Chemical Analysis Report

SW-DIST-2019-06-18-01

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

Event Description: **Reference Lake**
Request ID: **RQ-2019-06-10-16**
Customer: **SW-DIST**
Project ID: **LAKESREF**

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13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926
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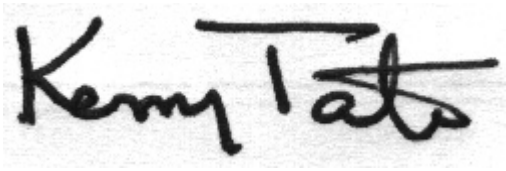
Date Certified: 01-JUL-2019 13:10



Case Narrative

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

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

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

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

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited 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 ROCHELLE_REF LAKE **Collection Date/Time: 06/17/2019 12:15**

Field ID: 280423814307 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2096145	EPA 180.1 Rev. 2.0	Turbidity	2.6		NTU	P365885	
	EPA 300.0 Rev. 2.1	Chloride	28		mg Cl/L	P366135	
		Sulfate	9.5		mg SO4/L	P366137	
	SM 2120 B	Color (true)	28		PCU	P365882	
	SM 2320 B-97	Total Alkalinity	53		mg CaCO3/L	P366156	
	SM 2540 C-97	TDS	138	A	mg/L	P366245	
	SM 2540 D-97	TSS	4	IA	mg/L	P366204	
	SM 4500 F-C-97	Fluoride	0.21		mg F/L	P366160	
2096146	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P366171	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P336265	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P366080	
	EPA 365.1 Rev. 2.0	Total-P	0.028		mg P/L	P366025	
	SM 5310 B-00	Organic Carbon	12		mg C/L	P366069	
2096147	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P365897	
2096150	EPA 200.7 Rev. 4.4	Barium	15.7		ug/L	P365952	
		Calcium	16.6		mg/L	P365952	
		Iron	30	U	ug/L	P365952	
		Magnesium	5.26		mg/L	P365952	
		Potassium	8.6		mg/L	P365952	
		Sodium	16.4		mg/L	P365952	
		Zinc	5.0	U	ug/L	P365952	
	EPA 200.8 Rev. 5.4	Aluminum	24		ug/L	P365952	
		Antimony	0.12	I	ug/L	P365952	
		Arsenic	1.40		ug/L	P365952	
		Boron**	54.2		ug/L	P365952	
		Cadmium	0.020	U	ug/L	P365952	
		Chromium	0.40	U	ug/L	P365952	
		Copper	0.73	I	ug/L	P365952	
		Lead	0.20	U	ug/L	P365952	
		Nickel	0.50	U	ug/L	P365952	
		Selenium	0.20	U	ug/L	P365952	
		Silver	0.010	U	ug/L	P365952	
		Thallium	0.10	U	ug/L	P365952	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for magnesium and potassium are unavailable because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for boron are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P365885

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365952

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: P365952

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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: P366135

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P366137

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P366171

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: P336265

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P366080

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P366025

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365897

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

Reference Method: SM 2120 B
Batch ID: P365882

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P366156

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

Reference Method: SM 2540 C-97
Batch ID: P366245

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P366204

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P366160

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P366069

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: P365952

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.1		P	85 - 115
Calcium	100		P	85 - 115
Iron	103		P	85 - 115
Magnesium	100		P	85 - 115
Potassium	98.3		P	85 - 115
Sodium	97.6		P	85 - 115
Zinc	97.1		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365952

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	95.5		P	85 - 115
Antimony	99.6		P	85 - 115
Arsenic	102		P	85 - 115
Boron	94.9		P	85 - 115
Cadmium	100		P	85 - 115
Chromium	101		P	85 - 115
Copper	98.7		P	85 - 115
Lead	101		P	85 - 115
Nickel	99.8		P	85 - 115
Selenium	99.7		P	85 - 115
Silver	99.2		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P366135

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P366137

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P366171

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P336265

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P366080

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: P366025

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365897

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

Reference Method: SM 2120 B
Batch ID: P365882

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

Reference Method: SM 2320 B-97
Batch ID: P366156

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	105		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P366160

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.6		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P366069

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.0		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365952

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096404	Barium	98.4	99.0	P/P	80 - 120
2096404	Calcium	99.8		P	80 - 120
2096404	Iron	98.6	101	P/P	80 - 120
2096404	Sodium	99.1		P	80 - 120
2096404	Zinc	95.9	96.2	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365952

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096404	Aluminum	98.3	97.4	P/P	80 - 120
2096404	Antimony	103	104	P/P	80 - 120
2096404	Arsenic	107	106	P/P	80 - 120
2096404	Cadmium	103	105	P/P	80 - 120
2096404	Chromium	99.8	99.2	P/P	80 - 120
2096404	Copper	97.5	97.0	P/P	80 - 120
2096404	Lead	102	102	P/P	80 - 120
2096404	Nickel	99.0	98.9	P/P	80 - 120
2096404	Selenium	92.6	92.6	P/P	80 - 120
2096404	Silver	99.9	99.7	P/P	80 - 120
2096404	Thallium	103	106	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P366135

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096101	Chloride	99.5	98.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P366137

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096101	Sulfate	99.1	98.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P366171

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096104	Ammonia-N	103	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P336265

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096161	Kjeldahl Nitrogen	106	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P366080

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096140	NO2NO3-N	100	100	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P366025

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096164	Total-P	102	99.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365897

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096156	O-Phosphate-P	101	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P366160

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096411	Fluoride	98.2	98.2	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P366069

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2096102	Organic Carbon	95.3	95.3	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P365885

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096101	Turbidity	1.89	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365952

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096404	Barium	0.552	Spike	P	0 - 20
2096404	Calcium	1.10	Spike	P	0 - 20
2096404	Iron	2.21	Spike	P	0 - 20
2096404	Magnesium	0.587	Spike	P	0 - 20
2096404	Potassium	0.876	Spike	P	0 - 20
2096404	Sodium	0.850	Spike	P	0 - 20
2096404	Zinc	0.283	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365952

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096404	Aluminum	1.00	Spike	P	0 - 20
2096404	Antimony	0.563	Spike	P	0 - 20
2096404	Arsenic	0.363	Spike	P	0 - 20
2096404	Boron	0.556	Spike	P	0 - 20
2096404	Cadmium	2.09	Spike	P	0 - 20
2096404	Chromium	0.664	Spike	P	0 - 20
2096404	Copper	0.606	Spike	P	0 - 20
2096404	Lead	0.291	Spike	P	0 - 20
2096404	Nickel	0.124	Spike	P	0 - 20
2096404	Selenium	0.0538	Spike	P	0 - 20
2096404	Silver	0.209	Spike	P	0 - 20
2096404	Thallium	2.88	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P366135

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096101	Chloride	0.578	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P366137

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096101	Sulfate	0.864	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P366171

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096104	Ammonia-N	0.580	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P336265

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096161	Kjeldahl Nitrogen	0.313	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P366080

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096140	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P366025

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096164	Total-P	2.50	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365897

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096156	O-Phosphate-P	0.495	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P365882

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096157	Color (true)	6.02	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P366156

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096411	Total Alkalinity	0.211	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P366245

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096145	TDS	0.727	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P366160

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096411	Fluoride	0.0	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P366069

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2096102	Organic Carbon	0.0	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 300.0 Rev. 2.1
Run ID: A92171
Included Lab Sample IDs: 2096145

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

Reference Method: SM 2120 B
Run ID: A92186
Included Lab Sample IDs: 2096145

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.2	101	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A92187
Included Lab Sample IDs: 2096145

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	99.5	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A92195
Included Lab Sample IDs: 2096147

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.9	98.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A92237
Included Lab Sample IDs: 2096146

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A92251
Included Lab Sample IDs: 2096150

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	100	100	P/P	95 - 105
Calcium	104	104	P/P	95 - 105
Iron	104	103	P/P	95 - 105
Magnesium	102	102	P/P	95 - 105
Potassium	103	101	P/P	95 - 105
Sodium	99.0	101	P/P	95 - 105
Zinc	100	101	P/P	95 - 105

Reference Method: SM 5310 B-00
Run ID: A92256
Included Lab Sample IDs: 2096146

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.8	97.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A92283
Included Lab Sample IDs: 2096150

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.4	98.1	P/P	90 - 110
Antimony	101	101	P/P	90 - 110
Arsenic	102	102	P/P	90 - 110
Boron	95.2	96.2	P/P	90 - 110
Cadmium	100	100	P/P	90 - 110
Chromium	103	101	P/P	90 - 110
Copper	101	101	P/P	90 - 110
Lead	102	101	P/P	90 - 110
Nickel	101	101	P/P	90 - 110
Selenium	101	101	P/P	90 - 110
Silver	97.4	98.0	P/P	90 - 110
Thallium	97.9	94.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A92285
Included Lab Sample IDs: 2096146

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.5	98.2	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A92292
Included Lab Sample IDs: 2096145

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: A92292
Included Lab Sample IDs: 2096145

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A92297
Included Lab Sample IDs: 2096146

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A92373
Included Lab Sample IDs: 2096146

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	93.6	96.8	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					1.89	
EPA 200.7 Rev. 4.4	Barium	99.1	98.4	99.0			0.552
	Calcium	100	99.8				1.10
	Iron	103	98.6	101			2.21
	Magnesium	100					0.587
	Potassium	98.3					0.876
	Sodium	97.6	99.1				0.850
	Zinc	97.1	95.9	96.2			0.283
EPA 200.8 Rev. 5.4	Aluminum	95.5	98.3	97.4			1.00
	Antimony	99.6	103	104			0.563
	Arsenic	102	107	106			0.363
	Boron	94.9					0.556
	Cadmium	100	103	105			2.09
	Chromium	101	99.8	99.2			0.664
	Copper	98.7	97.5	97.0			0.606
	Lead	101	102	102			0.291
	Nickel	99.8	99.0	98.9			0.124
	Selenium	99.7	92.6	92.6			0.0538
	Silver	99.2	99.9	99.7			0.209
	Thallium	100	103	106			2.88
EPA 300.0 Rev. 2.1	Chloride	99.6	99.5	98.8			0.578
	Sulfate	99.1	99.1	98.0			0.864
EPA 350.1 Rev. 2.0	Ammonia-N	103	103	102			0.580
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	110	106	107			0.313
EPA 353.2 Rev. 2.0	NO2NO3-N	100	100	100			0.0
EPA 365.1 Rev. 2.0	Total-P	103	102	99.9			2.50
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.3	101	101			0.495
SM 2120 B	Color (true)	101				6.02	
SM 2320 B-97	Total Alkalinity	105				0.211	
SM 2540 C-97	TDS					0.727	
SM 4500 F-C-97	Fluoride	98.6	98.2	98.2			0.0
SM 5310 B-00	Organic Carbon	96.0	95.3	95.3			0.0

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2096145
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2096150
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2096150
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2096145
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2096145
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2096146
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2096146
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2096146
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2096146

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2096147
SM 2120 B / E31780	True Color measured at 450 nm	2096145
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2096145
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2096145
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2096145
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2096145
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2096146

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	06/18/2019			06/18/2019 17:00	Adrian Shelby	2096145
EPA 200.7 Rev. 4.4	06/18/2019	06/19/2019 16:40	Elliott D. Healy	06/20/2019 14:12	Betina Topolski	2096150
EPA 200.8 Rev. 5.4	06/18/2019	06/19/2019 16:40	Elliott D. Healy	06/22/2019 05:54	Robert K Palmer	2096150
EPA 300.0 Rev. 2.1	06/18/2019			06/19/2019 20:05	Lipi Saha	2096145
EPA 350.1 Rev. 2.0	06/18/2019			06/21/2019 13:00	Ping Hua	2096146
EPA 351.2 Rev. 2.0	06/18/2019	06/25/2019 10:55	Sima Feizi	06/26/2019 13:39	Virginia P. Brown	2096146
EPA 353.2 Rev. 2.0	06/18/2019			06/20/2019 12:27	Beverly Y. Sanders	2096146
EPA 365.1 Rev. 2.0	06/18/2019	06/20/2019 13:17	Sima Feizi	06/21/2019 14:26	Lipi Saha	2096146
EPA 365.1 Rev. 2.0 dissolved	06/18/2019			06/18/2019 17:04	Jhamieka S. Greenwood	2096147
SM 2120 B	06/18/2019			06/18/2019 16:06	Madeline Funaro	2096145
SM 2320 B-97	06/18/2019			06/22/2019 10:36	Dale L. Simmons	2096145
SM 2540 C-97	06/18/2019			06/19/2019 15:22	Yijie Li	2096145
SM 2540 D-97	06/18/2019			06/19/2019 15:22	Yijie Li	2096145
SM 4500 F-C-97	06/18/2019			06/22/2019 10:36	Dale L. Simmons	2096145
SM 5310 B-00	06/18/2019			06/19/2019 08:13	Madeline Funaro	2096146