Chemical Analysis Report

CEN-DIST-2016-11-04-02

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

Event Description: **Horse Creek/Elbow Creek**
Request ID: **RQ-2016-11-07-78**
Customer: **CEN-DIST**
Project ID: **SMP**

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3319 Maguire Blvd., Suite 232
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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 01-DEC-2016 14:10

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: Horse Creek W of US Hwy 1 Bridge **Collection Date/Time: 11/03/2016 11:30**

Field ID: 27010589 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1847550	EPA 180.1 Rev. 2.0	Turbidity	4.9		NTU	P314636	
	SM 2320 B-97	Total Alkalinity	102		mg CaCO3/L	P314853	
	SM 2540 D-97	TSS	8	I	mg/L	P315052	
	SM 4500 F-C-97	Fluoride	0.71		mg F/L	P314856	
1847551	EPA 350.1 Rev. 2.0	Ammonia-N	0.10		mg N/L	P315028	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P315613	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.22		mg N/L	P315091	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P315150	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P314744	
1847552	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.076		mg P/L	P314638	
1847576	EPA 200.7 Rev. 4.4	Iron	410		ug/L	P314828	
	EPA 200.8 Rev. 5.4	Arsenic	2.55		ug/L	P314828	
		Cadmium	0.060	U	ug/L	P314828	
		Chromium	0.58	I	ug/L	P314828	
		Copper	1.7		ug/L	P314828	
		Lead	0.18	I	ug/L	P314828	
		Nickel	0.52	I	ug/L	P314828	
		Silver	0.015	U	ug/L	P314828	
		Zinc	3.1	I	ug/L	P314828	

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: Elbow Creek @ 540m DS of Apollo **Collection Date/Time: 11/03/2016 12:00**

Field ID: G5CE0070 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1847553	EPA 180.1 Rev. 2.0	Turbidity	2.5		NTU	P314636	
	EPA 300.0 Rev. 2.1	Chloride	93		mg Cl/L	P315721	
		Sulfate	35		mg SO4/L	P315723	
	SM 2120 B	Color (true)	100		PCU	P314629	
	SM 2320 B-97	Total Alkalinity	149		mg CaCO3/L	P315058	
	SM 2540 C-97	TDS	401		mg/L	P315049	
	SM 2540 D-97	TSS	4	I	mg/L	P315051	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P315060	
1847554	EPA 350.1 Rev. 2.0	Ammonia-N	0.15		mg N/L	P315027	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.83		mg N/L	P315514	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.18		mg N/L	P315285	
	EPA 365.1 Rev. 2.0	Total-P	0.20		mg P/L	P315145	
	SM 5310 B-00	Organic Carbon	16		mg C/L	P314743	
1847555	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P314637	

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: P314636

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314828

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314828

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L
Zinc	1.0	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315721

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315723

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315027

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315028

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315514

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315613

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315091

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315285

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315145

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315150

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314637

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314638

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

Reference Method: SM 2120 B
Batch ID: P314629

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P314853

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P315058

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

Reference Method: SM 2540 C-97
Batch ID: P315049

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P315051

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P315052

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P314856

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P315060

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P314743

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

Reference Method: SM 5310 B-00
Batch ID: P314744

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: P314828

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314828

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314828

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	103		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	99.4		P	85 - 115
Copper	96.9		P	85 - 115
Lead	98.2		P	85 - 115
Nickel	102		P	85 - 115
Silver	97.4		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315721

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315723

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315027

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315028

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	105		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315514

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315613

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	109		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315091

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	105		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315285

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315145

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315150

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314637

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314638

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.9		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P314853

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	95 - 108

Reference Method: SM 2320 B-97
Batch ID: P315058

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P314856

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.9		P	92 - 103

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P315060

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

Reference Method: SM 5310 B-00
Batch ID: P314743

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.2		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P314744

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.9		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314828

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847576	Iron	109	106	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314828

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847576	Arsenic	108	108	P/P	70 - 130
1847576	Cadmium	102	103	P/P	70 - 130
1847576	Chromium	92.5	92.1	P/P	70 - 130
1847576	Copper	91.4	93.3	P/P	70 - 130
1847576	Lead	104	104	P/P	70 - 130
1847576	Nickel	97.3	97.5	P/P	70 - 130
1847576	Silver	92.8	94.5	P/P	70 - 130
1847576	Zinc	98.5	101	P/P	70 - 130

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315721

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847317	Chloride	98.7		P	90 - 110
1847520	Chloride	104		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315723

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847317	Sulfate	94.4		P	90 - 110
1847520	Sulfate	101		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315028

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1846846	Ammonia-N	103	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315514

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1848097	Kjeldahl Nitrogen	90.5	92.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315613

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847508	Kjeldahl Nitrogen	106	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315091

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847482	NO2NO3-N	106	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315285

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847554	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847144	Total-P	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315150

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847882	Total-P	97.1	95.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314637

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847298	O-Phosphate-P	98.5	99.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314638

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847486	O-Phosphate-P	95.9	97.8	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P314856

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1846996	Fluoride	96.6	98.8	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P315060

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847437	Fluoride	99.8	99.8	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P314743

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847554	Organic Carbon	97.0	98.3	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P314744

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1847482	Organic Carbon	89.3	90.5	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P314636

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847481	Turbidity	4.46	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P314828

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847576	Iron	3.08	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P314828

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847576	Arsenic	0.581	Spike	P	0 - 20
1847576	Cadmium	0.587	Spike	P	0 - 20
1847576	Chromium	0.422	Spike	P	0 - 20
1847576	Copper	1.93	Spike	P	0 - 20
1847576	Lead	0.240	Spike	P	0 - 20
1847576	Nickel	0.205	Spike	P	0 - 20
1847576	Silver	1.80	Spike	P	0 - 20
1847576	Zinc	2.28	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315721

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847520	Chloride	1.71	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315723

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847520	Sulfate	3.04	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315027

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847120	Ammonia-N	0.648	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315028

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846846	Ammonia-N	1.45	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315514

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1848097	Kjeldahl Nitrogen	1.36	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315613

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847508	Kjeldahl Nitrogen	0.355	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315091

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847482	NO2NO3-N	0.943	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315285

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847554	NO2NO3-N	0.257	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847144	Total-P	0.0656	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315150

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847882	Total-P	1.77	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314637

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847298	O-Phosphate-P	0.627	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P314638

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847486	O-Phosphate-P	1.84	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P314629

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847527	Color (true)	2.05	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P314853

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846996	Total Alkalinity	0.349	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P315058

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847437	Total Alkalinity	1.19	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P315049

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847437	TDS	0.851	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P314856

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1846996	Fluoride	1.46	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P315060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847437	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P314743

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847554	Organic Carbon	0.729	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P314744

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1847482	Organic Carbon	1.15	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 2120 B
Run ID: A72633
Included Lab Sample IDs: 1847553

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.6	101	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A72634
Included Lab Sample IDs: 1847550, 1847553

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A72635
Included Lab Sample IDs: 1847552, 1847555

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 5310 B-00
Run ID: A72671
Included Lab Sample IDs: 1847551, 1847554

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.8	93.2	P/P	90 - 110
Organic Carbon	98.8	98.8	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A72710
Included Lab Sample IDs: 1847550

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

Reference Method: SM 4500 F-C-97
Run ID: A72710
Included Lab Sample IDs: 1847550

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A72765
Included Lab Sample IDs: 1847551, 1847554

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.8	99.6	P/P	90 - 110
Ammonia-N	100	101	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A72775
Included Lab Sample IDs: 1847553

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

Reference Method: SM 4500 F-C-97
Run ID: A72775
Included Lab Sample IDs: 1847553

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72778
Included Lab Sample IDs: 1847576

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	102	P/P	90 - 110
Cadmium	98.2	98.6	P/P	90 - 110
Chromium	95.1	95.1	P/P	90 - 110
Lead	94.5	96.2	P/P	90 - 110
Nickel	100	101	P/P	90 - 110
Silver	95.1	95.3	P/P	90 - 110
Zinc	102	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A72782
Included Lab Sample IDs: 1847551

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72785
Included Lab Sample IDs: 1847576

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	94.7	96.0	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A72793
Included Lab Sample IDs: 1847576

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A72842
Included Lab Sample IDs: 1847554

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A72854
Included Lab Sample IDs: 1847551, 1847554

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	103	P/P	90 - 110
Total-P	106	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A72943
Included Lab Sample IDs: 1847554

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	100	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A72975
Included Lab Sample IDs: 1847553

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.2	101	P/P	90 - 110
Sulfate	95.4	97.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A73001
Included Lab Sample IDs: 1847551

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A73001
Included Lab Sample IDs: 1847551

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	107	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					4.46	
EPA 200.7 Rev. 4.4	Iron	105	109	106			3.08
EPA 200.8 Rev. 5.4	Arsenic	103	108	108			0.581
	Cadmium	101	102	103			0.587
	Chromium	99.4	92.5	92.1			0.422
	Copper	96.9	91.4	93.3			1.93
	Lead	98.2	104	104			0.240
	Nickel	102	97.3	97.5			0.205
	Silver	97.4	92.8	94.5			1.80
	Zinc	102	98.5	101			2.28
EPA 300.0 Rev. 2.1	Chloride	103	104	98.7		1.71	
	Sulfate	100	101	94.4		3.04	
EPA 350.1 Rev. 2.0	Ammonia-N	104					0.648
	Ammonia-N	105	103	105			1.45
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.0	90.5	92.7			1.36
	Kjeldahl Nitrogen	109	106	106			0.355
EPA 353.2 Rev. 2.0	NO2NO3-N	105	106	106			0.943
	NO2NO3-N	103	104	104			0.257
EPA 365.1 Rev. 2.0	Total-P	102	100	100			0.0656
	Total-P	100	97.1	95.1			1.77
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	98.5	99.4			0.627
	O-Phosphate-P	99.9	95.9	97.8			1.84
SM 2120 B	Color (true)					2.05	
SM 2320 B-97	Total Alkalinity	101				0.349	
	Total Alkalinity	101				1.19	
SM 2540 C-97	TDS					0.851	
SM 4500 F-C-97	Fluoride	97.9	96.6	98.8			1.46
	Fluoride	97.0	99.8	99.8			0.0
SM 5310 B-00	Organic Carbon	99.2	97.0	98.3			0.729
	Organic Carbon	98.9	89.3	90.5			1.15

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1847550, 1847553
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1847576

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1847576
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1847553
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1847553
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1847551, 1847554
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1847551, 1847554
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1847551, 1847554
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1847551, 1847554
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1847552, 1847555
SM 2120 B / E31780	True Color measured at 450 nm	1847553
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1847550, 1847553
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1847553
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1847550, 1847553
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1847550, 1847553
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1847551, 1847554

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	11/04/2016			11/04/2016 16:03	Sima Feizi	1847550, 1847553
EPA 200.7 Rev. 4.4	11/04/2016	11/08/2016	Elliott D. Healy	11/14/2016	Joshua Ayres	1847576
EPA 200.8 Rev. 5.4	11/04/2016	11/08/2016	Elliott D. Healy	11/10/2016	Charles J. Peterson	1847576
	11/04/2016	11/08/2016	Elliott D. Healy	11/11/2016	Charles J. Peterson	1847576
EPA 300.0 Rev. 2.1	11/04/2016			11/23/2016	Ping Hua	1847553
EPA 350.1 Rev. 2.0	11/04/2016			11/10/2016	Julie Michelle Frank	1847551, 1847554
EPA 351.2 Rev. 2.0	11/04/2016	11/21/2016	Adrian Shelby	11/22/2016	Joseph Suarez	1847554
	11/04/2016	11/22/2016	Adrian Shelby	11/23/2016	Joseph Suarez	1847551
EPA 353.2 Rev. 2.0	11/04/2016			11/14/2016	Beverly Y. Sanders	1847551
	11/04/2016			11/16/2016	Beverly Y. Sanders	1847554
EPA 365.1 Rev. 2.0	11/04/2016	11/15/2016	Adrian Shelby	11/16/2016	Lipi Saha	1847551, 1847554
EPA 365.1 Rev. 2.0 dissolved	11/04/2016			11/04/2016 16:15	Julia Storbeck	1847555
	11/04/2016			11/04/2016 16:18	Julia Storbeck	1847552
SM 2120 B	11/04/2016			11/04/2016 15:11	Jared I. Manley	1847553
SM 2320 B-97	11/04/2016			11/09/2016	Dale L. Simmons	1847550
	11/04/2016			11/10/2016	Dale L. Simmons	1847553
SM 2540 C-97	11/04/2016			11/09/2016	Yijie Li	1847553
SM 2540 D-97	11/04/2016			11/09/2016	Yijie Li	1847550, 1847553
SM 4500 F-C-97	11/04/2016			11/08/2016	Dale L. Simmons	1847550
	11/04/2016			11/10/2016	Dale L. Simmons	1847553
SM 5310 B-00	11/04/2016			11/07/2016	Julie Michelle Frank	1847554
	11/04/2016			11/08/2016	Julie Michelle Frank	1847551