

Chemical Analysis Report

SE-DIST-2016-10-11-01

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

Event Description: **SMP - Fort Drum Creek(2)/Taylor Creek(1)**

Request ID: **RQ-2016-10-10-13**

Customer: **SE-DIST**

Project ID: **SMP**

Send Reports to:

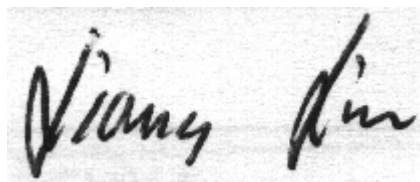
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

For additional information please contact

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 03-NOV-2016 17:27

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored 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: FORT DRUM CREEK @ 441 (SOUTH)

Collection Date/Time: 10/10/2016 11:15

Field ID: G3SE0013

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1839550	EPA 180.1 Rev. 2.0	Turbidity	5.1		NTU	P312973	
	EPA 300.0 Rev. 2.1	Chloride	24	A	mg Cl/L	P313676	
		Sulfate	5.6	A	mg SO4/L	P313679	
	SM 2120 B	Color (true)	440		PCU	P312921	
	SM 2320 B-97	Total Alkalinity	36		mg CaCO3/L	P313058	
	SM 2540 C-97	TDS	140		mg/L	P313713	
	SM 2540 D-97	TSS	12		mg/L	P313834	
	SM 4500 F-C-97	Fluoride	0.088	I	mg F/L	P313061	
1839553	EPA 350.1 Rev. 2.0	Ammonia-N	0.058		mg N/L	P313506	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.0		mg N/L	P313870	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.021		mg N/L	P313222	
	EPA 365.1 Rev. 2.0	Total-P	0.30		mg P/L	P313807	
	SM 5310 B-00	Organic Carbon	33		mg C/L	P313154	
1839556	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.19		mg P/L	P312917	
1839562	EPA 200.7 Rev. 4.4	Calcium	15.5		mg/L	P313098	
		Iron	1.81E+03		ug/L	P313098	
		Magnesium	4.93		mg/L	P313098	
		Potassium	5.4		mg/L	P313098	
		Sodium	11.8		mg/L	P313098	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P313098	
		Arsenic	0.80		ug/L	P313098	
		Cadmium	0.020	U	ug/L	P313098	
		Chromium	1.50		ug/L	P313098	
		Copper	1.23		ug/L	P313747	
		Lead	0.36		ug/L	P313098	
		Nickel	0.73		ug/L	P313747	
		Silver	0.0050	U	ug/L	P313098	

Sample Location: FORT DRUM CREEK @ 304TH ST

Collection Date/Time: 10/10/2016 11:40

Field ID: G3SE0012

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1839551	EPA 180.1 Rev. 2.0	Turbidity	5.4	A	NTU	P312974	
	EPA 300.0 Rev. 2.1	Chloride	21		mg Cl/L	P313677	
		Sulfate	3.9		mg SO4/L	P313680	
	SM 2120 B	Color (true)	470		PCU	P312921	
	SM 2320 B-97	Total Alkalinity	30		mg CaCO3/L	P313058	
	SM 2540 C-97	TDS	141		mg/L	P313713	
	SM 2540 D-97	TSS	4	I	mg/L	P313834	
	SM 4500 F-C-97	Fluoride	0.081	I	mg F/L	P313061	
1839554	EPA 350.1 Rev. 2.0	Ammonia-N	0.025		mg N/L	P313506	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.7		mg N/L	P313870	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.030		mg N/L	P313222	
	EPA 365.1 Rev. 2.0	Total-P	0.24		mg P/L	P313807	

Field ID: G3SE0012

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1839554	SM 5310 B-00	Organic Carbon	33		mg C/L	P313154	
1839557	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.17		mg P/L	P312917	
1839563	EPA 200.7 Rev. 4.4	Calcium	13.6		mg/L	P313098	
		Iron	1.43E+03		ug/L	P313098	
		Magnesium	4.08		mg/L	P313098	
		Potassium	4.2		mg/L	P313098	
		Sodium	9.9		mg/L	P313098	
		Zinc	5.0	U	ug/L	P313098	
	EPA 200.8 Rev. 5.4	Arsenic	0.73		ug/L	P313098	
		Cadmium	0.020	U	ug/L	P313098	
		Chromium	1.02		ug/L	P313098	
		Copper	1.36		ug/L	P313747	
		Lead	0.39		ug/L	P313098	
		Nickel	0.59		ug/L	P313747	
		Silver	0.0050	U	ug/L	P313098	

Sample Location: TAYLOR CREEK @ SR 70

Collection Date/Time: 10/10/2016 12:30

Field ID: G1SE0011

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1839552	EPA 180.1 Rev. 2.0	Turbidity	41		NTU	P312974	
	EPA 300.0 Rev. 2.1	Chloride	42		mg Cl/L	P313677	
		Sulfate	18		mg SO4/L	P313680	
	SM 2120 B	Color (true)	280		PCU	P312921	
	SM 2320 B-97	Total Alkalinity	120		mg CaCO3/L	P313058	
	SM 2540 C-97	TDS	290	A	mg/L	P313713	
	SM 2540 D-97	TSS	110	A	mg/L	P313834	
	SM 4500 F-C-97	Fluoride	0.098	I	mg F/L	P313061	
1839555	EPA 350.1 Rev. 2.0	Ammonia-N	0.30		mg N/L	P313506	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.1		mg N/L	P313870	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.32		mg N/L	P313222	
	EPA 365.1 Rev. 2.0	Total-P	0.24		mg P/L	P313807	
	SM 5310 B-00	Organic Carbon	32		mg C/L	P313154	
1839558	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.15		mg P/L	P312917	
1839564	EPA 200.7 Rev. 4.4	Calcium	52.0		mg/L	P313098	
		Iron	1.65E+03		ug/L	P313098	
		Magnesium	4.26		mg/L	P313098	
		Potassium	3.0		mg/L	P313098	
		Sodium	28.0		mg/L	P313098	
		Zinc	5.0	U	ug/L	P313098	
	EPA 200.8 Rev. 5.4	Arsenic	2.11		ug/L	P313098	
		Cadmium	0.020	U	ug/L	P313098	
		Chromium	0.91		ug/L	P313098	
		Copper	0.75	I	ug/L	P313747	

Field ID: G1SE0011

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1839564	EPA 200.8 Rev. 5.4	Lead	0.25		ug/L	P313098	
		Nickel	0.96		ug/L	P313747	
		Silver	0.0050	U	ug/L	P313098	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P312973

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P312974

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P313098

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313098

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	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: P313747

Component	Result	Code	Units
Copper	0.50	U	ug/L
Nickel	0.050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313676

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313677

Component	Result	Code	Units
Chloride	0.20	I	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313679

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313680

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313506

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P313870

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313222

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313807

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P312917

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

Reference Method: SM 2120 B
Batch ID: P312921

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P313058

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

Reference Method: SM 2540 C-97
Batch ID: P313713

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P313834

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P313061

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P313154

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: P313098

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	104		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	99.6		P	85 - 115
Sodium	104		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313098

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	102		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	99.1		P	85 - 115
Lead	96.3		P	85 - 115
Silver	100		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313747

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	95.0		P	85 - 115
Nickel	96.9		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313676

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313677

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313679

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313680

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313506

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P313870

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313222

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	106		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313807

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	97.9		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P312917

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

Reference Method: SM 2320 B-97
Batch ID: P313058

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P313061

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.6		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P313154

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P313098

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839541	Calcium	103		P	80 - 120
1839541	Iron	105		P	80 - 120
1839541	Magnesium	104		P	80 - 120
1839541	Potassium	98.6		P	80 - 120
1839541	Sodium	100		P	80 - 120
1839541	Zinc	102		P	80 - 120
1839819	Calcium	103		P	80 - 120
1839819	Iron	104	102	P/P	80 - 120
1839819	Magnesium	105	103	P/P	80 - 120
1839819	Potassium	101	99.7	P/P	80 - 120
1839819	Sodium	106	104	P/P	80 - 120
1839819	Zinc	101	98.1	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313098

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839541	Arsenic	100		P	80 - 120
1839541	Cadmium	101		P	80 - 120
1839541	Chromium	98.5		P	80 - 120
1839541	Lead	96.2		P	80 - 120
1839541	Silver	98.8		P	80 - 120
1839819	Arsenic	101	101	P/P	80 - 120
1839819	Cadmium	102	103	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313098

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839819	Chromium	101	102	P/P	80 - 120
1839819	Lead	95.1	95.7	P/P	80 - 120
1839819	Silver	100	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313747

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839542	Copper	84.9	90.1	P/P	80 - 120
1839542	Nickel	94.2	93.9	P/P	80 - 120
1842814	Copper	95.2		P	80 - 120
1842814	Nickel	95.7		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313676

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839526	Chloride	99.1		P	90 - 110
1839550	Chloride	98.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313677

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840069	Chloride	102		P	90 - 110
1840176	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313679

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839526	Sulfate	96.4		P	90 - 110
1839550	Sulfate	92.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313680

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840069	Sulfate	97.7		P	90 - 110
1840176	Sulfate	96.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313506

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839623	Ammonia-N	99.6	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P313870

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839647	Kjeldahl Nitrogen	95.2	98.5	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313222

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839494	NO2NO3-N	108	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313807

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839623	Total-P	97.0	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P312917

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839497	O-Phosphate-P	101	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P313061

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839403	Fluoride	98.4	99.0	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P313154

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839553	Organic Carbon	102		P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P312973

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839459	Turbidity	4.62	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P312974

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839551	Turbidity	6.06	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P313098

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839819	Calcium	0.0408	Spike	P	0 - 20
1839819	Iron	1.98	Spike	P	0 - 20
1839819	Magnesium	1.31	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P313098

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839819	Potassium	1.48	Spike	P	0 - 20
1839819	Sodium	1.43	Spike	P	0 - 20
1839819	Zinc	3.40	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313098

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839819	Arsenic	0.462	Spike	P	0 - 20
1839819	Cadmium	1.26	Spike	P	0 - 20
1839819	Chromium	0.667	Spike	P	0 - 20
1839819	Lead	0.668	Spike	P	0 - 20
1839819	Silver	0.343	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313747

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839542	Copper	5.89	Spike	P	0 - 20
1839542	Nickel	0.338	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313676

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839550	Chloride	0.498	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313677

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840069	Chloride	0.503	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313679

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839550	Sulfate	2.36	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313680

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840069	Sulfate	3.14	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313506

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839623	Ammonia-N	1.20	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P313870

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839647	Kjeldahl Nitrogen	2.73	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313222

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839494	NO2NO3-N	0.935	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313807

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839623	Total-P	6.43	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P312917

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839497	O-Phosphate-P	0.592	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P312921

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839526	Color (true)	0.291	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P313058

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839403	Total Alkalinity	0.331	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P313713

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839552	TDS	4.14	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 2540 D-97
Batch ID: P313834

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839552	TSS	5.82	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P313061

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839403	Fluoride	0.477	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P313154

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839553	Organic Carbon	4.12	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: A72157
Included Lab Sample IDs: 1839556, 1839557, 1839558

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

Reference Method: SM 2120 B
Run ID: A72158
Included Lab Sample IDs: 1839550, 1839551, 1839552

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	100	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A72177
Included Lab Sample IDs: 1839550, 1839551, 1839552

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	100	P/P	95 - 105
Turbidity	101	100	P/P	95 - 105
Turbidity	101	101	P/P	95 - 105

Reference Method: SM 2320 B-97
Run ID: A72195
Included Lab Sample IDs: 1839550, 1839551, 1839552

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97

Run ID: A72195

Included Lab Sample IDs: 1839550, 1839551, 1839552

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

Reference Method: SM 4500 F-C-97

Run ID: A72195

Included Lab Sample IDs: 1839550, 1839551, 1839552

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.1	100	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A72223

Included Lab Sample IDs: 1839553, 1839554, 1839555

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.5	97.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A72235

Included Lab Sample IDs: 1839553, 1839554, 1839555

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A72269

Included Lab Sample IDs: 1839562, 1839563, 1839564

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	104	P/P	90 - 110
Iron	99.2	100	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Potassium	99.8	101	P/P	90 - 110
Sodium	101	102	P/P	90 - 110
Zinc	100	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A72286

Included Lab Sample IDs: 1839562, 1839563, 1839564

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	100	P/P	90 - 110
Cadmium	97.9	97.9	P/P	90 - 110
Chromium	96.8	99.5	P/P	90 - 110
Lead	93.9	93.8	P/P	90 - 110
Silver	96.4	96.0	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A72305

Included Lab Sample IDs: 1839550, 1839551, 1839552

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A72305
Included Lab Sample IDs: 1839550, 1839551, 1839552

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	102	P/P	90 - 110
Chloride	101	102	P/P	90 - 110
Sulfate	97.7	99.6	P/P	90 - 110
Sulfate	98.3	99.2	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A72319
Included Lab Sample IDs: 1839553, 1839554, 1839555

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72427
Included Lab Sample IDs: 1839562, 1839563, 1839564

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	95.7	95.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A72429
Included Lab Sample IDs: 1839553, 1839554, 1839555

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A72495
Included Lab Sample IDs: 1839553, 1839554, 1839555

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72530
Included Lab Sample IDs: 1839562, 1839563, 1839564

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	93.9	101	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery	Precision	MS
				LCS SMP	

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					4.62	
	Turbidity					6.06	
EPA 200.7 Rev. 4.4	Calcium	103	103	103			0.0408
	Iron	104	105	104	102		1.98
	Magnesium	106	104	105	103		1.31
	Potassium	99.6	98.6	101	99.7		1.48
	Sodium	104	100	106	104		1.43
	Zinc	102	102	101	98.1		3.40
EPA 200.8 Rev. 5.4	Arsenic	102	100	101	101		0.462
	Cadmium	101	101	102	103		1.26
	Chromium	99.1	98.5	101	102		0.667
	Copper	95.0	84.9	90.1	95.2		5.89
	Lead	96.3	96.2	95.1	95.7		0.668
	Nickel	96.9	94.2	93.9	95.7		0.338
	Silver	100	98.8	100	100		0.343
EPA 300.0 Rev. 2.1	Chloride	103	98.6	99.1		0.498	
	Chloride	102	102	101		0.503	
	Sulfate	99.2	92.2	96.4		2.36	
	Sulfate	97.5	97.7	96.0		3.14	
EPA 350.1 Rev. 2.0	Ammonia-N	101	99.6	101			1.20
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.8	95.2	98.5			2.73
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	106	108	106			0.935
EPA 365.1 Rev. 2.0	Total-P	97.9	97.0	104			6.43
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	101	102			0.592
SM 2120 B	Color (true)					0.291	
SM 2320 B-97	Total Alkalinity	104				0.331	
SM 2540 C-97	TDS					4.14	
SM 2540 D-97	TSS					5.82	
SM 4500 F-C-97	Fluoride	98.6	98.4	99.0			0.477
SM 5310 B-00	Organic Carbon	94.2	102				4.12

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1839550, 1839551, 1839552
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1839562, 1839563, 1839564
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1839562, 1839563, 1839564
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1839550, 1839551, 1839552
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1839550, 1839551, 1839552
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1839553, 1839554, 1839555
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1839553, 1839554, 1839555
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1839553, 1839554, 1839555
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1839553, 1839554, 1839555
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1839556, 1839557, 1839558
SM 2120 B / E31780	True Color measured at 450 nm	1839550, 1839551, 1839552

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1839550, 1839551, 1839552
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1839550, 1839551, 1839552
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1839550, 1839551, 1839552
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1839550, 1839551, 1839552
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1839553, 1839554, 1839555

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	10/11/2016			10/11/2016 15:51	Blanca Fach	1839550, 1839551, 1839552
EPA 200.7 Rev. 4.4	10/11/2016	10/13/2016	Elliott D. Healy	10/17/2016	Joshua Ayres	1839562, 1839563, 1839564
EPA 200.8 Rev. 5.4	10/11/2016	10/13/2016	Elliott D. Healy	10/17/2016	Charles J. Peterson	1839562, 1839563, 1839564
	10/11/2016	10/24/2016	Elliott D. Healy	10/26/2016	Charles J. Peterson	1839562, 1839563, 1839564
	10/11/2016	10/24/2016	Elliott D. Healy	10/31/2016	Robert K Palmer	1839562, 1839563, 1839564
EPA 300.0 Rev. 2.1	10/11/2016			10/21/2016	Julia Storbeck	1839551, 1839552
	10/11/2016			10/21/2016	Ping Hua	1839550
EPA 350.1 Rev. 2.0	10/11/2016			10/19/2016	Sofia Elnemr	1839553, 1839554, 1839555
EPA 351.2 Rev. 2.0	10/11/2016	10/26/2016	Adrian Shelby	10/28/2016	Joseph Suarez	1839553, 1839554, 1839555
EPA 353.2 Rev. 2.0	10/11/2016			10/14/2016	Beverly Y. Sanders	1839553, 1839554, 1839555
EPA 365.1 Rev. 2.0	10/11/2016	10/25/2016	Vijayalakshmi Reddy	10/25/2016	Lipi Saha	1839553, 1839554, 1839555
EPA 365.1 Rev. 2.0 dissolved	10/11/2016			10/11/2016 14:59	Julia Storbeck	1839556, 1839557
	10/11/2016			10/11/2016 15:00	Julia Storbeck	1839558
SM 2120 B	10/11/2016			10/11/2016 15:05	Julie Michelle Frank	1839550
	10/11/2016			10/11/2016 15:06	Julie Michelle Frank	1839551, 1839552
SM 2320 B-97	10/11/2016			10/13/2016	Dale L. Simmons	1839550, 1839551, 1839552
SM 2540 C-97	10/11/2016			10/15/2016	Yijie Li	1839550, 1839551, 1839552
SM 2540 D-97	10/11/2016			10/15/2016	Yijie Li	1839550, 1839551, 1839552
SM 4500 F-C-97	10/11/2016			10/13/2016	Dale L. Simmons	1839550, 1839551, 1839552
SM 5310 B-00	10/11/2016			10/13/2016	Julie Michelle Frank	1839553, 1839554, 1839555