

Chemical Analysis Report

SO-DIST-2016-06-14-01

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

Event Description: **SMP: Florida Keys**
Request ID: **RQ-2016-06-27-04**
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

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

Certified by: Colin Wright, Environmental Administrator

Date Certified: 07-JUL-2016 10:55

A handwritten signature in black ink, appearing to read "Colin Wright", is written 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: Indian Key Fill at SW End

Collection Date/Time: 06/13/2016 13:20

Field ID: G5SD0073

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1807760	EPA 180.1 Rev. 2.0	Turbidity	1.9		NTU	P306166	
	SM 2320 B-97	Total Alkalinity	118		mg CaCO3/L	P306670	
	SM 2540 D-97	TSS	7	I	mg/L	P306867	
	SM 4500 F-C-97	Fluoride	1.4		mg F/L	P306379	
1807765	EPA 350.1 Rev. 2.0	Ammonia-N	0.025		mg N/L	P306889	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.69		mg N/L	P306195	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.006	I	mg N/L	P306435	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P306317	
	SM 5310 B-00	Organic Carbon	7.1		mg C/L	P307067	
1807770	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P306180	
1807780	EPA 200.7 Rev. 4.4	Iron	120	U	ug/L	P306345	
	EPA 200.8 Rev. 5.4	Arsenic	2.99		ug/L	P306345	
		Cadmium	0.060	U	ug/L	P306345	
		Chromium	0.15	U	ug/L	P306345	
		Copper	0.30	U	ug/L	P306345	
		Lead	0.15	U	ug/L	P306345	
		Nickel	0.18	I	ug/L	P307029	
		Silver	0.015	U	ug/L	P306345	
		Zinc	3.0	U	ug/L	P306345	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: Grassy Key @ Curry Hammock SP Creek

Collection Date/Time: 06/13/2016 14:40

Field ID: FLKEYS0022FTM

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1807761	EPA 180.1 Rev. 2.0	Turbidity	2.7	A	NTU	P306166	
	SM 2320 B-97	Total Alkalinity	120		mg CaCO3/L	P306670	
	SM 2540 D-97	TSS	4	I	mg/L	P306867	
	SM 4500 F-C-97	Fluoride	1.3		mg F/L	P306379	
1807766	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P306889	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.41		mg N/L	P306195	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.074		mg N/L	P306435	
	EPA 365.1 Rev. 2.0	Total-P	0.016		mg P/L	P306317	
	SM 5310 B-00	Organic Carbon	4.0		mg C/L	P307067	
1807771	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P306180	
1807781	EPA 200.7 Rev. 4.4	Iron	120	U	ug/L	P306345	
	EPA 200.8 Rev. 5.4	Arsenic	2.80		ug/L	P306345	
		Cadmium	0.060	U	ug/L	P306345	
		Chromium	0.15	U	ug/L	P306345	
		Copper	0.30	U	ug/L	P306345	
		Lead	0.15	U	ug/L	P306345	
		Nickel	0.15	U	ug/L	P306345	
		Silver	0.015	U	ug/L	P306345	

Field ID: FLKEYS0022FTM

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1807781	EPA 200.8 Rev. 5.4	Zinc	3.0	U	ug/L	P306345	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: 6012C by Bridge No Name Key

Collection Date/Time: 06/13/2016 15:50

Field ID: G5SD0071

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1807762	EPA 180.1 Rev. 2.0	Turbidity	0.65		NTU	P306166	
	SM 2320 B-97	Total Alkalinity	114		mg CaCO3/L	P306670	
	SM 2540 D-97	TSS	4	I	mg/L	P306867	
	SM 4500 F-C-97	Fluoride	1.3		mg F/L	P306379	
1807767	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P306423	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.27	I	mg N/L	P306195	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P306435	
	EPA 365.1 Rev. 2.0	Total-P	0.011		mg P/L	P306317	
	SM 5310 B-00	Organic Carbon	2.6		mg C/L	P307067	
1807772	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P306180	
1807782	EPA 200.7 Rev. 4.4	Iron	120	U	ug/L	P306345	
	EPA 200.8 Rev. 5.4	Arsenic	2.54		ug/L	P306345	
		Cadmium	0.060	U	ug/L	P306345	
		Chromium	0.15	U	ug/L	P306345	
		Copper	0.30	U	ug/L	P306345	
		Lead	0.15	U	ug/L	P306345	
		Nickel	0.15	U	ug/L	P306345	
		Silver	0.015	U	ug/L	P306345	
		Zinc	3.0	U	ug/L	P306345	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: Field Blank

Collection Date/Time: 06/13/2016 14:50

Field ID: G5SD-Blank1

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1807763	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P306166	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P306373	
	SM 2540 D-97	TSS	2	U	mg/L	P306866	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P306377	
1807768	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P306890	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P306197	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P306341	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P306319	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P306614	
1807773	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P306179	
1807783	EPA 200.7 Rev. 4.4	Iron	30	U	ug/L	P306345	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P306345	

Field ID: G5SD-Blank1

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1807783	EPA 200.8 Rev. 5.4	Cadmium	0.020	U	ug/L	P306345	
		Chromium	0.050	U	ug/L	P306345	
		Copper	0.10	U	ug/L	P306345	
		Lead	0.050	U	ug/L	P306345	
		Nickel	0.050	U	ug/L	P306345	
		Silver	0.0050	U	ug/L	P306345	
		Zinc	1.0	U	ug/L	P306345	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: Indian Key Fill at SW End -dup

Collection Date/Time: 06/13/2016 13:30

Field ID: G5SD0073-DUP

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1807764	EPA 180.1 Rev. 2.0	Turbidity	1.7		NTU	P306166	
	SM 2320 B-97	Total Alkalinity	115		mg CaCO3/L	P306670	
	SM 2540 D-97	TSS	6	I	mg/L	P306867	
	SM 4500 F-C-97	Fluoride	1.4		mg F/L	P306379	
1807769	EPA 350.1 Rev. 2.0	Ammonia-N	0.027		mg N/L	P306423	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.74		mg N/L	P306195	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.008	I	mg N/L	P306435	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P306320	
	SM 5310 B-00	Organic Carbon	7.0		mg C/L	P307067	
1807774	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P306180	
1807784	EPA 200.7 Rev. 4.4	Iron	120	U	ug/L	P306345	
	EPA 200.8 Rev. 5.4	Arsenic	2.82		ug/L	P306345	
		Cadmium	0.060	U	ug/L	P306345	
		Chromium	0.15	U	ug/L	P306345	
		Copper	0.30	U	ug/L	P306345	
		Lead	0.15	U	ug/L	P306345	
		Nickel	0.20	I	ug/L	P307029	
		Silver	0.015	U	ug/L	P306345	
		Zinc	3.0	U	ug/L	P306345	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P306166

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P306345

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306345

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
Zinc	1.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307029

Component	Result	Code	Units
Nickel	0.050	U	ug/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306423

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306889

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306890

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306195

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306197

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306341

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306435

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306317

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306319

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306320

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306179

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306180

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

Reference Method: SM 2320 B-97
Batch ID: P306373

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

Reference Method: SM 2320 B-97
Batch ID: P306670

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

Quality Assurance Report Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P306866

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P306867

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P306377

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P306379

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P306614

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Reference Method: SM 5310 B-00
Batch ID: P307067

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: P306345

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	108		P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306345

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	97.2		P	85 - 115
Cadmium	99.2		P	85 - 115
Chromium	96.7		P	85 - 115
Copper	95.6		P	85 - 115
Lead	95.8		P	85 - 115
Nickel	96.5		P	85 - 115

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306345

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Silver	96.1		P	85 - 115
Zinc	99.3		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307029

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Nickel	93.7		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306423

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306889

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306890

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.3		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306195

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306197

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306341

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	98.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306435

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	99.5		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306317

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306319

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306320

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	98.4		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306179

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306180

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

Reference Method: SM 2320 B-97
Batch ID: P306373

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

Reference Method: SM 2320 B-97
Batch ID: P306670

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	106		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P306377

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.1		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P306379

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P306614

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

Reference Method: SM 5310 B-00
Batch ID: P307067

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P306345

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1808038	Iron	111		P	70 - 130
1808166	Iron	107	107	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306345

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1808038	Arsenic	104		P	70 - 130
1808038	Cadmium	99.6		P	70 - 130
1808038	Chromium	85.2		P	70 - 130
1808038	Copper	97.2		P	70 - 130
1808038	Lead	102		P	70 - 130
1808038	Nickel	100		P	70 - 130
1808038	Silver	91.7		P	70 - 130
1808038	Zinc	100		P	70 - 130
1808166	Arsenic	102	100	P/P	70 - 130
1808166	Cadmium	90.3	91.2	P/P	70 - 130
1808166	Chromium	78.7	76.1	P/P	70 - 130
1808166	Copper	94.3	94.5	P/P	70 - 130
1808166	Lead	102	100	P/P	70 - 130
1808166	Nickel	99.1	98.3	P/P	70 - 130
1808166	Silver	88.7	87.0	P/P	70 - 130
1808166	Zinc	96.5	95.5	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307029

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1808172	Nickel	92.4	91.5	P/P	70 - 130

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306423

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807648	Ammonia-N	101	102	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306889

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807765	Ammonia-N	102	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306890

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1808960	Ammonia-N	95.6	97.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306195

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807502	Kjeldahl Nitrogen	97.3	98.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306197

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807649	Kjeldahl Nitrogen	99.2	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306341

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807452	NO2NO3-N	96.8		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306435

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807503	NO2NO3-N	95.8	97.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306317

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807765	Total-P	90.4	92.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306319

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807791	Total-P	96.8	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306320

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807828	Total-P	94.1	98.5	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306179

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807792	O-Phosphate-P	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306180

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1808034	O-Phosphate-P	98.5	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P306377

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1808201	Fluoride	98.6	101	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P306379

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1808119	Fluoride	95.7	95.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P306614

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807647	Organic Carbon	92.0	92.6	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P307067

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1807826	Organic Carbon	91.7	91.7	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P306166

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807761	Turbidity	17.5	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P306345

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1808166	Iron	0.394	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P306345

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1808166	Arsenic	1.90	Spike	P	0 - 20
1808166	Cadmium	0.989	Spike	P	0 - 20
1808166	Chromium	3.27	Spike	P	0 - 20
1808166	Copper	0.175	Spike	P	0 - 20
1808166	Lead	1.34	Spike	P	0 - 20
1808166	Nickel	0.811	Spike	P	0 - 20
1808166	Silver	1.93	Spike	P	0 - 20
1808166	Zinc	0.981	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307029

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1808172	Nickel	1.00	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306423

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807648	Ammonia-N	0.383	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306889

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807765	Ammonia-N	0.602	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P306890

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1808960	Ammonia-N	1.86	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306195

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807502	Kjeldahl Nitrogen	0.833	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306197

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807649	Kjeldahl Nitrogen	0.986	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306341

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807452	NO2NO3-N	1.11	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306435

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807503	NO2NO3-N	1.46	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306317

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807765	Total-P	2.13	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306319

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807791	Total-P	4.17	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306320

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807828	Total-P	4.21	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306179

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807792	O-Phosphate-P	0.987	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306180

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1808034	O-Phosphate-P	2.41	Spike	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P306373

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1808201	Total Alkalinity	0.169	Sample	P	0 - 4.8

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
Batch ID: P306670

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1808975	Total Alkalinity	0.0789	Sample	P	0 - 4.8

Reference Method: SM 4500 F-C-97
Batch ID: P306377

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1808201	Fluoride	1.45	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P306379

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1808119	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P306614

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807647	Organic Carbon	0.567	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P307067

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1807826	Organic Carbon	0.0486	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 180.1 Rev. 2.0
Run ID: A70027
Included Lab Sample IDs: 1807760, 1807761, 1807762, 1807763, 1807764

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	99.0	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A70031
Included Lab Sample IDs: 1807770, 1807771, 1807772, 1807773, 1807774

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.2	98.0	P/P	90 - 110
O-Phosphate-P	99.6	98.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A70085

Included Lab Sample IDs: 1807768

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A70094

Included Lab Sample IDs: 1807765, 1807766, 1807767, 1807768, 1807769

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	93.1	96.5	P/P	90 - 110
Kjeldahl Nitrogen	96.5	92.9	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A70097

Included Lab Sample IDs: 1807763

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

Reference Method: SM 4500 F-C-97

Run ID: A70097

Included Lab Sample IDs: 1807760, 1807761, 1807762, 1807763, 1807764

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	101	100	P/P	90 - 110
Fluoride	101	99.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A70105

Included Lab Sample IDs: 1807767, 1807769

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A70106

Included Lab Sample IDs: 1807765, 1807766, 1807767, 1807769

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A70120

Included Lab Sample IDs: 1807765, 1807766, 1807767, 1807768, 1807769

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	99.8	P/P	90 - 110
Total-P	102	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A70129

Included Lab Sample IDs: 1807780, 1807781, 1807782, 1807783, 1807784

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A70140

Included Lab Sample IDs: 1807780, 1807781, 1807782, 1807783, 1807784

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.1	100	P/P	90 - 110
Arsenic	98.7	98.1	P/P	90 - 110
Cadmium	100	97.7	P/P	90 - 110
Cadmium	97.7	100	P/P	90 - 110
Chromium	95.9	98.4	P/P	90 - 110
Chromium	98.4	94.6	P/P	90 - 110
Copper	99.1	101	P/P	90 - 110
Copper	100	99.1	P/P	90 - 110
Lead	95.2	96.2	P/P	90 - 110
Lead	96.2	95.8	P/P	90 - 110
Nickel	101	99.2	P/P	90 - 110
Nickel	99.2	101	P/P	90 - 110
Silver	96.0	97.0	P/P	90 - 110
Silver	97.0	95.3	P/P	90 - 110
Zinc	101	102	P/P	90 - 110
Zinc	102	101	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A70160

Included Lab Sample IDs: 1807768

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.6	95.7	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A70169

Included Lab Sample IDs: 1807760, 1807761, 1807762, 1807764

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A70237

Included Lab Sample IDs: 1807765, 1807766, 1807768

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.8	98.2	P/P	90 - 110
Ammonia-N	99.9	98.8	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00

Run ID: A70300

Included Lab Sample IDs: 1807765, 1807766, 1807767, 1807769

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	105	96.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A70363

Included Lab Sample IDs: 1807780, 1807784

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	92.4	95.4	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				17.5	
EPA 200.7 Rev. 4.4	Iron	108	111 107 107			0.394
EPA 200.8 Rev. 5.4	Arsenic	97.2	104 102 100			1.90
	Cadmium	99.2	99.6 90.3 91.2			0.989
	Chromium	96.7	85.2 78.7 76.1			3.27
	Copper	95.6	97.2 94.3 94.5			0.175
	Lead	95.8	102 102 100			1.34
	Nickel	96.5	100 99.1 98.3			0.811
	Nickel	93.7	92.4 91.5			1.00
	Silver	96.1	91.7 88.7 87.0			1.93
	Zinc	99.3	100 96.5 95.5			0.981
EPA 350.1 Rev. 2.0	Ammonia-N	99.6	101 102			0.383
	Ammonia-N	97.0	102 101			0.602
	Ammonia-N	94.3	95.6 97.8			1.86
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.8	97.3 98.2			0.833
	Kjeldahl Nitrogen	100	99.2 100			0.986
EPA 353.2 Rev. 2.0	NO2NO3-N	98.0	96.8			1.11
	NO2NO3-N	99.5	95.8 97.8			1.46
EPA 365.1 Rev. 2.0	Total-P	101	90.4 92.4			2.13
	Total-P	100	96.8 101			4.17
	Total-P	98.4	94.1 98.5			4.21
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	101 102			0.987
	O-Phosphate-P	104	98.5 101			2.41
SM 2320 B-97	Total Alkalinity	102			0.169	
	Total Alkalinity	106			0.0789	
SM 4500 F-C-97	Fluoride	98.1	98.6 101			1.45
	Fluoride	98.5	95.7 95.7			0.0
SM 5310 B-00	Organic Carbon	96.2	92.0 92.6			0.567
	Organic Carbon	102	91.7 91.7			0.0486

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1807760, 1807761, 1807762, 1807763, 1807764
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1807780, 1807781, 1807782, 1807783, 1807784
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1807780, 1807781, 1807782, 1807783, 1807784
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1807765, 1807766, 1807767, 1807768, 1807769
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1807765, 1807766, 1807767, 1807768, 1807769
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1807765, 1807766, 1807767, 1807768, 1807769
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1807765, 1807766, 1807767, 1807768, 1807769
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1807770, 1807771, 1807772, 1807773, 1807774
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1807760, 1807761, 1807762, 1807763, 1807764
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1807760, 1807761, 1807762, 1807763, 1807764
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1807760, 1807761, 1807762, 1807763, 1807764
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1807765, 1807766, 1807767, 1807768, 1807769

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	06/14/2016			06/14/2016 13:47	Rochelle Y Jackson	1807760, 1807761, 1807762, 1807763, 1807764
EPA 200.7 Rev. 4.4	06/14/2016	06/16/2016	Elliott D. Healy	06/20/2016	Joshua Ayres	1807780, 1807781, 1807782, 1807783, 1807784
EPA 200.8 Rev. 5.4	06/14/2016	06/16/2016	Elliott D. Healy	06/20/2016	Charles J. Peterson	1807783
	06/14/2016	06/16/2016	Elliott D. Healy	06/21/2016	Charles J. Peterson	1807780, 1807781, 1807782, 1807784
	06/14/2016	06/28/2016	Elliott D. Healy	07/01/2016	Charles J. Peterson	1807780, 1807784
EPA 350.1 Rev. 2.0	06/14/2016			06/17/2016	Diana M. Turner	1807767, 1807769
	06/14/2016			06/24/2016	Diana M. Turner	1807765, 1807766, 1807768
EPA 351.2 Rev. 2.0	06/14/2016	06/15/2016	Sofia Elnemr	06/16/2016	Christopher Armour	1807765, 1807766, 1807767, 1807768, 1807769
EPA 353.2 Rev. 2.0	06/14/2016			06/16/2016	Beverly Y. Sanders	1807768
	06/14/2016			06/17/2016	Beverly Y. Sanders	1807765, 1807766, 1807767, 1807769
EPA 365.1 Rev. 2.0	06/14/2016	06/16/2016	Vijayalakshmi Reddy	06/17/2016	Lipi Saha	1807765, 1807766, 1807767, 1807768, 1807769
EPA 365.1 Rev. 2.0 dissolved	06/14/2016			06/14/2016 15:55	Julia Storbeck	1807773
	06/14/2016			06/14/2016 15:56	Julia Storbeck	1807770, 1807774
	06/14/2016			06/14/2016 16:02	Julia Storbeck	1807771
	06/14/2016			06/14/2016 16:07	Julia Storbeck	1807772
SM 2320 B-97	06/14/2016			06/16/2016	Dale L. Simmons	1807763
	06/14/2016			06/22/2016	Rochelle Y Jackson	1807760, 1807761, 1807762, 1807764
SM 2540 D-97	06/14/2016			06/17/2016	Yijie Li	1807760, 1807761, 1807762, 1807763, 1807764
SM 4500 F-C-97	06/14/2016			06/16/2016	Dale L. Simmons	1807760, 1807761, 1807762, 1807763, 1807764
SM 5310 B-00	06/14/2016			06/20/2016	Diana M. Turner	1807768
	06/14/2016			06/29/2016	Diana M. Turner	1807765, 1807766, 1807767, 1807769