Chemical Analysis Report

CEN-DIST-2018-08-16-01

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

Event Description: **Drawdy LVI / Silver / Gear**
Request ID: **RQ-2018-08-06-29**
Customer: **CEN-DIST**
Project ID: **SMP**

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Certified by: Colin Wright, Program Administrator

Date Certified: 05-SEP-2018 11:33

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: LAKE DRAWDY @ 150M NNE OF CENTER **Collection Date/Time: 08/15/2018 10:18**

Field ID: G2CE0079 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2017637	EPA 180.1 Rev. 2.0	Turbidity	1.2		NTU	P350289	
	EPA 300.0 Rev. 2.1	Chloride	18		mg Cl/L	P350643	
		Sulfate	5.4		mg SO4/L	P350645	
	SM 2120 B	Color (true)	330		PCU	P350296	
	SM 2320 B-97	Total Alkalinity	2.6		mg CaCO3/L	P350424	
	SM 2540 C-97	TDS	96		mg/L	P350587	
	SM 2540 D-97	TSS	2	U	mg/L	P350577	
	SM 4500 F-C-97	Fluoride	0.035	I	mg F/L	P350427	
2017639	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P350628	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.90		mg N/L	P350279	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.01	I	mg N/L	P350526	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P350509	
	SM 5310 B-00	Organic Carbon	26		mg C/L	P350548	
2017641	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P350264	
2017647	EPA 200.7 Rev. 4.4	Calcium	5.07		mg/L	P350334	
		Iron	320		ug/L	P350334	
		Magnesium	1.65		mg/L	P350334	
		Potassium	1.9		mg/L	P350334	
		Sodium	9.8		mg/L	P350334	
		Zinc	5.0	U	ug/L	P350334	
	EPA 200.8 Rev. 5.4	Arsenic	1.29		ug/L	P350334	
		Cadmium	0.020	U	ug/L	P350334	
		Chromium	0.61	I	ug/L	P350334	
		Copper	1.36		ug/L	P350334	
		Lead	0.31		ug/L	P350334	
		Nickel	0.29	I	ug/L	P350334	
		Silver	0.010	U	ug/L	P350334	

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: LAKE DRAWDY @ 150M S OF CENTER **Collection Date/Time: 08/15/2018 10:30**

Field ID: G2CE0078 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2017638	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P350289	
	EPA 300.0 Rev. 2.1	Chloride	18		mg Cl/L	P350643	
		Sulfate	5.5		mg SO4/L	P350645	
	SM 2120 B	Color (true)	320		PCU	P350296	
	SM 2320 B-97	Total Alkalinity	2.8		mg CaCO3/L	P350424	
	SM 2540 C-97	TDS	87		mg/L	P350587	
	SM 2540 D-97	TSS	2	I	mg/L	P350577	
	SM 4500 F-C-97	Fluoride	0.037	I	mg F/L	P350427	
2017640	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P350628	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.89		mg N/L	P350279	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.014		mg N/L	P350526	
	EPA 365.1 Rev. 2.0	Total-P	0.019		mg P/L	P350509	
	SM 5310 B-00	Organic Carbon	25		mg C/L	P350548	
2017642	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P350264	
2017648	EPA 200.7 Rev. 4.4	Calcium	5.07		mg/L	P350334	
		Iron	320		ug/L	P350334	
		Magnesium	1.66		mg/L	P350334	
		Potassium	1.8		mg/L	P350334	
		Sodium	9.8		mg/L	P350334	
		Zinc	5.0	U	ug/L	P350334	
	EPA 200.8 Rev. 5.4	Arsenic	1.29		ug/L	P350334	
		Cadmium	0.020	U	ug/L	P350334	
		Chromium	0.60	I	ug/L	P350334	
		Copper	1.37		ug/L	P350334	
		Lead	0.31		ug/L	P350334	
		Nickel	0.29	I	ug/L	P350334	
		Silver	0.010	U	ug/L	P350334	

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P350289

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P350334

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: P350334

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: P350643

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350645

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350628

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P350279

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350526

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350509

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350264

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

Reference Method: SM 2120 B
Batch ID: P350296

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P350424

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

Reference Method: SM 2540 C-97
Batch ID: P350587

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P350577

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P350427

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P350548

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: P350334

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	100		P	85 - 115
Iron	104		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	101		P	85 - 115
Sodium	97.2		P	85 - 115
Zinc	99.8		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350334

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	101		P	85 - 115
Cadmium	104		P	85 - 115
Chromium	98.6		P	85 - 115
Copper	97.9		P	85 - 115
Lead	103		P	85 - 115
Nickel	100		P	85 - 115
Silver	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350643

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350645

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350628

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P350279

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	107		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350526

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350509

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	96.4		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350264

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

Reference Method: SM 2120 B
Batch ID: P350296

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.0		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P350424

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P350427

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.7		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P350548

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.1		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P350334

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017135	Calcium	106		P	80 - 120
2017135	Iron	105		P	80 - 120
2017135	Magnesium	104		P	80 - 120
2017135	Potassium	101		P	80 - 120
2017135	Sodium	101		P	80 - 120
2017135	Zinc	109		P	80 - 120
2017254	Calcium	103		P	80 - 120
2017254	Iron	107	105	P/P	80 - 120
2017254	Magnesium	102		P	80 - 120
2017254	Potassium	102	100	P/P	80 - 120
2017254	Sodium	97.9		P	80 - 120
2017254	Zinc	101	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350334

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017135	Arsenic	105		P	80 - 120
2017135	Cadmium	104		P	80 - 120
2017135	Chromium	98.6		P	80 - 120
2017135	Copper	98.9		P	80 - 120
2017135	Lead	106		P	80 - 120
2017135	Nickel	99.3		P	80 - 120
2017135	Silver	100		P	80 - 120
2017254	Arsenic	105	105	P/P	80 - 120
2017254	Cadmium	106	105	P/P	80 - 120
2017254	Chromium	99.1	101	P/P	80 - 120
2017254	Copper	99.2	100	P/P	80 - 120
2017254	Lead	106	106	P/P	80 - 120
2017254	Nickel	100	102	P/P	80 - 120
2017254	Silver	101	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350643

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017552	Chloride	93.0		P	90 - 110
2017638	Chloride	94.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350645

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017552	Sulfate	95.7		P	90 - 110
2017638	Sulfate	97.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350628

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017587	Ammonia-N	101	103	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P350279

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017584	Kjeldahl Nitrogen	106	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350526

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017695	NO2NO3-N	99.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350509

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017695	Total-P	93.6	96.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350264

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017700	O-Phosphate-P	96.0	97.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P350427

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017691	Fluoride	99.2	97.9	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P350548

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017596	Organic Carbon	108		P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P350289

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017579	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P350334

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017254	Calcium	1.41	Spike	P	0 - 20
2017254	Iron	1.23	Spike	P	0 - 20
2017254	Magnesium	1.58	Spike	P	0 - 20
2017254	Potassium	1.32	Spike	P	0 - 20
2017254	Sodium	1.44	Spike	P	0 - 20
2017254	Zinc	0.519	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350334

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017254	Arsenic	0.329	Spike	P	0 - 20
2017254	Cadmium	0.986	Spike	P	0 - 20
2017254	Chromium	1.52	Spike	P	0 - 20
2017254	Copper	1.10	Spike	P	0 - 20
2017254	Lead	0.187	Spike	P	0 - 20
2017254	Nickel	1.09	Spike	P	0 - 20
2017254	Silver	0.0591	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350643

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017552	Chloride	1.91	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350645

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017552	Sulfate	1.47	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350628

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017587	Ammonia-N	1.13	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P350279

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017584	Kjeldahl Nitrogen	0.949	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350526

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017695	NO2NO3-N	0.595	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350509

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017695	Total-P	2.76	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350264

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017700	O-Phosphate-P	1.45	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P350296

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017516	Color (true)	0.974	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P350424

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017691	Total Alkalinity	0.0281	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P350587

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017729	TDS	1.79	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P350427

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017691	Fluoride	0.986	Spike	P	0 - 3.5

Quality Assurance Report
Precision

Reference Method: SM 5310 B-00
Batch ID: P350548

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017596	Organic Carbon	0.448	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A85936
Included Lab Sample IDs: 2017641, 2017642

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	101	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A85945
Included Lab Sample IDs: 2017637, 2017638

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	101	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A85946
Included Lab Sample IDs: 2017637, 2017638

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.7	102	P/P	90 - 115

Reference Method: SM 2320 B-97
Run ID: A85999
Included Lab Sample IDs: 2017637, 2017638

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

Reference Method: SM 4500 F-C-97
Run ID: A85999
Included Lab Sample IDs: 2017637, 2017638

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A86009
Included Lab Sample IDs: 2017647, 2017648

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	104	P/P	90 - 110
Iron	103	104	P/P	90 - 110
Magnesium	102	103	P/P	90 - 110
Potassium	101	101	P/P	90 - 110
Sodium	97.4	99.9	P/P	90 - 110
Zinc	102	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A86017
Included Lab Sample IDs: 2017639, 2017640

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	106	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A86032
Included Lab Sample IDs: 2017639, 2017640

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

Reference Method: SM 5310 B-00
Run ID: A86036
Included Lab Sample IDs: 2017639, 2017640

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.0	96.6	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A86049
Included Lab Sample IDs: 2017637, 2017638

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	101	P/P	90 - 110
Chloride	103	101	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110
Sulfate	104	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A86050
Included Lab Sample IDs: 2017647, 2017648

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.9	98.6	P/P	90 - 110
Cadmium	98.4	98.0	P/P	90 - 110
Chromium	96.2	96.4	P/P	90 - 110
Copper	97.8	97.6	P/P	90 - 110
Lead	104	104	P/P	90 - 110
Nickel	97.9	96.6	P/P	90 - 110
Silver	98.4	98.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A86058
Included Lab Sample IDs: 2017639, 2017640

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A86067
Included Lab Sample IDs: 2017639, 2017640

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	101	P/P	90 - 110
Ammonia-N	102	100	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						0.0	
EPA 200.7 Rev. 4.4	Calcium	100	106	103				1.41
	Iron	104	105	107	105			1.23
	Magnesium	102	104	102				1.58
	Potassium	101	101	102	100			1.32
	Sodium	97.2	101	97.9				1.44
	Zinc	99.8	109	101	102			0.519
EPA 200.8 Rev. 5.4	Arsenic	101	105	105	105			0.329
	Cadmium	104	104	106	105			0.986
	Chromium	98.6	98.6	99.1	101			1.52
	Copper	97.9	98.9	99.2	100			1.10
	Lead	103	106	106	106			0.187
	Nickel	100	99.3	100	102			1.09
	Silver	101	100	101	101			0.0591
EPA 300.0 Rev. 2.1	Chloride	102	93.0	94.4			1.91	
	Sulfate	101	95.7	97.1			1.47	
EPA 350.1 Rev. 2.0	Ammonia-N	101	101	103				1.13
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	106	105				0.949
EPA 353.2 Rev. 2.0	NO2NO3-N	101	99.5					0.595
EPA 365.1 Rev. 2.0	Total-P	96.4	93.6	96.8				2.76
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.8	96.0	97.4				1.45
SM 2120 B	Color (true)	98.0					0.974	
SM 2320 B-97	Total Alkalinity	103					0.0281	
SM 2540 C-97	TDS						1.79	
SM 4500 F-C-97	Fluoride	97.7	99.2	97.9				0.986
SM 5310 B-00	Organic Carbon	98.1	108					0.448

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2017637, 2017638
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2017647, 2017648
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2017647, 2017648
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2017637, 2017638
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2017637, 2017638
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2017639, 2017640
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2017639, 2017640
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2017639, 2017640
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2017639, 2017640
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2017641, 2017642
SM 2120 B / E31780	True Color measured at 450 nm	2017637, 2017638
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2017637, 2017638
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2017637, 2017638
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2017637, 2017638
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2017637, 2017638

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2017639, 2017640

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	08/16/2018			08/16/2018 15:39	William L. Brown IV	2017637, 2017638
EPA 200.7 Rev. 4.4	08/16/2018	08/16/2018 13:15	Elliott D. Healy	08/20/2018 14:35	Betina Topolski	2017647
	08/16/2018	08/16/2018 13:15	Elliott D. Healy	08/20/2018 14:41	Betina Topolski	2017648
EPA 200.8 Rev. 5.4	08/16/2018	08/16/2018 13:15	Elliott D. Healy	08/22/2018 00:45	Allison Taylor	2017647
	08/16/2018	08/16/2018 13:15	Elliott D. Healy	08/22/2018 00:54	Allison Taylor	2017648
EPA 300.0 Rev. 2.1	08/16/2018			08/22/2018 15:33	Lipi Saha	2017638
	08/16/2018			08/22/2018 17:56	Lipi Saha	2017637
EPA 350.1 Rev. 2.0	08/16/2018			08/22/2018 12:55	Ping Hua	2017640
	08/16/2018			08/22/2018 13:13	Ping Hua	2017639
EPA 351.2 Rev. 2.0	08/16/2018	08/17/2018 08:11	Adrian Shelby	08/20/2018 15:23	Joseph Suarez	2017639
	08/16/2018	08/17/2018 08:11	Adrian Shelby	08/20/2018 15:24	Joseph Suarez	2017640
EPA 353.2 Rev. 2.0	08/16/2018			08/21/2018 13:07	Lauren Bottorf	2017639
	08/16/2018			08/21/2018 13:08	Lauren Bottorf	2017640
EPA 365.1 Rev. 2.0	08/16/2018	08/21/2018 13:00	Sima Feizi	08/22/2018 11:13	Beverly Y. Sanders	2017639
	08/16/2018	08/21/2018 13:00	Sima Feizi	08/22/2018 11:14	Beverly Y. Sanders	2017640
EPA 365.1 Rev. 2.0 dissolved	08/16/2018			08/16/2018 15:52	Julia Storbeck	2017641
	08/16/2018			08/16/2018 15:53	Julia Storbeck	2017642
SM 2120 B	08/16/2018			08/16/2018 16:14	Tanya Welborn	2017637, 2017638
SM 2320 B-97	08/16/2018			08/18/2018 04:05	Dale L. Simmons	2017637
	08/16/2018			08/18/2018 04:16	Dale L. Simmons	2017638
SM 2540 C-97	08/16/2018			08/17/2018 16:00	William L. Brown IV	2017637, 2017638
SM 2540 D-97	08/16/2018			08/17/2018 17:25	William L. Brown IV	2017637, 2017638
SM 4500 F-C-97	08/16/2018			08/18/2018 04:05	Dale L. Simmons	2017637
	08/16/2018			08/18/2018 04:16	Dale L. Simmons	2017638
SM 5310 B-00	08/16/2018			08/20/2018 20:55	Megan Treadwell	2017639
	08/16/2018			08/20/2018 21:42	Megan Treadwell	2017640