

Chemical Analysis Report

WQAP-2017-12-12-03

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

Event Description: **Horse Hole Creek**
Request ID: **RQ-2017-12-11-46**
Customer: **WQAP**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
13051 N. Telecom Parkway
Tampa, FL 33637
Attn: Judy Ashton

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 03-JAN-2018 14:36



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 HOLE CREEK @ 19

Collection Date/Time: 12/12/2017 12:10

Field ID: G5SW0141

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1953291	EPA 180.1 Rev. 2.0	Turbidity	0.85		NTU	P336845	
	EPA 300.0 Rev. 2.1	Chloride	12	A	mg Cl/L	P336972	
		Sulfate	4.2	A	mg SO4/L	P336974	
	SM 2120 B	Color (true)	270		PCU	P336922	
	SM 2320 B-97	Total Alkalinity	38		mg CaCO3/L	P337082	
	SM 2540 C-97	TDS	139		mg/L	P337250	
	SM 2540 D-97	TSS	2	I	mg/L	P337246	
	SM 4500 F-C-97	Fluoride	0.038	I	mg F/L	P337232	
1953292	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P337503	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P337214	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P337166	
	EPA 365.1 Rev. 2.0	Total-P	0.027		mg P/L	P337060	
	SM 5310 B-00	Organic Carbon	30		mg C/L	P337020	
1953293	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.009	I	mg P/L	P336865	
1953295	EPA 200.7 Rev. 4.4	Calcium	18.6		mg/L	P336859	
		Iron	440		ug/L	P336859	
		Magnesium	3.54		mg/L	P336859	
		Potassium	0.30	U	mg/L	P336859	
		Sodium	5.5		mg/L	P336859	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P336859	
		Arsenic	0.38		ug/L	P336859	
		Cadmium	0.020	U	ug/L	P336859	
		Chromium	0.40	U	ug/L	P336859	
		Copper	0.31	I	ug/L	P336859	
		Lead	0.078	I	ug/L	P336859	
		Nickel	0.34	I	ug/L	P336859	
		Silver	0.010	U	ug/L	P336859	

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.

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium and magnesium are unavailable because of high analyte concentration in the QC sample. Batch matrix spike recoveries for potassium and sodium are unavailable for one of two spiked samples 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: P336845

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P336859

Component	Result	Code	Units
Calcium	0.075	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P336859

Component	Result	Code	Units
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: P336859

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P336972

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P336974

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P337503

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337214

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P337166

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P337060

Component	Result	Code	Units
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Quality Assurance Report Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P337060

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P336865

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

Reference Method: SM 2120 B
Batch ID: P336922

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P337082

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

Reference Method: SM 2540 C-97
Batch ID: P337250

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P337246

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P337232

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P337020

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: P336859

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P336859

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	105		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	101		P	85 - 115
Sodium	106		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P336859

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	89.0		P	85 - 115
Cadmium	90.5		P	85 - 115
Chromium	87.0		P	85 - 115
Copper	86.9		P	85 - 115
Lead	88.4		P	85 - 115
Nickel	88.0		P	85 - 115
Silver	91.8		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P336972

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P336974

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P337503

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337214

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.9		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P337166

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P337060

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P336865

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

Reference Method: SM 2320 B-97
Batch ID: P337082

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

Reference Method: SM 4500 F-C-97
Batch ID: P337232

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

Reference Method: SM 5310 B-00
Batch ID: P337020

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P336859

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1951871	Iron	104	107	P/P	80 - 120
1951871	Potassium	100	104	P/P	80 - 120
1951871	Sodium	101	106	P/P	80 - 120
1951871	Zinc	98.1	100	P/P	80 - 120
1953283	Iron	110		P	80 - 120
1953283	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P336859

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1951871	Arsenic	89.2	102	P/P	80 - 120
1951871	Cadmium	91.9	105	P/P	80 - 120
1951871	Chromium	85.9	96.0	P/P	80 - 120
1951871	Copper	83.1	92.3	P/P	80 - 120
1951871	Lead	88.1	97.9	P/P	80 - 120
1951871	Nickel	85.9	95.4	P/P	80 - 120
1951871	Silver	91.1	101	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P336859

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1953283	Arsenic	98.6		P	80 - 120
1953283	Cadmium	103		P	80 - 120
1953283	Chromium	98.6		P	80 - 120
1953283	Copper	93.3		P	80 - 120
1953283	Lead	98.4		P	80 - 120
1953283	Nickel	95.5		P	80 - 120
1953283	Silver	101		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P336972

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1953291	Chloride	101		P	90 - 110
1953312	Chloride	99.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P336974

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1953291	Sulfate	99.8		P	90 - 110
1953312	Sulfate	98.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P337214

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1953226	Kjeldahl Nitrogen	98.0	92.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P337166

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1952257	NO2NO3-N	101		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P337060

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1953107	Total-P	98.9	99.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P336865

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1953227	O-Phosphate-P	97.3	98.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
 Batch ID: P337232

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1953313	Fluoride	97.9	98.6	P/P	91 - 105

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P337020

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1953226	Organic Carbon	94.3	95.1	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P336845

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953104	Turbidity	3.24	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P336859

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1951871	Calcium	1.89	Spike	P	0 - 20
1951871	Iron	2.57	Spike	P	0 - 20
1951871	Magnesium	2.67	Spike	P	0 - 20
1951871	Potassium	2.85	Spike	P	0 - 20
1951871	Sodium	2.53	Spike	P	0 - 20
1951871	Zinc	2.05	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P336859

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1951871	Arsenic	13.0	Spike	P	0 - 20
1951871	Cadmium	13.2	Spike	P	0 - 20
1951871	Chromium	10.5	Spike	P	0 - 20
1951871	Copper	10.5	Spike	P	0 - 20
1951871	Lead	10.5	Spike	P	0 - 20
1951871	Nickel	10.5	Spike	P	0 - 20
1951871	Silver	10.3	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P336972

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953291	Chloride	3.61	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P336974

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953291	Sulfate	4.65	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P337503

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1952996	Ammonia-N	1.64	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337214

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953226	Kjeldahl Nitrogen	4.12	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P337166

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1952257	NO2NO3-N	0.188	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P337060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953107	Total-P	0.335	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P336865

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953227	O-Phosphate-P	0.751	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P336922

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953298	Color (true)	0.365	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P337082

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953313	Total Alkalinity	0.131	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P337250

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953299	TDS	0.447	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P337232

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953313	Fluoride	0.473	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P337020

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1953226	Organic Carbon	0.675	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: A80852
Included Lab Sample IDs: 1953291

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A80871
Included Lab Sample IDs: 1953293

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	98.5	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A80872
Included Lab Sample IDs: 1953291

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	103	105	P/P	90 - 110
Sulfate	100	100	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A80880
Included Lab Sample IDs: 1953291

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	96.5	98.7	P/P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A80910
Included Lab Sample IDs: 1953295

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	95.9	94.8	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A80910

Included Lab Sample IDs: 1953295

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	97.8	98.8	P/P	90 - 110
Chromium	95.9	98.1	P/P	90 - 110
Copper	96.3	95.3	P/P	90 - 110
Lead	96.8	97.1	P/P	90 - 110
Nickel	95.7	95.3	P/P	90 - 110
Silver	98.0	98.3	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A80912

Included Lab Sample IDs: 1953295

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	97.8	105	P/P	90 - 110
Iron	98.8	106	P/P	90 - 110
Magnesium	98.6	105	P/P	90 - 110
Potassium	96.4	104	P/P	90 - 110
Sodium	97.1	104	P/P	90 - 110
Zinc	103	105	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A80926

Included Lab Sample IDs: 1953292

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.4	96.8	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A80955

Included Lab Sample IDs: 1953291

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.8	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A80968

Included Lab Sample IDs: 1953292

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	95.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A80992

Included Lab Sample IDs: 1953292

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

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-97
 Run ID: A81017
 Included Lab Sample IDs: 1953291

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

Reference Method: EPA 351.2 Rev. 2.0
 Run ID: A81050
 Included Lab Sample IDs: 1953292

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	104	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
 Run ID: A81135
 Included Lab Sample IDs: 1953292

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	94.4	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						3.24	
EPA 200.7 Rev. 4.4	Calcium	104						1.89
	Iron	105	104	107	110			2.57
	Magnesium	108						2.67
	Potassium	101	100	104				2.85
	Sodium	106	101	106				2.53
	Zinc	102	98.1	100	101			2.05
EPA 200.8 Rev. 5.4	Arsenic	89.0	89.2	102	98.6			13.0
	Cadmium	90.5	91.9	105	103			13.2
	Chromium	87.0	85.9	96.0	98.6			10.5
	Copper	86.9	83.1	92.3	93.3			10.5
	Lead	88.4	88.1	97.9	98.4			10.5
	Nickel	88.0	85.9	95.4	95.5			10.5
	Silver	91.8	91.1	101	101			10.3
EPA 300.0 Rev. 2.1	Chloride	99.3	101	99.8			3.61	
	Sulfate	97.6	99.8	98.2			4.65	
EPA 350.1 Rev. 2.0	Ammonia-N	97.6						1.64
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.9	98.0	92.4				4.12
EPA 353.2 Rev. 2.0	NO2NO3-N	102	101					0.188
EPA 365.1 Rev. 2.0	Total-P	104	98.9	99.3				0.335
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	97.3	98.4				0.751
SM 2120 B	Color (true)						0.365	
SM 2320 B-97	Total Alkalinity	102					0.131	
SM 2540 C-97	TDS						0.447	
SM 4500 F-C-97	Fluoride	97.9	97.9	98.6				0.473

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery	LCS	Precision SMP	MS
SM 5310 B-00	Organic Carbon	93.4	94.3 95.1			0.675

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1953291
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1953295
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1953295
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1953291
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1953291
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1953292
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1953292
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1953292
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1953292
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1953293
SM 2120 B / E31780	True Color measured at 450 nm	1953291
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1953291
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1953291
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1953291
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1953291
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1953292

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	12/12/2017			12/12/2017 16:03	DeAsia Armster	1953291
EPA 200.7 Rev. 4.4	12/12/2017	12/13/2017	Allison Taylor	12/14/2017	Betina Topolski	1953295
EPA 200.8 Rev. 5.4	12/12/2017	12/13/2017	Allison Taylor	12/14/2017	Nadine Brooks	1953295
EPA 300.0 Rev. 2.1	12/12/2017			12/14/2017	Julia Storbeck	1953291
EPA 350.1 Rev. 2.0	12/12/2017			12/26/2017	Sofia Elnemr	1953292
EPA 351.2 Rev. 2.0	12/12/2017	12/19/2017	Adrian Shelby	12/20/2017	Joseph Suarez	1953292
EPA 353.2 Rev. 2.0	12/12/2017			12/19/2017	Beverly Y. Sanders	1953292
EPA 365.1 Rev. 2.0	12/12/2017	12/15/2017	Sima Feizi	12/18/2017	Lipi Saha	1953292
EPA 365.1 Rev. 2.0 dissolved	12/12/2017			12/13/2017 10:36	Megan Treadwell	1953293
SM 2120 B	12/12/2017			12/13/2017 16:30	Tanya Welborn	1953291
SM 2320 B-97	12/12/2017			12/16/2017	Dale L. Simmons	1953291
SM 2540 C-97	12/12/2017			12/15/2017	Yijie Li	1953291
SM 2540 D-97	12/12/2017			12/15/2017	Yijie Li	1953291
SM 4500 F-C-97	12/12/2017			12/19/2017	Dale L. Simmons	1953291
SM 5310 B-00	12/12/2017			12/14/2017	Megan Treadwell	1953292