

Chemical Analysis Report

SO-DIST-2016-04-19-01

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-2016-04-18-09**
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: 11-MAY-2016 15:42

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 @ SW End

Collection Date/Time: 04/18/2016 13:10

Field ID: G5SD041816-1

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790259	EPA 180.1 Rev. 2.0	Turbidity	7.2		NTU	P302555	
	SM 2320 B-97	Total Alkalinity	113		mg CaCO3/L	P302741	
	SM 2540 D-97	TSS	14		mg/L	P302894	
	SM 4500 F-C-97	Fluoride	1.3		mg F/L	P302746	
1790263	EPA 350.1 Rev. 2.0	Ammonia-N	0.012		mg N/L	P303364	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.33	I	mg N/L	P303095	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P303057	
	EPA 365.1 Rev. 2.0	Total-P	0.011	J	mg P/L	P302926	MS
	SM 5310 B-00	Organic Carbon	2.0		mg C/L	P302857	
1790267	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P302523	
1790279	EPA 200.7 Rev. 4.4	Iron	120	U	ug/L	P302527	
		Zinc	20	U	ug/L	P302527	
	EPA 200.8 Rev. 5.4	Arsenic	1.94		ug/L	P302980	
		Cadmium	0.060	U	ug/L	P302980	
		Chromium	1.2	I	ug/L	P302980	
		Copper	0.36	I	ug/L	P302980	
		Lead	0.25	U	ug/L	P302980	
		Nickel	0.75	U	ug/L	P302980	
		Silver	0.015	U	ug/L	P302980	

Ref. Method and Comment:

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

EPA 365.1 Rev. 2.0: Total-P: Refer to the narrative for an explanation of QC Codes.

Sample Location: Grassy Key @ Curry Hammock Creek

Collection Date/Time: 04/18/2016 14:30

Field ID: G5SD041816-3

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790260	EPA 180.1 Rev. 2.0	Turbidity	2.6		NTU	P302555	
	SM 2320 B-97	Total Alkalinity	131		mg CaCO3/L	P302741	
	SM 2540 D-97	TSS	4	I	mg/L	P302894	
	SM 4500 F-C-97	Fluoride	1.3		mg F/L	P302746	
1790264	EPA 350.1 Rev. 2.0	Ammonia-N	0.015		mg N/L	P303364	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.32	I	mg N/L	P303095	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	I	mg N/L	P303057	
	EPA 365.1 Rev. 2.0	Total-P	0.015		mg P/L	P302926	MS
	SM 5310 B-00	Organic Carbon	4.4		mg C/L	P302857	
1790268	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P302523	
1790280	EPA 200.7 Rev. 4.4	Iron	120	U	ug/L	P302527	
		Zinc	20	U	ug/L	P302527	
	EPA 200.8 Rev. 5.4	Arsenic	2.34		ug/L	P302980	
		Cadmium	0.060	U	ug/L	P302980	
		Chromium	1.5	I	ug/L	P302980	
		Copper	0.51	I	ug/L	P302980	
		Lead	0.25	U	ug/L	P302980	

Field ID: G5SD041816-3

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790280	EPA 200.8 Rev. 5.4	Nickel	0.78	I	ug/L	P302980	
		Silver	0.015	U	ug/L	P302980	

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: 04/18/2016 13:30

Field ID: G5SD041816-5

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790261	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P302555	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P302740	
	SM 2540 D-97	TSS	2	U	mg/L	P302893	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P302745	
1790265	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P303373	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P303392	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P302867	
	EPA 365.1 Rev. 2.0	Total-P	0.003	I	mg P/L	P303069	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P302950	
1790269	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P302523	
1790281	EPA 200.7 Rev. 4.4	Iron	30	U	ug/L	P302527	
		Zinc	5.0	U	ug/L	P302527	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P302980	
		Cadmium	0.020	U	ug/L	P302980	
		Chromium	0.30	U	ug/L	P302980	
		Copper	0.10	U	ug/L	P302980	
		Lead	0.050	U	ug/L	P302980	
		Nickel	0.25	U	ug/L	P302980	
		Silver	0.0050	U	ug/L	P302980	

Ref. Method and Comment:

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

EPA 350.1 Rev. 2.0: The result was confirmed on 05/02/2016.

EPA 365.1 Rev. 2.0: Total-P: The result was confirmed on 05/04/2016.

Sample Location: Indian Key Fill @ SW End Dupl

Collection Date/Time: 04/18/2016 13:15

Field ID: G5SD041816-6

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790262	EPA 180.1 Rev. 2.0	Turbidity	7.1		NTU	P302555	
	SM 2320 B-97	Total Alkalinity	113		mg CaCO3/L	P302741	
	SM 2540 D-97	TSS	9	I	mg/L	P302894	
	SM 4500 F-C-97	Fluoride	1.3		mg F/L	P302746	
1790266	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P303364	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.45		mg N/L	P303095	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P303057	
	EPA 365.1 Rev. 2.0	Total-P	0.012		mg P/L	P302926	MS
	SM 5310 B-00	Organic Carbon	1.9	I	mg C/L	P302857	

Field ID: G5SD041816-6

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790270	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P302523	
1790282	EPA 200.7 Rev. 4.4	Iron	120	U	ug/L	P302527	
		Zinc	20	U	ug/L	P302527	
	EPA 200.8 Rev. 5.4	Arsenic	2.00		ug/L	P302980	
		Cadmium	0.060	U	ug/L	P302980	
		Chromium	1.5	I	ug/L	P302980	
		Copper	0.52	I	ug/L	P302980	
		Lead	0.25	U	ug/L	P302980	
		Nickel	0.75	U	ug/L	P302980	
		Silver	0.015	U	ug/L	P302980	

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: P302555

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P302527

Component	Result	Code	Units
Iron	30	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P302980

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.30	U	ug/L
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.25	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P303364

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

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P303373

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303095

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303392

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P302867

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303057

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302926

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303069

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302523

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

Reference Method: SM 2320 B-97
Batch ID: P302740

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

Reference Method: SM 2320 B-97
Batch ID: P302741

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: P302893

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P302894

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P302745

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P302746

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P302857

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

Reference Method: SM 5310 B-00
Batch ID: P302950

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: P302527

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	106		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302980

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	98.7		P	85 - 115
Cadmium	98.8		P	85 - 115
Chromium	103		P	85 - 115
Copper	98.0		P	85 - 115
Lead	97.7		P	85 - 115

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302980

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Nickel	103		P	85 - 115
Silver	94.7		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303364

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303373

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.1		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303095

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.5		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303392

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P302867

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	108		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303057

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302926

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303069

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302523

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

Reference Method: SM 2320 B-97
Batch ID: P302740

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

Reference Method: SM 2320 B-97
Batch ID: P302741

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

Reference Method: SM 4500 F-C-97
Batch ID: P302745

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.0		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P302746

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.6		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P302857

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.6		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P302950

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P302527

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1789542	Iron	101	101	P/P	70 - 130
1789542	Zinc	113	109	P/P	70 - 130

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302980

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1789544	Arsenic	102	101	P/P	70 - 130
1789544	Cadmium	87.7	87.5	P/P	70 - 130
1789544	Chromium	101	101	P/P	70 - 130
1789544	Copper	92.5	89.7	P/P	70 - 130
1789544	Lead	104	103	P/P	70 - 130
1789544	Nickel	96.4	99.8	P/P	70 - 130
1789544	Silver	85.7	85.7	P/P	70 - 130

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303364

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790527	Ammonia-N	102	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303373

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790180	Ammonia-N	98.4	97.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303095

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790134	Kjeldahl Nitrogen	96.9	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303392

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790177	Kjeldahl Nitrogen	94.7	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P302867

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790176	NO2NO3-N	106	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303057

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790134	NO2NO3-N	94.0	98.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302926

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790263	Total-P	85.0	87.9	F/F	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303069

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790176	Total-P	98.5	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302523

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790267	O-Phosphate-P	100	99.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P302745

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1789841	Fluoride	97.4	96.8	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P302746

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1789510	Fluoride	97.0	97.0	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P302857

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1789214	Organic Carbon	94.2	95.7	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P302950

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790176	Organic Carbon	94.6	95.8	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P302555

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790175	Turbidity	5.89	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P302527

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1789542	Iron	0.297	Spike	P	0 - 20
1789542	Zinc	4.00	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302980

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1789544	Arsenic	1.65	Spike	P	0 - 20
1789544	Cadmium	0.179	Spike	P	0 - 20
1789544	Chromium	0.00841	Spike	P	0 - 20
1789544	Copper	2.58	Spike	P	0 - 20
1789544	Lead	0.576	Spike	P	0 - 20
1789544	Nickel	3.42	Spike	P	0 - 20
1789544	Silver	0.0185	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303364

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790527	Ammonia-N	0.937	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303373

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790180	Ammonia-N	0.607	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303095

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790134	Kjeldahl Nitrogen	2.71	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303392

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790177	Kjeldahl Nitrogen	4.33	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P302867

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790176	NO2NO3-N	0.282	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303057

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790134	NO2NO3-N	2.93	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302926

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790263	Total-P	3.36	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303069

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790176	Total-P	3.56	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302523

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790267	O-Phosphate-P	0.300	Spike	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P302740

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1789841	Total Alkalinity	0.305	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P302741

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1789510	Total Alkalinity	0.264	Sample	P	0 - 4.8

Reference Method: SM 4500 F-C-97
Batch ID: P302745

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1789841	Fluoride	0.530	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P302746

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1789510	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P302857

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1789214	Organic Carbon	1.42	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 5310 B-00
Batch ID: P302950

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790176	Organic Carbon	0.918	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: A68960
Included Lab Sample IDs: 1790267, 1790268, 1790269, 1790270

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	101	P/P	90 - 110
O-Phosphate-P	98.9	100	P/P	90 - 110
O-Phosphate-P	99.8	98.9	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A68973
Included Lab Sample IDs: 1790259, 1790260, 1790261, 1790262

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

Reference Method: SM 2320 B-97
Run ID: A69026
Included Lab Sample IDs: 1790259, 1790260, 1790261, 1790262

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.4	102	P/P	90 - 110
Total Alkalinity	99.4	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A69026
Included Lab Sample IDs: 1790259, 1790260, 1790261, 1790262

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.5	98.5	P/P	90 - 110
Fluoride	98.5	98.1	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A69031
Included Lab Sample IDs: 1790281

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

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00

Run ID: A69060

Included Lab Sample IDs: 1790263, 1790264, 1790266

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.9	95.9	P/P	90 - 110
Organic Carbon	95.2	94.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A69066

Included Lab Sample IDs: 1790265

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	93.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A69081

Included Lab Sample IDs: 1790279, 1790280, 1790281, 1790282

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	101	99.3	P/P	90 - 110
Zinc	101	99.6	P/P	90 - 110
Zinc	102	101	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A69096

Included Lab Sample IDs: 1790265

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.6	93.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A69129

Included Lab Sample IDs: 1790263, 1790264, 1790266

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: A69131

Included Lab Sample IDs: 1790263, 1790264, 1790266

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.2	99.2	P/P	90 - 110
Total-P	99.2	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A69194

Included Lab Sample IDs: 1790279, 1790280, 1790281, 1790282

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	99.2	P/P	90 - 110
Arsenic	99.2	100	P/P	90 - 110
Cadmium	95.7	94.4	P/P	90 - 110
Cadmium	96.5	95.7	P/P	90 - 110
Copper	96.8	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A69194

Included Lab Sample IDs: 1790279, 1790280, 1790281, 1790282

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	99.7	96.8	P/P	90 - 110
Lead	96.3	95.7	P/P	90 - 110
Silver	95.6	95.1	P/P	90 - 110
Silver	96.5	95.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A69203

Included Lab Sample IDs: 1790265

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A69207

Included Lab Sample IDs: 1790263, 1790264, 1790265, 1790266

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A69214

Included Lab Sample IDs: 1790279, 1790280, 1790282

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	95.4	95.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A69223

Included Lab Sample IDs: 1790263, 1790264, 1790266

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.3	99.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A69248

Included Lab Sample IDs: 1790279, 1790280, 1790281, 1790282

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	107	105	P/P	90 - 110
Chromium	99.4	107	P/P	90 - 110
Nickel	106	106	P/P	90 - 110
Nickel	99.2	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A69302

Included Lab Sample IDs: 1790265

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	105	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	MS
						SMP	
EPA 180.1 Rev. 2.0	Turbidity					5.89	
EPA 200.7 Rev. 4.4	Iron	106	101	101			0.297
	Zinc	100	113	109			4.00
EPA 200.8 Rev. 5.4	Arsenic	98.7	102	101			1.65
	Cadmium	98.8	87.7	87.5			0.179
	Chromium	103	101	101			0.0084
	Copper	98.0	92.5	89.7			2.58
	Lead	97.7	104	103			0.576
	Nickel	103	96.4	99.8			3.42
	Silver	94.7	85.7	85.7			0.0185
EPA 350.1 Rev. 2.0	Ammonia-N	100	102	101			0.937
	Ammonia-N	97.1	98.4	97.7			0.607
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.5	96.9	100			2.71
	Kjeldahl Nitrogen	107	94.7	100			4.33
EPA 353.2 Rev. 2.0	NO2NO3-N	108	106	106			0.282
	NO2NO3-N	104	94.0	98.0			2.93
EPA 365.1 Rev. 2.0	Total-P	99.2	85.0	87.9			3.36
	Total-P	97.8	98.5	102			3.56
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	100	99.7			0.300
SM 2320 B-97	Total Alkalinity	101				0.305	
	Total Alkalinity	102				0.264	
SM 4500 F-C-97	Fluoride	97.0	97.4	96.8			0.530
	Fluoride	94.6	97.0	97.0			0.0
SM 5310 B-00	Organic Carbon	97.6	94.2	95.7			1.42
	Organic Carbon	94.6	94.6	95.8			0.918

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1790259, 1790260, 1790261, 1790262
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1790279, 1790280, 1790281, 1790282
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1790279, 1790280, 1790281, 1790282
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1790263, 1790264, 1790265, 1790266
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1790263, 1790264, 1790265, 1790266
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1790263, 1790264, 1790265, 1790266
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1790263, 1790264, 1790265, 1790266
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1790267, 1790268, 1790269, 1790270
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1790259, 1790260, 1790261, 1790262
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1790259, 1790260, 1790261, 1790262

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1790259, 1790260, 1790261, 1790262
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1790263, 1790264, 1790265, 1790266

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	04/19/2016			04/19/2016 14:16	Blanca Fach	1790259, 1790260, 1790261, 1790262
EPA 200.7 Rev. 4.4	04/19/2016	04/19/2016	Elliott D. Healy	04/21/2016	Joshua Ayres	1790281
	04/19/2016	04/19/2016	Elliott D. Healy	04/26/2016	Joshua Ayres	1790279, 1790280, 1790281, 1790282
EPA 200.8 Rev. 5.4	04/19/2016	04/26/2016	Elliott D. Healy	04/29/2016	Charles J. Peterson	1790279, 1790280, 1790281, 1790282
	04/19/2016	04/26/2016	Elliott D. Healy	05/02/2016	Charles J. Peterson	1790279, 1790280, 1790282
	04/19/2016	04/26/2016	Elliott D. Healy	05/03/2016	Robert K Palmer	1790279, 1790280, 1790281, 1790282
EPA 350.1 Rev. 2.0	04/19/2016			05/02/2016	Diana M. Turner	1790263, 1790264, 1790265, 1790266
EPA 351.2 Rev. 2.0	04/19/2016	04/27/2016	Sofia Elnemr	05/02/2016	Christopher Armour	1790263, 1790264, 1790266
	04/19/2016	05/03/2016	Sofia Elnemr	05/04/2016	Christopher Armour	1790265
EPA 353.2 Rev. 2.0	04/19/2016			04/22/2016	Peter D. Kaus	1790265
	04/19/2016			04/27/2016	Peter D. Kaus	1790263, 1790264, 1790266
EPA 365.1 Rev. 2.0	04/19/2016	04/26/2016	Christopher Armour	04/27/2016	Lipi Saha	1790263, 1790264, 1790266
	04/19/2016	04/27/2016	Lipi Saha	04/28/2016	Lipi Saha	1790265
EPA 365.1 Rev. 2.0 dissolved	04/19/2016			04/19/2016 14:56	Ping Hua	1790267
	04/19/2016			04/19/2016 15:40	Ping Hua	1790269
	04/19/2016			04/19/2016 15:48	Ping Hua	1790268
	04/19/2016			04/19/2016 15:49	Ping Hua	1790270
SM 2320 B-97	04/19/2016			04/21/2016	Dale L. Simmons	1790259, 1790260, 1790261, 1790262
SM 2540 D-97	04/19/2016			04/20/2016	Yijie Li	1790259, 1790260, 1790261, 1790262
SM 4500 F-C-97	04/19/2016			04/21/2016	Dale L. Simmons	1790259, 1790260, 1790261, 1790262
SM 5310 B-00	04/19/2016			04/22/2016	Sofia Elnemr	1790263, 1790264, 1790266
	04/19/2016			04/26/2016	Sofia Elnemr	1790265