

Chemical Analysis Report

SE-DIST-2016-08-16-01

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

Event Description: **SMP-Ft. Drum creek**

Request ID: **RQ-2016-08-15-79**

Customer: **SE-DIST**

Project ID: **SMP**

Send Reports to:

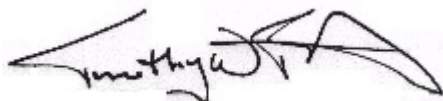
FL Dept. of Environmental Protection
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Attn: Matthew Sewell

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Certified by: Timothy Fitzpatrick, Program Administrator

Date Certified: 08-SEP-2016 09:15



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 CREK @ 441 (SOUTH)

Collection Date/Time: 08/15/2016 10:50

Field ID: G3SE0013

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1823859	EPA 180.1 Rev. 2.0	Turbidity	7.4		NTU	P309832	
	EPA 300.0 Rev. 2.1	Chloride	30		mg Cl/L	P310310	
		Sulfate	8.1		mg SO4/L	P310313	
	SM 2120 B	Color (true)	240		PCU	P310027	
	SM 2320 B-97	Total Alkalinity	43		mg CaCO3/L	P309932	
	SM 2540 C-97	TDS	168		mg/L	P310210	
	SM 2540 D-97	TSS	17		mg/L	P310203	
	SM 4500 F-C-97	Fluoride	0.076	I	mg F/L	P309933	
1823861	EPA 350.1 Rev. 2.0	Ammonia-N	0.17		mg N/L	P310051	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P309945	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.17		mg N/L	P310022	MS
	EPA 365.1 Rev. 2.0	Total-P	0.24		mg P/L	P309887	
	SM 5310 B-00	Organic Carbon	27		mg C/L	P310367	
1823863	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.17		mg P/L	P309837	
1823870	EPA 200.7 Rev. 4.4	Calcium	18.9		mg/L	P309889	
		Iron	1.33E+03		ug/L	P309889	
		Magnesium	5.04		mg/L	P309889	
		Potassium	6.5		mg/L	P309889	
		Sodium	16.6		mg/L	P309889	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P309889	
		Arsenic	0.78		ug/L	P309889	
		Cadmium	0.020	U	ug/L	P309889	
		Chromium	1.17		ug/L	P309889	
		Copper	0.64		ug/L	P309889	
		Lead	0.35		ug/L	P309889	
		Nickel	0.49		ug/L	P309889	
		Silver	0.0050	U	ug/L	P309889	

Ref. Method and Comment:

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

EPA 350.1 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: FORT DRUM CREEK @ 304TH ST.

Collection Date/Time: 08/15/2016 11:10

Field ID: G3SE0012

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1823860	EPA 180.1 Rev. 2.0	Turbidity	3.0		NTU	P309832	
	EPA 300.0 Rev. 2.1	Chloride	22		mg Cl/L	P310310	
		Sulfate	5.5		mg SO4/L	P310313	
	SM 2120 B	Color (true)	360		PCU	P310027	
	SM 2320 B-97	Total Alkalinity	31		mg CaCO3/L	P309932	
	SM 2540 C-97	TDS	146	A	mg/L	P310211	
	SM 2540 D-97	TSS	5	I	mg/L	P310204	
	SM 4500 F-C-97	Fluoride	0.074	I	mg F/L	P309933	
1823862	EPA 350.1 Rev. 2.0	Ammonia-N	0.027		mg N/L	P310051	

Field ID: G3SE0012

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1823862	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P309945	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.16		mg N/L	P310023	
	EPA 365.1 Rev. 2.0	Total-P	0.20		mg P/L	P309887	
	SM 5310 B-00	Organic Carbon	33		mg C/L	P310367	
1823864	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.15		mg P/L	P309837	
1823871	EPA 200.7 Rev. 4.4	Calcium	15.4		mg/L	P309889	
		Iron	1.13E+03		ug/L	P309889	
		Magnesium	3.50		mg/L	P309889	
		Potassium	4.0		mg/L	P309889	
		Sodium	12.5		mg/L	P309889	
		Zinc	5.0	U	ug/L	P309889	
	EPA 200.8 Rev. 5.4	Arsenic	0.74		ug/L	P309889	
		Cadmium	0.020	U	ug/L	P309889	
		Chromium	0.91		ug/L	P309889	
		Copper	0.69		ug/L	P309889	
		Lead	0.27		ug/L	P309889	
		Nickel	0.51		ug/L	P309889	
		Silver	0.0050	U	ug/L	P309889	

Ref. Method and Comment:

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

EPA 350.1 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: FORT DRUM CREEK @ 441 (SOUTH)

Collection Date/Time: 08/15/2016 11:00

Field ID: G3SE0013_BLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1823865	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P309832	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P310310	
		Sulfate	0.20	U	mg SO4/L	P310313	
	SM 2120 B	Color (true)	2.5	U	PCU	P310027	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P309932	
	SM 2540 C-97	TDS	15	U	mg/L	P310210	
	SM 2540 D-97	TSS	2	U	mg/L	P310203	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P309933	
1823866	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P310051	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P309945	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P310023	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P309887	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P310367	
1823867	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P309837	
1823872	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P309889	
		Iron	30	U	ug/L	P309889	
		Magnesium	0.040	U	mg/L	P309889	
		Potassium	0.30	U	mg/L	P309889	
		Sodium	0.50	U	mg/L	P309889	

Field ID: G3SE0013_BLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1823872	EPA 200.7 Rev. 4.4	Zinc	5.0	U	ug/L	P309889	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P309889	
		Cadmium	0.020	U	ug/L	P309889	
		Chromium	0.050	U	ug/L	P309889	
		Copper	0.10	U	ug/L	P309889	
		Lead	0.050	U	ug/L	P309889	
		Nickel	0.050	U	ug/L	P309889	
		Silver	0.0050	U	ug/L	P309889	

Ref. Method and Comment:
 SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
 EPA 350.1 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P309832

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P309889

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: P309889

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

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P310310

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P310313

Component	Result	Code	Units
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Quality Assurance Report Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P310313

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P310051

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309945

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310022

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310023

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309887

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309837

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

Reference Method: SM 2120 B
Batch ID: P310027

Component	Result	Code	Units
Color (true)	2.5	U	

Reference Method: SM 2320 B-97
Batch ID: P309932

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

Quality Assurance Report Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P310210

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P310211

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P310203

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P310204

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P309933

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P310367

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: P309889

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	106		P	85 - 115
Iron	106		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	99.7		P	85 - 115
Sodium	104		P	85 - 115
Zinc	98.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309889

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	94.1		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309889

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cadmium	94.4		P	85 - 115
Chromium	94.7		P	85 - 115
Copper	92.2		P	85 - 115
Lead	95.0		P	85 - 115
Nickel	92.7		P	85 - 115
Silver	95.6		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P310310

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P310313

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P310051

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309945

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310022

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310023

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309887

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309837

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

Reference Method: SM 2320 B-97
Batch ID: P309932

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

Reference Method: SM 4500 F-C-97
Batch ID: P309933

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.5		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P310367

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.5		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P309889

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823617	Calcium	102		P	80 - 120
1823617	Iron	104	107	P/P	80 - 120
1823617	Magnesium	104		P	80 - 120
1823617	Potassium	97.5	104	P/P	80 - 120
1823617	Sodium	103		P	80 - 120
1823617	Zinc	97.6	98.8	P/P	80 - 120
1823965	Calcium	109		P	80 - 120
1823965	Iron	106		P	80 - 120
1823965	Magnesium	107		P	80 - 120
1823965	Potassium	103		P	80 - 120
1823965	Sodium	107		P	80 - 120
1823965	Zinc	102		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309889

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823617	Arsenic	98.2	96.1	P/P	80 - 120
1823617	Cadmium	99.2	97.9	P/P	80 - 120
1823617	Chromium	97.5	94.2	P/P	80 - 120
1823617	Copper	94.4	91.3	P/P	80 - 120
1823617	Lead	99.7	96.4	P/P	80 - 120
1823617	Nickel	95.1	91.4	P/P	80 - 120
1823617	Silver	99.7	97.4	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309889

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823965	Arsenic	96.5		P	80 - 120
1823965	Cadmium	98.1		P	80 - 120
1823965	Chromium	97.8		P	80 - 120
1823965	Copper	93.9		P	80 - 120
1823965	Lead	99.2		P	80 - 120
1823965	Nickel	94.5		P	80 - 120
1823965	Silver	98.2		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P310310

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823804	Chloride	99.7		P	90 - 110
1823876	Chloride	98.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P310313

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823804	Sulfate	101		P	90 - 110
1823876	Sulfate	100		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309945

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823908	Kjeldahl Nitrogen	97.0	99.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310022

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823805	NO2NO3-N	86.4	86.8	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310023

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823862	NO2NO3-N	90.0	91.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309887

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823812	Total-P	104	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309837

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823948	O-Phosphate-P	101	101	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P309933

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823876	Fluoride	95.2	96.8	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P310367

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823807	Organic Carbon	97.9	97.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P309832

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823804	Turbidity	4.41	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P309889

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823617	Calcium	4.65	Spike	P	0 - 20
1823617	Iron	2.61	Spike	P	0 - 20
1823617	Magnesium	3.19	Spike	P	0 - 20
1823617	Potassium	5.52	Spike	P	0 - 20
1823617	Sodium	6.03	Spike	P	0 - 20
1823617	Zinc	1.19	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309889

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823617	Arsenic	2.14	Spike	P	0 - 20
1823617	Cadmium	1.28	Spike	P	0 - 20
1823617	Chromium	3.44	Spike	P	0 - 20
1823617	Copper	3.28	Spike	P	0 - 20
1823617	Lead	3.41	Spike	P	0 - 20
1823617	Nickel	3.94	Spike	P	0 - 20
1823617	Silver	2.32	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P310310

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823804	Chloride	0.124	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P310313

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823804	Sulfate	0.0762	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P310051

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823588	Ammonia-N	0.223	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309945

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823908	Kjeldahl Nitrogen	1.29	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310022

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823805	NO2NO3-N	0.536	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310023

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823862	NO2NO3-N	0.595	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309887

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823812	Total-P	1.40	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309837

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823948	O-Phosphate-P	0.0994	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P310027

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823889	Color (true)	0.718	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
Batch ID: P309932

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823876	Total Alkalinity	0.131	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P310210

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823404	TDS	1.47	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P310211

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823860	TDS	6.14	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P309933

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823876	Fluoride	1.48	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P310367

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823807	Organic Carbon	0.191	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: A71160
Included Lab Sample IDs: 1823859, 1823860, 1823865

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A71161
Included Lab Sample IDs: 1823863, 1823864, 1823867

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	99.6	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B

Run ID: A71162

Included Lab Sample IDs: 1823859, 1823860, 1823865

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.1	99.0	P/P	90 - 115

Reference Method: SM 2320 B-97

Run ID: A71199

Included Lab Sample IDs: 1823859, 1823860, 1823865

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A71199

Included Lab Sample IDs: 1823859, 1823860, 1823865

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A71209

Included Lab Sample IDs: 1823861, 1823862

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A71224

Included Lab Sample IDs: 1823861, 1823862, 1823866

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.1	94.3	P/P	90 - 110
Kjeldahl Nitrogen	94.3	98.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A71229

Included Lab Sample IDs: 1823861, 1823862, 1823866

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	P/P	90 - 110
NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A71238

Included Lab Sample IDs: 1823861, 1823862, 1823866

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A71239

Included Lab Sample IDs: 1823870, 1823871, 1823872

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A71239

Included Lab Sample IDs: 1823870, 1823871, 1823872

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	99.8	P/P	90 - 110
Calcium	101	99.4	P/P	90 - 110
Calcium	99.8	101	P/P	90 - 110
Iron	101	99.5	P/P	90 - 110
Iron	99.2	101	P/P	90 - 110
Iron	99.9	99.2	P/P	90 - 110
Magnesium	100	103	P/P	90 - 110
Magnesium	100	100	P/P	90 - 110
Magnesium	103	101	P/P	90 - 110
Potassium	101	99.4	P/P	90 - 110
Potassium	98.0	101	P/P	90 - 110
Potassium	98.9	98.0	P/P	90 - 110
Sodium	102	99.1	P/P	90 - 110
Sodium	97.6	98.4	P/P	90 - 110
Sodium	98.4	102	P/P	90 - 110
Zinc	97.5	98.2	P/P	90 - 110
Zinc	97.6	97.2	P/P	90 - 110
Zinc	98.2	97.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A71244

Included Lab Sample IDs: 1823866

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A71245

Included Lab Sample IDs: 1823870, 1823871, 1823872

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	95.6	94.7	P/P	90 - 110
Arsenic	98.7	96.8	P/P	90 - 110
Cadmium	95.1	95.6	P/P	90 - 110
Cadmium	96.1	95.4	P/P	90 - 110
Chromium	92.6	95.3	P/P	90 - 110
Chromium	96.7	95.5	P/P	90 - 110
Copper	93.3	92.8	P/P	90 - 110
Lead	94.8	94.5	P/P	90 - 110
Lead	95.8	95.9	P/P	90 - 110
Nickel	94.1	93.1	P/P	90 - 110
Silver	96.9	96.2	P/P	90 - 110
Silver	97.2	95.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A71266

Included Lab Sample IDs: 1823872

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	100	97.8	P/P	90 - 110
Nickel	100	97.9	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A71280

Included Lab Sample IDs: 1823859, 1823860, 1823865

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	101	P/P	90 - 110
Sulfate	99.1	96.7	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A71332

Included Lab Sample IDs: 1823861, 1823862, 1823866

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.2	97.0	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						4.41	
EPA 200.7 Rev. 4.4	Calcium	106	102	109				4.65
	Iron	106	104	107	106			2.61
	Magnesium	104	104	107				3.19
	Potassium	99.7	97.5	104	103			5.52
	Sodium	104	103	107				6.03
	Zinc	98.5	97.6	98.8	102			1.19
EPA 200.8 Rev. 5.4	Arsenic	94.1	98.2	96.1	96.5			2.14
	Cadmium	94.4	99.2	97.9	98.1			1.28
	Chromium	94.7	97.5	94.2	97.8			3.44
	Copper	92.2	94.4	91.3	93.9			3.28
	Lead	95.0	99.7	96.4	99.2			3.41
	Nickel	92.7	95.1	91.4	94.5			3.94
	Silver	95.6	99.7	97.4	98.2			2.32
EPA 300.0 Rev. 2.1	Chloride	100	99.7	98.8			0.124	
	Sulfate	100	101	100			0.0762	
EPA 350.1 Rev. 2.0	Ammonia-N	98.0						0.223
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.1	97.0	99.4				1.29
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	86.4	86.8				0.536
	NO ₂ NO ₃ -N	102	90.0	91.0				0.595
EPA 365.1 Rev. 2.0	Total-P	102	104	103				1.40
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	101	101				0.0994
SM 2120 B	Color (true)						0.718	
SM 2320 B-97	Total Alkalinity	103					0.131	
SM 2540 C-97	TDS						1.47	
	TDS						6.14	
SM 4500 F-C-97	Fluoride	96.5	95.2	96.8				1.48
SM 5310 B-00	Organic Carbon	95.5	97.9	97.6				0.191

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1823859, 1823860, 1823865
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1823870, 1823871, 1823872
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1823870, 1823871, 1823872
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1823859, 1823860, 1823865
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1823859, 1823860, 1823865
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1823861, 1823862, 1823866
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1823861, 1823862, 1823866
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1823861, 1823862, 1823866
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1823861, 1823862, 1823866
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1823863, 1823864, 1823867
SM 2120 B / E31780	True Color measured at 450 nm	1823859, 1823860, 1823865
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1823859, 1823860, 1823865
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1823859, 1823860, 1823865
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1823859, 1823860, 1823865
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1823859, 1823860, 1823865
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1823861, 1823862, 1823866

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	08/16/2016			08/16/2016 16:27	Sima Feizi	1823859, 1823860, 1823865
EPA 200.7 Rev. 4.4	08/16/2016	08/17/2016	Elliott D. Healy	08/19/2016	Joshua Ayres	1823870, 1823871, 1823872
EPA 200.8 Rev. 5.4	08/16/2016	08/17/2016	Elliott D. Healy	08/18/2016	Charles J. Peterson	1823870, 1823871, 1823872
	08/16/2016	08/17/2016	Elliott D. Healy	08/22/2016	Charles J. Peterson	1823872
EPA 300.0 Rev. 2.1	08/16/2016			08/24/2016	Ping Hua	1823859, 1823860, 1823865
EPA 350.1 Rev. 2.0	08/16/2016			08/21/2016	Julie Michelle Frank	1823861, 1823862, 1823866
EPA 351.2 Rev. 2.0	08/16/2016	08/18/2016	Martin Acosta	08/19/2016	Christopher Armour	1823861, 1823862, 1823866
EPA 353.2 Rev. 2.0	08/16/2016			08/19/2016	Beverly Y. Sanders	1823861, 1823862, 1823866
EPA 365.1 Rev. 2.0	08/16/2016	08/17/2016	Vijayalakshmi Reddy	08/18/2016	Lipi Saha	1823861, 1823862
	08/16/2016	08/17/2016	Vijayalakshmi Reddy	08/22/2016	Lipi Saha	1823866
EPA 365.1 Rev. 2.0 dissolved	08/16/2016			08/16/2016 15:57	Julia Storbeck	1823867
	08/16/2016			08/16/2016 16:02	Julia Storbeck	1823863
	08/16/2016			08/16/2016 16:03	Julia Storbeck	1823864
SM 2120 B	08/16/2016			08/16/2016 18:12	Rochelle Y Jackson	1823859
	08/16/2016			08/16/2016 18:13	Rochelle Y Jackson	1823860
	08/16/2016			08/16/2016 18:14	Rochelle Y Jackson	1823865
SM 2320 B-97	08/16/2016			08/17/2016	Dale L. Simmons	1823859, 1823860, 1823865
SM 2540 C-97	08/16/2016			08/17/2016	Yijie Li	1823859, 1823860, 1823865
SM 2540 D-97	08/16/2016			08/17/2016	Yijie Li	1823859, 1823860, 1823865
SM 4500 F-C-97	08/16/2016			08/17/2016	Dale L. Simmons	1823859, 1823860, 1823865
SM 5310 B-00	08/16/2016			08/24/2016	Sofia Elnemr	1823861, 1823862, 1823866