Chemical Analysis Report

CEN-DIST-2018-08-28-03

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

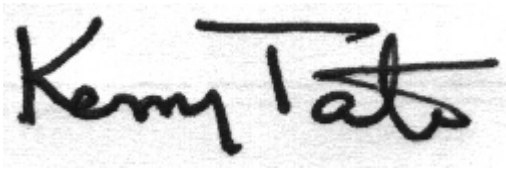
Event Description: **Vol: Cow Crk**
Request ID: **RQ-2018-07-30-35**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Mike Linger

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 13-SEP-2018 11:15



Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

A - Value reported is the mean of two or more determinations.
B - Results based on colony counts outside the acceptable range.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J - Estimated value and/or the analysis did not meet established quality control criteria.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
N - Presumptive evidence of presence of material.
O - Sampled, but analysis lost or not performed.
Q - Sample held beyond normal holding time.
T - Value reported is less than the criterion of detection.
U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
V - Analyte was detected in both sample and method blank.
X - Too few individuals to calculate SCI value.
Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Cow Creek at Osteen-Maytown Road (2952) **Collection Date/Time: 08/27/2018 10:43**

Field ID: G2CE0086 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2020502	EPA 180.1 Rev. 2.0	Turbidity	1.7	A	NTU	P350940	
	EPA 300.0 Rev. 2.1	Chloride	9.9		mg Cl/L	P350987	
		Sulfate	0.49	I	mg SO4/L	P350990	
	SM 2120 B	Color (true)	670		PCU	P350850	
	SM 2320 B-97	Total Alkalinity	2.8		mg CaCO3/L	P351143	
	SM 2540 C-97	TDS	95		mg/L	P351239	
	SM 2540 D-97	TSS	2	I	mg/L	P351070	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P351052	
2020503	EPA 350.1 Rev. 2.0	Ammonia-N	0.034		mg N/L	P350918	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P350894	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P351126	
	EPA 365.1 Rev. 2.0	Total-P	0.024		mg P/L	P350955	
	SM 5310 B-00	Organic Carbon	44		mg C/L	P351336	
2020504	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.009	I	mg P/L	P350835	
2020516	EPA 200.7 Rev. 4.4	Calcium	5.89		mg/L	P350964	
		Iron	1.48E+03		ug/L	P350964	
		Magnesium	1.0		mg/L	P350964	
		Potassium	0.30	U	mg/L	P350964	
		Sodium	6.2		mg/L	P350964	
		Zinc	5.3	I	ug/L	P350964	
	EPA 200.8 Rev. 5.4	Arsenic	0.63		ug/L	P350964	
		Cadmium	0.020	U	ug/L	P350964	
		Chromium	0.63	I	ug/L	P350964	
		Copper	0.23	I	ug/L	P350964	
		Lead	0.55		ug/L	P350964	
		Nickel	0.57	I	ug/L	P350964	
		Silver	0.010	U	ug/L	P350964	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P350940

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P350964

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: P350964

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: P350987

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350990

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350918

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P350894

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: P351126

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350955

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350835

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

Reference Method: SM 2120 B
Batch ID: P350850

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P351143

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

Reference Method: SM 2540 C-97
Batch ID: P351239

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P351070

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P351052

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P351336

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: P350964

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	102		P	85 - 115
Iron	102		P	85 - 115
Magnesium	109		P	85 - 115
Potassium	110		P	85 - 115
Sodium	101		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350964

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	93.8		P	85 - 115
Cadmium	93.0		P	85 - 115
Chromium	88.5		P	85 - 115
Copper	87.3		P	85 - 115
Lead	91.5		P	85 - 115
Nickel	89.8		P	85 - 115
Silver	92.7		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350987

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350990

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350918

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: P350894

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P351126

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350955

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350835

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

Reference Method: SM 2120 B
Batch ID: P350850

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.2		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P351143

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

Reference Method: SM 4500 F-C-97
Batch ID: P351052

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

Reference Method: SM 5310 B-00
Batch ID: P351336

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.1		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P350964

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020573	Calcium	104		P	80 - 120
2020573	Iron	99.3		P	80 - 120
2020573	Magnesium	105		P	80 - 120
2020573	Potassium	106		P	80 - 120
2020573	Sodium	101		P	80 - 120
2020573	Zinc	103		P	80 - 120
2020654	Calcium	99.7		P	80 - 120
2020654	Iron	99.5	98.4	P/P	80 - 120
2020654	Magnesium	105	103	P/P	80 - 120
2020654	Potassium	110	107	P/P	80 - 120
2020654	Sodium	97.7		P	80 - 120
2020654	Zinc	104	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350964

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020573	Arsenic	99.8		P	80 - 120
2020573	Cadmium	98.4		P	80 - 120
2020573	Chromium	94.9		P	80 - 120
2020573	Copper	95.4		P	80 - 120
2020573	Lead	97.4		P	80 - 120
2020573	Nickel	95.4		P	80 - 120
2020573	Silver	95.4		P	80 - 120
2020654	Arsenic	101	102	P/P	80 - 120
2020654	Cadmium	101	103	P/P	80 - 120
2020654	Chromium	97.9	96.9	P/P	80 - 120
2020654	Copper	96.1	96.8	P/P	80 - 120
2020654	Lead	100	101	P/P	80 - 120
2020654	Nickel	97.1	97.5	P/P	80 - 120
2020654	Silver	95.9	96.7	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350987

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020175	Chloride	97.6		P	90 - 110
2020467	Chloride	97.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350990

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020175	Sulfate	98.1		P	90 - 110
2020467	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350918

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020387	Ammonia-N	95.2	99.7	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P350894

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020523	Kjeldahl Nitrogen	98.4	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P351126

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020369	NO2NO3-N	99.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350955

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020465	Total-P	94.2	92.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350835

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020526	O-Phosphate-P	98.7	98.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P351052

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020073	Fluoride	98.1	98.3	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P351336

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020368	Organic Carbon	95.5	97.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P350940

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020502	Turbidity	2.41	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P350964

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020654	Calcium	1.54	Spike	P	0 - 20
2020654	Iron	1.09	Spike	P	0 - 20
2020654	Magnesium	1.22	Spike	P	0 - 20
2020654	Potassium	2.36	Spike	P	0 - 20
2020654	Sodium	1.98	Spike	P	0 - 20
2020654	Zinc	2.87	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350964

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020654	Arsenic	0.432	Spike	P	0 - 20
2020654	Cadmium	2.18	Spike	P	0 - 20
2020654	Chromium	1.05	Spike	P	0 - 20
2020654	Copper	0.672	Spike	P	0 - 20
2020654	Lead	0.662	Spike	P	0 - 20
2020654	Nickel	0.452	Spike	P	0 - 20
2020654	Silver	0.801	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350987

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020175	Chloride	8.28	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350990

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020175	Sulfate	9.98	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350918

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020387	Ammonia-N	2.31	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P350894

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020523	Kjeldahl Nitrogen	0.901	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P351126

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020369	NO2NO3-N	0.614	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350955

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020465	Total-P	1.45	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350835

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020526	O-Phosphate-P	0.0527	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P350850

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020467	Color (true)	1.21	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P351143

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020073	Total Alkalinity	0.102	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P351239

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020476	TDS	5.52	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P351070

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020476	TSS	5.88	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P351052

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020073	Fluoride	0.477	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P351336

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020368	Organic Carbon	1.64	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: A86148
Included Lab Sample IDs: 2020504

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.2	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A86154
Included Lab Sample IDs: 2020502

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.6	99.2	P/P	90 - 115

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A86185
Included Lab Sample IDs: 2020503

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A86194
Included Lab Sample IDs: 2020502

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	106	95.8	P/P	90 - 110
Sulfate	104	94.3	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A86200
Included Lab Sample IDs: 2020502

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A86229
Included Lab Sample IDs: 2020503

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A86233
Included Lab Sample IDs: 2020503

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

Reference Method: SM 4500 F-C-97
Run ID: A86252
Included Lab Sample IDs: 2020502

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.5	101	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A86277
Included Lab Sample IDs: 2020516

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	94.8	94.2	P/P	90 - 110
Cadmium	93.7	93.9	P/P	90 - 110
Chromium	91.4	91.4	P/P	90 - 110
Copper	93.9	92.7	P/P	90 - 110
Lead	102	101	P/P	90 - 110
Nickel	94.4	92.9	P/P	90 - 110
Silver	93.8	92.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A86281
Included Lab Sample IDs: 2020516

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	97.9	P/P	95 - 105
Iron	98.8	94.7	P/P	95 - 105
Magnesium	101	97.8	P/P	95 - 105
Potassium	103	101	P/P	95 - 105
Sodium	101	98.2	P/P	95 - 105
Zinc	102	101	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A86298
Included Lab Sample IDs: 2020503

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

Reference Method: SM 2320 B-97
Run ID: A86303
Included Lab Sample IDs: 2020502

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

Reference Method: SM 5310 B-00
Run ID: A86377
Included Lab Sample IDs: 2020503

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.0	94.5	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						2.41	
EPA 200.7 Rev. 4.4	Calcium	102	104	99.7				1.54
	Iron	102	99.3	99.5	98.4			1.09
	Magnesium	109	105	105	103			1.22
	Potassium	110	106	110	107			2.36
	Sodium	101	101	97.7				1.98
	Zinc	103	103	104	101			2.87
EPA 200.8 Rev. 5.4	Arsenic	93.8	99.8	101	102			0.432
	Cadmium	93.0	98.4	101	103			2.18
	Chromium	88.5	94.9	97.9	96.9			1.05
	Copper	87.3	95.4	96.1	96.8			0.672
	Lead	91.5	97.4	100	101			0.662
	Nickel	89.8	95.4	97.1	97.5			0.452
	Silver	92.7	95.4	95.9	96.7			0.801
EPA 300.0 Rev. 2.1	Chloride	102	97.6	97.0			8.28	
	Sulfate	101	98.1	101			9.98	
EPA 350.1 Rev. 2.0	Ammonia-N	101	95.2	99.7				2.31
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	98.4	100				0.901
EPA 353.2 Rev. 2.0	NO2NO3-N	100	99.5					0.614
EPA 365.1 Rev. 2.0	Total-P	99.2	94.2	92.8				1.45
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.6	98.7	98.8				0.0527
SM 2120 B	Color (true)	97.2					1.21	
SM 2320 B-97	Total Alkalinity	103					0.102	
SM 2540 C-97	TDS						5.52	
SM 2540 D-97	TSS						5.88	
SM 4500 F-C-97	Fluoride	97.7	98.1	98.3				0.477
SM 5310 B-00	Organic Carbon	97.1	95.5	97.9				1.64

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2020502
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2020516
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2020516
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2020502
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2020502
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2020503
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2020503
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2020503
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2020503
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2020504
SM 2120 B / E31780	True Color measured at 450 nm	2020502
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2020502
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2020502
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2020502

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2020502
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2020503

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	08/28/2018			08/28/2018 15:32	Megan Treadwell	2020502
EPA 200.7 Rev. 4.4	08/28/2018	08/30/2018 14:20	Elliott D. Healy	08/31/2018 13:54	Martin Acosta	2020516
EPA 200.8 Rev. 5.4	08/28/2018	08/30/2018 14:20	Elliott D. Healy	09/04/2018 15:47	Allison Taylor	2020516
EPA 300.0 Rev. 2.1	08/28/2018			08/30/2018 22:06	Lipi Saha	2020502
EPA 350.1 Rev. 2.0	08/28/2018			08/29/2018 13:42	Ping Hua	2020503
EPA 351.2 Rev. 2.0	08/28/2018	08/29/2018 15:30	Adrian Shelby	08/31/2018 10:59	Joseph Suarez	2020503
EPA 353.2 Rev. 2.0	08/28/2018			09/05/2018 13:41	Lauren Bottorf	2020503
EPA 365.1 Rev. 2.0	08/28/2018	08/30/2018 11:37	Sima Feizi	08/31/2018 11:53	Beverly Y. Sanders	2020503
EPA 365.1 Rev. 2.0 dissolved	08/28/2018			08/28/2018 13:49	Lipi Saha	2020504
SM 2120 B	08/28/2018			08/28/2018 15:15	Julia Storbeck	2020502
SM 2320 B-97	08/28/2018			09/05/2018 21:32	Dale L. Simmons	2020502
SM 2540 C-97	08/28/2018			08/30/2018 14:22	Yijie Li	2020502
SM 2540 D-97	08/28/2018			08/30/2018 14:22	Yijie Li	2020502
SM 4500 F-C-97	08/28/2018			08/31/2018 06:30	Dale L. Simmons	2020502
SM 5310 B-00	08/28/2018			09/07/2018 19:23	Megan Treadwell	2020503