Chemical Analysis Report

WQAP-2016-10-31-01

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

Event Description:	**Caney Creek, Ward Creek, Soapstone Branch and Lake Lafayette Drain**
Request ID:	**RQ-2016-10-31-66**
Customer:	**WQAP**
Project ID:	**SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
MS #3560
Tallahassee, FL 32399-2400
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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 23-NOV-2016 12:46

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: Caney Creek Upstream of US 90 **Collection Date/Time: 10/31/2016 11:15**

Field ID: G1WA0014_10312016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1845994	EPA 180.1 Rev. 2.0	Turbidity	6.9		NTU	P314350	
	EPA 300.0 Rev. 2.1	Chloride	6.8		mg Cl/L	P315243	
	SM 2120 B	Color (true)	92		PCU	P314305	
	SM 2320 B-97	Total Alkalinity	36		mg CaCO3/L	P314346	
	SM 2540 C-97	TDS	69		mg/L	P314715	
	SM 2540 D-97	TSS	4	I	mg/L	P314676	
	SM 4500 F-C-97	Fluoride	0.090	I	mg F/L	P314347	
1845995	EPA 350.1 Rev. 2.0	Ammonia-N	0.016		mg N/L	P314910	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.51		mg N/L	P315200	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.38		mg N/L	P314515	
	EPA 365.1 Rev. 2.0	Total-P	0.57		mg P/L	P314885	
	SM 5310 B-00	Organic Carbon	6.5		mg C/L	P314247	
1845996	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.49		mg P/L	P314303	
1846006	EPA 200.7 Rev. 4.4	Calcium	9.45		mg/L	P314313	
		Iron	790		ug/L	P314313	
		Magnesium	3.74		mg/L	P314313	
		Potassium	3.5		mg/L	P314313	
		Sodium	5.0		mg/L	P314313	
		Zinc	5.0	U	ug/L	P314698	
	EPA 200.8 Rev. 5.4	Arsenic	0.62		ug/L	P314313	
		Cadmium	0.020	U	ug/L	P314313	
		Chromium	0.72		ug/L	P314313	
		Copper	0.21	I	ug/L	P314313	
		Lead	0.26		ug/L	P314313	
		Nickel	0.32		ug/L	P314821	
		Silver	0.0050	U	ug/L	P314821	

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

Sample Location: Caney Creek Upstream of US 90 DUP **Collection Date/Time: 10/31/2016 11:15**

Field ID: G1WA0014_10312016 D Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1845997	EPA 180.1 Rev. 2.0	Turbidity	7.0		NTU	P314350	
	EPA 300.0 Rev. 2.1	Chloride	6.9		mg Cl/L	P315243	
	SM 2120 B	Color (true)	93		PCU	P314305	
	SM 2320 B-97	Total Alkalinity	35		mg CaCO3/L	P314346	
	SM 2540 C-97	TDS	63		mg/L	P314715	
	SM 2540 D-97	TSS	5	I	mg/L	P314676	
	SM 4500 F-C-97	Fluoride	0.091	I	mg F/L	P314347	
1845998	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P314910	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.53		mg N/L	P315200	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.38		mg N/L	P314515	
	EPA 365.1 Rev. 2.0	Total-P	0.57		mg P/L	P314886	

Field ID: G1WA0014_10312016 D Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1845998	SM 5310 B-00	Organic Carbon	6.5		mg C/L	P314247	
1845999	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.49		mg P/L	P314303	
1846007	EPA 200.7 Rev. 4.4	Calcium	9.42		mg/L	P314313	
		Iron	770		ug/L	P314313	
		Magnesium	3.71		mg/L	P314313	
		Potassium	3.5		mg/L	P314313	
		Sodium	4.9		mg/L	P314313	
		Zinc	5.0	U	ug/L	P314698	
	EPA 200.8 Rev. 5.4	Arsenic	0.61		ug/L	P314313	
		Cadmium	0.020	U	ug/L	P314313	
		Chromium	0.71		ug/L	P314313	
		Copper	0.33	I	ug/L	P314313	
		Lead	0.25		ug/L	P314313	
		Nickel	0.35		ug/L	P314821	
		Silver	0.0050	U	ug/L	P314821	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Field Blank **Collection Date/Time: 10/31/2016 11:05**

Field ID: G1WA0014_10312016 B Matrix: DI-WATER

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1846000	EPA 180.1 Rev. 2.0	Turbidity	0.10		NTU	P314350	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P315243	
	SM 2120 B	Color (true)	2.5	U	PCU	P314305	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P314346	
	SM 2540 C-97	TDS	15	U	mg/L	P314712	
	SM 2540 D-97	TSS	2	U	mg/L	P314673	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P314347	
1846001	EPA 350.1 Rev. 2.0	Ammonia-N	0.0020	U	mg N/L	P314910	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P315200	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P314515	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P314886	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P314247	
1846002	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P314303	
1846008	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P314313	
		Iron	30	U	ug/L	P314313	
		Magnesium	0.040	U	mg/L	P314313	
		Potassium	0.30	U	mg/L	P314313	
		Sodium	0.50	U	mg/L	P314313	
		Zinc	5.0	U	ug/L	P314698	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P314313	
		Cadmium	0.020	U	ug/L	P314313	
		Chromium	0.050	U	ug/L	P314313	

Field ID: G1WA0014_10312016 B Matrix: DI-WATER

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1846008	EPA 200.8 Rev. 5.4	Copper	0.10	U	ug/L	P314313	
		Lead	0.050	U	ug/L	P314313	
		Nickel	0.050	U	ug/L	P314821	
		Silver	0.0050	U	ug/L	P314821	

Ref. Method and Comment:
EPA 180.1 Rev. 2.0: The result was confirmed on 11/01/2016.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: 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: P314350

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314313

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314698

Component	Result	Code	Units
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314313

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314821

Component	Result	Code	Units
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315243

Component	Result	Code	Units

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315243

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314910

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315200

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314515

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314885

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314886

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314303

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

Reference Method: SM 2120 B
Batch ID: P314305

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P314346

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: P314712

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P314715

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P314673

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P314676

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P314347

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P314247

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: P314313

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	110		P	85 - 115
Magnesium	105		P	85 - 115
Potassium	105		P	85 - 115
Sodium	104		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314698

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Zinc	99.1		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314313

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	98.7		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	101		P	85 - 115
Copper	95.1		P	85 - 115
Lead	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314821

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Nickel	99.4		P	85 - 115
Silver	96.5		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315243

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314910

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.1		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315200

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.8		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314515

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314885

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314886

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	97.4		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314303

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.3		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P314346

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P314347

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.4		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P314247

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.0		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314313

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1846028	Calcium	103		P	80 - 120
1846028	Iron	107	108	P/P	80 - 120
1846028	Magnesium	106		P	80 - 120
1846028	Potassium	102	102	P/P	80 - 120
1846028	Sodium	103		P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314698

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1846027	Zinc	99.8	99.1	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314313

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1846028	Arsenic	100	101	P/P	80 - 120
1846028	Cadmium	104	105	P/P	80 - 120
1846028	Chromium	101	101	P/P	80 - 120
1846028	Copper	84.9	85.2	P/P	80 - 120
1846028	Lead	102	103	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314821

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1846657	Nickel	98.1		P	80 - 120
1846657	Silver	94.8		P	80 - 120
1847184	Nickel	98.5	95.7	P/P	80 - 120
1847184	Silver	97.1	94.7	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315243

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1845028	Chloride	101		P	90 - 110
1845086	Chloride	98.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314910

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1845995	Ammonia-N	95.6	97.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315200

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1845677	Kjeldahl Nitrogen	98.2	93.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314515

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1846043	NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314885

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1845659	Total-P	98.9	95.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314303

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1846022	O-Phosphate-P	96.4	96.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P314347

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1846013	Fluoride	97.6	98.8	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P314247

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P314247

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1845652	Organic Carbon	93.4	92.2	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P314350

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846038	Turbidity	8.93	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314313

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846028	Calcium	0.394	Spike	P	0 - 20
1846028	Iron	0.542	Spike	P	0 - 20
1846028	Magnesium	0.179	Spike	P	0 - 20
1846028	Potassium	0.0269	Spike	P	0 - 20
1846028	Sodium	0.237	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314698

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846027	Zinc	0.692	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314313

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846028	Arsenic	0.231	Spike	P	0 - 20
1846028	Cadmium	0.234	Spike	P	0 - 20
1846028	Chromium	0.0201	Spike	P	0 - 20
1846028	Copper	0.285	Spike	P	0 - 20
1846028	Lead	0.600	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314821

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847184	Nickel	2.72	Spike	P	0 - 20
1847184	Silver	2.43	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315243

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1845028	Chloride	0.207	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P314910

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1845995	Ammonia-N	1.73	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315200

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1845677	Kjeldahl Nitrogen	3.16	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P314515

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846043	NO2NO3-N	0.913	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314885

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1845659	Total-P	2.88	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P314886

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1845998	Total-P	0.125	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314303

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846022	O-Phosphate-P	0.235	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P314305

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846012	Color (true)	0.245	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-97
Batch ID: P314346

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846013	Total Alkalinity	0.405	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P314712

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1845002	TDS	3.72	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P314715

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1845673	TDS	5.56	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P314347

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846013	Fluoride	0.947	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P314247

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1845652	Organic Carbon	0.755	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: SM 5310 B-00
Run ID: A72535
Included Lab Sample IDs: 1845995, 1845998, 1846001

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.8	94.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A72553
Included Lab Sample IDs: 1845996, 1845999, 1846002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	101	P/P	90 - 110
O-Phosphate-P	101	99.3	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2120 B
Run ID: A72554
Included Lab Sample IDs: 1845994, 1845997, 1846000

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.9	100	P/P	85 - 115

Reference Method: SM 2320 B-97
Run ID: A72561
Included Lab Sample IDs: 1845994, 1845997, 1846000

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

Reference Method: SM 4500 F-C-97
Run ID: A72561
Included Lab Sample IDs: 1845994, 1845997, 1846000

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	98.6	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A72563
Included Lab Sample IDs: 1845994, 1845997, 1846000

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A72587
Included Lab Sample IDs: 1846006, 1846007, 1846008

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	104	104	P/P	90 - 110
Calcium	104	104	P/P	90 - 110
Iron	104	104	P/P	90 - 110
Iron	104	105	P/P	90 - 110
Magnesium	104	105	P/P	90 - 110
Magnesium	104	104	P/P	90 - 110
Potassium	102	102	P/P	90 - 110
Potassium	102	102	P/P	90 - 110
Sodium	101	102	P/P	90 - 110
Sodium	102	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72593
Included Lab Sample IDs: 1846006, 1846007, 1846008

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	96.6	96.6	P/P	90 - 110
Cadmium	98.9	98.8	P/P	90 - 110
Chromium	99.7	101	P/P	90 - 110
Copper	94.9	95.2	P/P	90 - 110
Lead	98.9	101	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A72599
Included Lab Sample IDs: 1845995, 1845998, 1846001

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A72736
Included Lab Sample IDs: 1845995, 1845998, 1846001

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.3	97.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A72743
Included Lab Sample IDs: 1846006, 1846007, 1846008

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Zinc	100	101	P/P	95 - 105
Zinc	101	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72778
Included Lab Sample IDs: 1846006, 1846007, 1846008

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	99.5	97.2	P/P	90 - 110
Silver	94.6	96.2	P/P	90 - 110
Silver	96.2	95.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A72780
Included Lab Sample IDs: 1845995, 1845998

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.5	97.4	P/P	90 - 110
Total-P	98.4	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A72791
Included Lab Sample IDs: 1846001

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72817
Included Lab Sample IDs: 1846008

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	98.5	98.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A72830
Included Lab Sample IDs: 1845994, 1845997, 1846000

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A72874
Included Lab Sample IDs: 1845995, 1845998, 1846001

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	98.6	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		
					LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity					8.93	
EPA 200.7 Rev. 4.4	Calcium	105	103				0.394
	Iron	110	107	108			0.542
	Magnesium	105	106				0.179
	Potassium	105	102	102			0.0269
	Sodium	104	103				0.237
	Zinc	99.1	99.8	99.1			0.692
EPA 200.8 Rev. 5.4	Arsenic	98.7	100	101			0.231
	Cadmium	101	104	105			0.234
	Chromium	101	101	101			0.0201
	Copper	95.1	84.9	85.2			0.285
	Lead	101	102	103			0.600
	Nickel	99.4	98.1	98.5	95.7		2.72
	Silver	96.5	94.8	97.1	94.7		2.43
EPA 300.0 Rev. 2.1	Chloride	99.1	101	98.6		0.207	
EPA 350.1 Rev. 2.0	Ammonia-N	98.1	95.6	97.8			1.73
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.8	98.2	93.5			3.16
EPA 353.2 Rev. 2.0	NO2NO3-N	108	101	102			0.913
EPA 365.1 Rev. 2.0	Total-P	97.0	98.9	95.9			2.88
	Total-P	97.4					0.125
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.3	96.4	96.7			0.235
SM 2120 B	Color (true)					0.245	
SM 2320 B-97	Total Alkalinity	102				0.405	
SM 2540 C-97	TDS					3.72	
	TDS					5.56	
SM 4500 F-C-97	Fluoride	97.4	97.6	98.8			0.947
SM 5310 B-00	Organic Carbon	95.0	93.4	92.2			0.755

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1845994, 1845997, 1846000
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1846006, 1846007, 1846008
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1846006, 1846007, 1846008
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1845994, 1845997, 1846000
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1845995, 1845998, 1846001
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1845995, 1845998, 1846001
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1845995, 1845998, 1846001
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1845995, 1845998, 1846001
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1845996, 1845999, 1846002
SM 2120 B / E31780	True Color measured at 450 nm	1845994, 1845997, 1846000
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1845994, 1845997, 1846000
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1845994, 1845997, 1846000
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1845994, 1845997, 1846000
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1845994, 1845997, 1846000
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1845995, 1845998, 1846001

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	10/31/2016			11/01/2016 15:55	Julie Michelle Frank	1845994, 1845997, 1846000
EPA 200.7 Rev. 4.4	10/31/2016	11/01/2016	Elliott D. Healy	11/02/2016	Joshua Ayres	1846006, 1846007, 1846008
	10/31/2016	11/07/2016	Elliott D. Healy	11/09/2016	Joshua Ayres	1846006, 1846007, 1846008
EPA 200.8 Rev. 5.4	10/31/2016	11/01/2016	Elliott D. Healy	11/02/2016	Charles J. Peterson	1846006, 1846007, 1846008
	10/31/2016	11/08/2016	Elliott D. Healy	11/10/2016	Charles J. Peterson	1846006, 1846007, 1846008
	10/31/2016	11/08/2016	Elliott D. Healy	11/14/2016	Charles J. Peterson	1846008
EPA 300.0 Rev. 2.1	10/31/2016			11/16/2016	Ping Hua	1845994, 1845997, 1846000
EPA 350.1 Rev. 2.0	10/31/2016			11/09/2016	Sofia Elnemr	1845995, 1845998, 1846001
EPA 351.2 Rev. 2.0	10/31/2016	11/16/2016	Martin Acosta	11/17/2016	Joseph Suarez	1845995, 1845998, 1846001
EPA 353.2 Rev. 2.0	10/31/2016			11/03/2016	Beverly Y. Sanders	1845995, 1845998, 1846001
EPA 365.1 Rev. 2.0	10/31/2016	11/09/2016	Adrian Shelby	11/10/2016	Lipi Saha	1845995, 1845998
	10/31/2016	11/09/2016	Adrian Shelby	11/14/2016	Lipi Saha	1846001
EPA 365.1 Rev. 2.0 dissolved	10/31/2016			11/01/2016 15:19	Julia Storbeck	1846002
	10/31/2016			11/01/2016 15:34	Julia Storbeck	1845996
	10/31/2016			11/01/2016 15:35	Julia Storbeck	1845999
SM 2120 B	10/31/2016			11/01/2016 16:00	Julie Michelle Frank	1845994
	10/31/2016			11/01/2016 16:01	Julie Michelle Frank	1845997
	10/31/2016			11/01/2016 16:02	Julie Michelle Frank	1846000
SM 2320 B-97	10/31/2016			11/01/2016	Dale L. Simmons	1845994, 1845997, 1846000
SM 2540 C-97	10/31/2016			11/01/2016	Yijie Li	1845994, 1845997, 1846000
SM 2540 D-97	10/31/2016			11/01/2016	Yijie Li	1845994, 1845997, 1846000
SM 4500 F-C-97	10/31/2016			11/01/2016	Dale L. Simmons	1845994, 1845997, 1846000
SM 5310 B-00	10/31/2016			10/31/2016	Julie Michelle Frank	1845995, 1845998, 1846001