120
1810053	Calcium	101		P	80 - 120
1810053	Iron	108	108	P/P	80 - 120
1810053	Magnesium	103		P	80 - 120
1810053	Potassium	106	105	P/P	80 - 120
1810053	Sodium	103		P	80 - 120
1810053	Zinc	101	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306589

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1809701	Arsenic	103	101	P/P	80 - 120
1809701	Cadmium	105	104	P/P	80 - 120
1809701	Chromium	104	101	P/P	80 - 120
1809701	Copper	93.6	92.5	P/P	80 - 120
1809701	Lead	104	102	P/P	80 - 120
1809701	Nickel	94.2	93.0	P/P	80 - 120
1809701	Silver	101	99.0	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306737

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810049	Arsenic	104		P	80 - 120
1810049	Cadmium	102		P	80 - 120
1810049	Chromium	98.1		P	80 - 120
1810049	Copper	95.2		P	80 - 120
1810049	Lead	100		P	80 - 120
1810049	Silver	97.3		P	80 - 120
1810053	Arsenic	101	102	P/P	80 - 120
1810053	Cadmium	99.2	99.9	P/P	80 - 120
1810053	Chromium	99.1	100	P/P	80 - 120
1810053	Copper	92.9	95.6	P/P	80 - 120
1810053	Lead	97.9	98.5	P/P	80 - 120
1810053	Silver	99.4	99.5	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307460

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1812897	Nickel	101		P	80 - 120
1813652	Nickel	99.6	97.7	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307236

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1809715	Chloride	100		P	90 - 110
1809716	Chloride	100		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307238

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1809715	Sulfate	100		P	90 - 110
1809716	Sulfate	99.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306897

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1809718	Ammonia-N	94.5	95.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P307355

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810364	Ammonia-N	98.6	98.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306944

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1809669	NO2NO3-N	95.6	96.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306715

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1809669	Total-P	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306561

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1809654	O-Phosphate-P	98.4	98.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P307284

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810672	Fluoride	98.7	98.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P307066

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1809649	Organic Carbon	96.4	101	P/P	85 - 115

Quality Assurance Report Precision

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P306572

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809646	Turbidity	3.95	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P306589

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809701	Calcium	2.96	Spike	P	0 - 20
1809701	Iron	2.04	Spike	P	0 - 20
1809701	Magnesium	2.98	Spike	P	0 - 20
1809701	Potassium	3.19	Spike	P	0 - 20
1809701	Sodium	3.39	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P306737

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810053	Calcium	0.124	Spike	P	0 - 20
1810053	Iron	0.405	Spike	P	0 - 20
1810053	Magnesium	0.965	Spike	P	0 - 20
1810053	Potassium	0.440	Spike	P	0 - 20
1810053	Sodium	0.0589	Spike	P	0 - 20
1810053	Zinc	0.886	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306589

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809701	Arsenic	2.55	Spike	P	0 - 20
1809701	Cadmium	1.45	Spike	P	0 - 20
1809701	Chromium	2.50	Spike	P	0 - 20
1809701	Copper	1.14	Spike	P	0 - 20
1809701	Lead	1.73	Spike	P	0 - 20
1809701	Nickel	1.18	Spike	P	0 - 20
1809701	Silver	1.92	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306737

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810053	Arsenic	1.06	Spike	P	0 - 20
1810053	Cadmium	0.698	Spike	P	0 - 20
1810053	Chromium	1.07	Spike	P	0 - 20
1810053	Copper	2.81	Spike	P	0 - 20
1810053	Lead	0.630	Spike	P	0 - 20
1810053	Silver	0.122	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307460

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1813652	Nickel	1.96	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307236

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809715	Chloride	0.499	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307238

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809715	Sulfate	0.922	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306897

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809718	Ammonia-N	0.463	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P307355

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810364	Ammonia-N	0.119	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306606

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809667	Kjeldahl Nitrogen	2.17	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306944

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809669	NO2NO3-N	0.881	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306715

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809669	Total-P	0.991	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306561

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809654	O-Phosphate-P	0.446	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P306576

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809715	Color (true)	2.11	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P307277

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810672	Total Alkalinity	0.317	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P307010

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809289	TDS	2.74	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P307014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809714	TDS	8.07	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P306988

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809289	TSS	8.19	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P306992

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809714	TSS	7.41	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P307284

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810672	Fluoride	0.0	Spike	P	0 - 3.0

Quality Assurance Report Precision

Reference Method: SM 5310 B-00
Batch ID: P307066

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1809649	Organic Carbon	2.95	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: A70146
Included Lab Sample IDs: 1809689, 1809690

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.1	99.1	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A70148
Included Lab Sample IDs: 1809685, 1809686

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	101	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A70149
Included Lab Sample IDs: 1809685, 1809686

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.0	98.8	P/P	90 - 115

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A70176
Included Lab Sample IDs: 1809701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	102	P/P	90 - 110
Iron	103	101	P/P	90 - 110
Magnesium	103	102	P/P	90 - 110
Potassium	101	99.9	P/P	90 - 110
Sodium	101	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A70202
Included Lab Sample IDs: 1809687, 1809688

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A70208

Included Lab Sample IDs: 1809687

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A70212

Included Lab Sample IDs: 1809688

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A70228

Included Lab Sample IDs: 1809701, 1809702

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	103	101	P/P	90 - 110
Iron	103	102	P/P	90 - 110
Magnesium	105	103	P/P	90 - 110
Potassium	102	101	P/P	90 - 110
Sodium	102	101	P/P	90 - 110
Zinc	101	101	P/P	90 - 110
Zinc	102	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A70237

Included Lab Sample IDs: 1809688

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	95.3	96.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A70238

Included Lab Sample IDs: 1809701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	96.7	96.7	P/P	90 - 110
Cadmium	101	100	P/P	90 - 110
Chromium	102	102	P/P	90 - 110
Copper	95.3	94.9	P/P	90 - 110
Lead	98.5	98.3	P/P	90 - 110
Nickel	95.2	94.9	P/P	90 - 110
Silver	98.0	97.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A70249

Included Lab Sample IDs: 1809687, 1809688

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	99.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A70295

Included Lab Sample IDs: 1809702

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.0	97.5	P/P	90 - 110
Cadmium	98.2	97.3	P/P	90 - 110
Chromium	97.6	98.7	P/P	90 - 110
Copper	97.8	97.1	P/P	90 - 110
Lead	94.3	94.8	P/P	90 - 110
Silver	97.0	95.9	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A70300

Included Lab Sample IDs: 1809687, 1809688

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	107	105	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A70313

Included Lab Sample IDs: 1809685, 1809686

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	100	P/P	90 - 110
Sulfate	101	97.3	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A70372

Included Lab Sample IDs: 1809685, 1809686

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.7	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A70372

Included Lab Sample IDs: 1809685, 1809686

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A70390

Included Lab Sample IDs: 1809687

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.0	98.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A70477

Included Lab Sample IDs: 1809702

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	105	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

* 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						3.95	
EPA 200.7 Rev. 4.4	Calcium	104						2.96
	Calcium	103	105	101				0.124
	Iron	105	103	106				2.04
	Iron	105	105	108	108			0.405
	Magnesium	103	104					2.98
	Magnesium	104	105	103				0.965
	Potassium	99.2						3.19
	Potassium	101	104	105	106			0.440
	Sodium	101	103					3.39
	Sodium	104	103					0.0589
	Zinc	99.3	108	102	101			0.886
EPA 200.8 Rev. 5.4	Arsenic	96.9	103	101				2.55
	Arsenic	99.5	104	101	102			1.06
	Cadmium	102	105	104				1.45
	Cadmium	98.6	102	99.2	99.9			0.698
	Chromium	103	104	101				2.50
	Chromium	98.2	98.1	99.1	100			1.07
	Copper	94.6	93.6	92.5				1.14
	Copper	96.0	95.2	92.9	95.6			2.81
	Lead	99.9	104	102				1.73
	Lead	96.4	100	97.9	98.5			0.630
	Nickel	95.5	94.2	93.0				1.18
	Nickel	102	101	99.6	97.7			1.96
	Silver	100	101	99.0				1.92
	Silver	96.9	97.3	99.4	99.5			0.122
EPA 300.0 Rev. 2.1	Chloride	101	100	100			0.499	
	Sulfate	100	100	99.5			0.922	
EPA 350.1 Rev. 2.0	Ammonia-N	93.8	94.5	95.0				0.463
	Ammonia-N	95.9	98.6	98.8				0.119
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107						2.17
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	97.0	95.6	96.6				0.881
EPA 365.1 Rev. 2.0	Total-P	101	102	103				0.991
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	98.4	98.9				0.446
SM 2120 B	Color (true)						2.11	
SM 2320 B-97	Total Alkalinity	103					0.317	
SM 2540 C-97	TDS						2.74	
	TDS						8.07	
SM 2540 D-97	TSS						8.19	
	TSS						7.41	
SM 4500 F-C-97	Fluoride	98.0	98.7	98.7				0.0
SM 5310 B-00	Organic Carbon	101	96.4	101				2.95

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1809685, 1809686
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1809701, 1809702
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1809701, 1809702
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1809685, 1809686
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1809685, 1809686
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1809687, 1809688
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1809687, 1809688
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1809687, 1809688
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1809687, 1809688
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1809689, 1809690
SM 2120 B / E31780	True Color measured at 450 nm	1809685, 1809686
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1809685, 1809686
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1809685, 1809686
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1809685, 1809686
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1809685, 1809686
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1809687, 1809688

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	06/21/2016			06/21/2016 15:30	Sima Feizi	1809685, 1809686
EPA 200.7 Rev. 4.4	06/21/2016	06/21/2016	Elliott D. Healy	06/22/2016	Joshua Ayres	1809701
	06/21/2016	06/23/2016	Elliott D. Healy	06/24/2016	Joshua Ayres	1809701, 1809702
EPA 200.8 Rev. 5.4	06/21/2016	06/21/2016	Elliott D. Healy	06/24/2016	Charles J. Peterson	1809701
	06/21/2016	06/23/2016	Elliott D. Healy	06/28/2016	Charles J. Peterson	1809702
	06/21/2016	07/06/2016	Elliott D. Healy	07/08/2016	Charles J. Peterson	1809702
EPA 300.0 Rev. 2.1	06/21/2016			06/30/2016	Ping Hua	1809685, 1809686
EPA 350.1 Rev. 2.0	06/21/2016			06/24/2016	Diana M. Turner	1809688
	06/21/2016			07/05/2016	Diana M. Turner	1809687
EPA 351.2 Rev. 2.0	06/21/2016	06/22/2016	Sofia Elnemr	06/23/2016	Christopher Armour	1809687, 1809688
EPA 353.2 Rev. 2.0	06/21/2016			06/27/2016	Beverly Y. Sanders	1809687, 1809688
EPA 365.1 Rev. 2.0	06/21/2016	06/23/2016	Vijayalakshmi Reddy	06/24/2016	Lipi Saha	1809687, 1809688
EPA 365.1 Rev. 2.0 dissolved	06/21/2016			06/21/2016 14:36	Julia Storbeck	1809690
	06/21/2016			06/21/2016 14:39	Julia Storbeck	1809689
SM 2120 B	06/21/2016			06/21/2016 16:04	Chrisoulla Rakowski	1809685
	06/21/2016			06/21/2016 16:05	Chrisoulla Rakowski	1809686
SM 2320 B-97	06/21/2016			07/02/2016	Dale L. Simmons	1809685, 1809686
SM 2540 C-97	06/21/2016			06/22/2016	Yijie Li	1809685, 1809686
SM 2540 D-97	06/21/2016			06/22/2016	Yijie Li	1809685, 1809686
SM 4500 F-C-97	06/21/2016			07/02/2016	Dale L. Simmons	1809685, 1809686
SM 5310 B-00	06/21/2016			06/29/2016	Diana M. Turner	1809687, 1809688