Chemical Analysis Report

CEN-DIST-2021-04-01-01

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

Event Description: **Little Haw Creek / Lake Dias**
Request ID: **RQ-2021-03-15-07**
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: Kalina Warren

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: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 23-APR-2021 09:46

Case Narrative

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

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

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

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

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program 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 Dias @ Center **Collection Date/Time: 03/31/2021 10:42**

Field ID: G2CE0235 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2235503	EPA 180.1 Rev. 2.0	Turbidity	3.2		NTU	P395823	
	EPA 300.0 Rev. 2.1	Chloride	18		mg Cl/L	P395980	
		Sulfate	5.5		mg SO4/L	P395982	
	SM 2120 B-2011	Color (true)	110		PCU	P395830	
	SM 2320 B-2011	Total Alkalinity	21		mg CaCO3/L	P396042	
	SM 2540 C-2011	TDS	95		mg/L	P396392	
	SM 2540 D-2011	TSS	4	I	mg/L	P396398	
	SM 4500 F-C-2011	Fluoride	0.044	I	mg F/L	P396044	
2235504	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P395921	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.90		mg N/L	P396376	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P396067	
	EPA 365.1 Rev. 2.0	Total-P	0.029		mg P/L	P395969	
	SM 5310 B-2011	Organic Carbon	16		mg C/L	P396053	
2235505	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P395809	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Little Haw Creek @ 25m DS of SR40 **Collection Date/Time: 03/31/2021 11:37**

Field ID: G2CE0128 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2235508	EPA 200.7 Rev. 4.4	Barium	9.9		ug/L	P395998	
		Calcium	5.27		mg/L	P395998	
		Iron	800		ug/L	P395998	
		Magnesium	1.39		mg/L	P395998	
		Potassium	0.30	U	mg/L	P395998	
		Sodium	11.6		mg/L	P395998	
		Zinc	6.3	I	ug/L	P395998	
	EPA 200.8 Rev. 5.4	Aluminum	407		ug/L	P395998	
		Antimony	0.050	U	ug/L	P395998	
		Arsenic	0.38		ug/L	P395998	
		Beryllium	0.017	I	ug/L	P395998	
		Boron**	25.8		ug/L	P395998	
		Cadmium	0.020	U	ug/L	P395998	
		Chromium	0.67	I	ug/L	P395998	
		Copper	0.40	U	ug/L	P395998	
		Lead	0.36	I	ug/L	P395998	
		Nickel	0.50	U	ug/L	P395998	
		Selenium	0.20	U	ug/L	P395998	
		Silver	0.010	U	ug/L	P395998	
		Thallium	0.10	U	ug/L	P395998	
	SM 2340B	Hardness	18.9		mg/L	P395998	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P395823

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P395998

Component	Result	Code	Units
Barium	1.0	U	ug/L
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: P395998

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395980

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395982

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395921

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396376

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396067

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395969

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395809

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

Reference Method: SM 2120 B-2011
Batch ID: P395830

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P396042

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

Reference Method: SM 2540 C-2011
Batch ID: P396392

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P396398

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P396044

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P396053

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: P395998

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	100		P	85 - 115
Calcium	109		P	85 - 115
Iron	105		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	103		P	85 - 115
Sodium	104		P	85 - 115
Zinc	95.6		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P395998

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	91.8		P	85 - 115
Antimony	98.9		P	85 - 115
Arsenic	95.4		P	85 - 115
Beryllium	89.6		P	85 - 115
Boron	95.0		P	85 - 115
Cadmium	96.8		P	85 - 115
Chromium	94.0		P	85 - 115
Copper	94.1		P	85 - 115
Lead	98.1		P	85 - 115
Nickel	94.7		P	85 - 115
Selenium	93.4		P	85 - 115
Silver	99.9		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395980

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395982

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395921

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396376

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396067

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395969

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: P395809

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

Reference Method: SM 2120 B-2011
Batch ID: P395830

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P396042

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P396044

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.0		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P396053

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.4		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P395998

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235430	Barium	105		P	80 - 120
2235430	Calcium	109		P	80 - 120
2235430	Iron	111		P	80 - 120
2235430	Magnesium	108		P	80 - 120
2235430	Potassium	109		P	80 - 120
2235430	Sodium	109		P	80 - 120
2235430	Zinc	106		P	80 - 120
2235615	Barium	104	104	P/P	80 - 120
2235615	Calcium	105		P	80 - 120
2235615	Iron	106	107	P/P	80 - 120
2235615	Magnesium	103	104	P/P	80 - 120
2235615	Potassium	106	106	P/P	80 - 120
2235615	Sodium	108	107	P/P	80 - 120
2235615	Zinc	104	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P395998

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235430	Aluminum	93.1		P	80 - 120
2235430	Antimony	100		P	80 - 120
2235430	Arsenic	97.8		P	80 - 120
2235430	Beryllium	91.2		P	80 - 120
2235430	Boron	92.1		P	80 - 120
2235430	Cadmium	100		P	80 - 120
2235430	Chromium	96.5		P	80 - 120
2235430	Copper	95.8		P	80 - 120
2235430	Lead	100		P	80 - 120
2235430	Nickel	95.1		P	80 - 120
2235430	Selenium	92.7		P	80 - 120
2235430	Silver	99.3		P	80 - 120
2235430	Thallium	106		P	80 - 120
2235615	Aluminum	86.4	93.1	P/P	80 - 120
2235615	Antimony	98.3	103	P/P	80 - 120
2235615	Arsenic	93.9	97.7	P/P	80 - 120
2235615	Beryllium	90.0	93.7	P/P	80 - 120
2235615	Boron	90.4	93.5	P/P	80 - 120
2235615	Cadmium	98.0	101	P/P	80 - 120
2235615	Chromium	95.3	99.1	P/P	80 - 120
2235615	Copper	94.5	98.5	P/P	80 - 120
2235615	Lead	97.1	99.5	P/P	80 - 120
2235615	Nickel	94.4	99.1	P/P	80 - 120
2235615	Selenium	90.6	96.9	P/P	80 - 120
2235615	Silver	100	101	P/P	80 - 120
2235615	Thallium	101	105	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395980

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235396	Chloride	98.5		P	90 - 110
2235503	Chloride	99.7		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395982

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235396	Sulfate	101		P	90 - 110
2235503	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395921

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235609	Ammonia-N	95.6	99.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396067

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235520	NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395969

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235475	Total-P	100	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395809

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235479	O-Phosphate-P	100	98.0	P/P	90 - 110

Reference Method: SM 5310 B-2011
Batch ID: P396053

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235727	Organic Carbon	97.4	99.0	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P395823

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235608	Turbidity	1.08	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P395998

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235615	Barium	0.372	Spike	P	0 - 20
2235615	Calcium	0.593	Spike	P	0 - 20
2235615	Iron	0.885	Spike	P	0 - 20
2235615	Magnesium	0.760	Spike	P	0 - 20
2235615	Potassium	0.0900	Spike	P	0 - 20
2235615	Sodium	0.529	Spike	P	0 - 20
2235615	Zinc	1.90	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P395998

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235615	Aluminum	6.71	Spike	P	0 - 20
2235615	Antimony	4.65	Spike	P	0 - 20
2235615	Arsenic	3.96	Spike	P	0 - 20
2235615	Beryllium	4.04	Spike	P	0 - 20
2235615	Boron	2.79	Spike	P	0 - 20
2235615	Cadmium	3.08	Spike	P	0 - 20
2235615	Chromium	3.98	Spike	P	0 - 20
2235615	Copper	4.06	Spike	P	0 - 20
2235615	Lead	2.42	Spike	P	0 - 20
2235615	Nickel	4.80	Spike	P	0 - 20
2235615	Selenium	6.72	Spike	P	0 - 20
2235615	Silver	0.935	Spike	P	0 - 20
2235615	Thallium	4.49	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395980

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235396	Chloride	0.703	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395982

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235396	Sulfate	0.255	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395921

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235609	Ammonia-N	2.31	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396376

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235477	Kjeldahl Nitrogen	5.21	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396067

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235520	NO2NO3-N	0.496	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395969

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235475	Total-P	2.13	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395809

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235479	O-Phosphate-P	2.22	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P395830

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235492	Color (true)	1.71	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P396042

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235759	Total Alkalinity	0.609	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P396392

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235702	TDS	2.26	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-2011
Batch ID: P396044

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235759	Fluoride	0.502	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P396053

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235727	Organic Carbon	0.991	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A104426
Included Lab Sample IDs: 2235505

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.5	98.4	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A104429
Included Lab Sample IDs: 2235503

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

Reference Method: SM 2120 B-2011
Run ID: A104430
Included Lab Sample IDs: 2235503

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	102	P/P	90 - 115

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A104467
Included Lab Sample IDs: 2235504

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A104495
Included Lab Sample IDs: 2235503

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104507
Included Lab Sample IDs: 2235504

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

Reference Method: SM 2320 B-2011
Run ID: A104518
Included Lab Sample IDs: 2235503

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

Reference Method: SM 4500 F-C-2011
Run ID: A104518
Included Lab Sample IDs: 2235503

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 5310 B-2011
Run ID: A104530
Included Lab Sample IDs: 2235504

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.8	97.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A104545
Included Lab Sample IDs: 2235504

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A104607
Included Lab Sample IDs: 2235508

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	102	100	P/P	90 - 110
Antimony	104	104	P/P	90 - 110
Arsenic	100	99.4	P/P	90 - 110
Beryllium	98.4	98.5	P/P	90 - 110
Cadmium	101	100	P/P	90 - 110
Chromium	99.4	99.1	P/P	90 - 110
Copper	98.5	98.5	P/P	90 - 110
Nickel	99.5	99.5	P/P	90 - 110
Selenium	98.6	97.6	P/P	90 - 110
Thallium	104	105	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A104679
Included Lab Sample IDs: 2235508

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	93.8	90.4	P/P	90 - 110
Lead	97.7	96.2	P/P	90 - 110
Silver	96.7	95.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A104729
Included Lab Sample IDs: 2235504

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A104774
Included Lab Sample IDs: 2235508

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	102	P/P	90 - 110
Calcium	106	107	P/P	90 - 110
Iron	108	107	P/P	90 - 110
Magnesium	105	104	P/P	90 - 110
Potassium	108	107	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A104774
Included Lab Sample IDs: 2235508

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sodium	108	107	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A104812
Included Lab Sample IDs: 2235508

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Zinc	105	101	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						1.08	
EPA 200.7 Rev. 4.4	Barium	100	105	104	104			0.372
	Calcium	109	109	105				0.593
	Iron	105	111	106	107			0.885
	Magnesium	102	108	103	104			0.760
	Potassium	103	109	106	106			0.0900
	Sodium	104	109	108	107			0.529
	Zinc	95.6	106	104	102			1.90
EPA 200.8 Rev. 5.4	Aluminum	91.8	93.1	86.4	93.1			6.71
	Antimony	98.9	100	98.3	103			4.65
	Arsenic	95.4	97.8	93.9	97.7			3.96
	Beryllium	89.6	91.2	90.0	93.7			4.04
	Boron	95.0	90.4	93.5	92.1			2.79
	Cadmium	96.8	100	98.0	101			3.08
	Chromium	94.0	96.5	95.3	99.1			3.98
	Copper	94.1	95.8	94.5	98.5			4.06
	Lead	98.1	97.1	99.5	100			2.42
	Nickel	94.7	95.1	94.4	99.1			4.80
	Selenium	93.4	92.7	90.6	96.9			6.72
	Silver	99.9	100	101	99.3			0.935
	Thallium	100	106	101	105			4.49
EPA 300.0 Rev. 2.1	Chloride	101	98.5	99.7			0.703	
	Sulfate	101	101	101			0.255	
EPA 350.1 Rev. 2.0	Ammonia-N	98.6	95.6	99.6				2.31
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101						5.21
EPA 353.2 Rev. 2.0	NO2NO3-N	100	100	101				0.496
EPA 365.1 Rev. 2.0	Total-P	100	100	103				2.13
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	100	98.0				2.22
SM 2120 B-2011	Color (true)	102					1.71	
SM 2320 B-2011	Total Alkalinity	100					0.609	
SM 2540 C-2011	TDS						2.26	
SM 4500 F-C-2011	Fluoride	99.0						0.502
SM 5310 B-2011	Organic Carbon	95.4	97.4	99.0				0.991

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2235503
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2235508
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2235508
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2235503
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2235503
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2235504
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2235504
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2235504
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2235504
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2235505
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2235503
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2235503
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2235508

Reference Method Descriptions

Method	Description	Associated Samples
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2235503
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2235503
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2235503
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2235504

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	04/01/2021			04/01/2021 15:12	Yen Ta	2235503
EPA 200.7 Rev. 4.4	04/01/2021	04/06/2021 15:40	Elliott D. Healy	04/15/2021 22:55	Betina Topolski	2235508
	04/01/2021	04/06/2021 15:40	Elliott D. Healy	04/16/2021 15:34	Betina Topolski	2235508
EPA 200.8 Rev. 5.4	04/01/2021	04/06/2021 15:40	Elliott D. Healy	04/08/2021 23:50	McKinley C Carter	2235508
	04/01/2021	04/06/2021 15:40	Elliott D. Healy	04/13/2021 03:44	Alexander Thompson	2235508
EPA 300.0 Rev. 2.1	04/01/2021			04/06/2021 01:34	Lipi Saha	2235503
EPA 350.1 Rev. 2.0	04/01/2021			04/04/2021 12:43	Ping Hua	2235504
EPA 351.2 Rev. 2.0	04/01/2021	04/12/2021 14:15	Yen Ta	04/14/2021 13:36	Virginia P. Brown	2235504
EPA 353.2 Rev. 2.0	04/01/2021			04/06/2021 09:12	Beverly Y. Sanders	2235504
EPA 365.1 Rev. 2.0	04/01/2021	04/05/2021 12:50	Yen Ta	04/06/2021 12:55	Shengyu Ding	2235504
EPA 365.1 Rev. 2.0 dissolved	04/01/2021			04/01/2021 14:02	Lipi Saha	2235505
SM 2120 B-2011	04/01/2021			04/01/2021 16:29	Benjamin T. Nordmann	2235503
SM 2320 B-2011	04/01/2021			04/06/2021 07:15	Dale L. Simmons	2235503
SM 2340B	04/01/2021			04/15/2021 22:55	Betina Topolski	2235508
SM 2540 C-2011	04/01/2021			04/06/2021 15:21	Yijie Li	2235503
SM 2540 D-2011	04/01/2021			04/06/2021 15:05	Yijie Li	2235503
SM 4500 F-C-2011	04/01/2021			04/06/2021 07:15	Dale L. Simmons	2235503
SM 5310 B-2011	04/01/2021			04/06/2021 04:39	Madeline Gruver	2235504