

Chemical Analysis Report

CEN-DIST-2019-06-04-01

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

Event Description: **Lk Barber + LVI + D&B**
Request ID: **RQ-2019-05-27-21**
Customer: **CEN-DIST**
Project ID: **SMP**

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Date Certified: 19-JUN-2019 11:12



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 Barber (George) @ Center

Collection Date/Time: 06/03/2019 11:25

Field ID: G2CE0209

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2091040	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P365009	
	EPA 300.0 Rev. 2.1	Chloride	17	A	mg Cl/L	P365310	
		Sulfate	16	A	mg SO4/L	P365313	
	SM 2120 B	Color (true)	11		PCU	P365014	
	SM 2320 B-97	Total Alkalinity	24		mg CaCO3/L	P365483	
	SM 2540 C-97	TDS	88		mg/L	P365621	
	SM 2540 D-97	TSS	2	I	mg/L	P365626	
	SM 4500 F-C-97	Fluoride	0.036	I	mg F/L	P365484	
2091041	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	I	mg N/L	P365350	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.52		mg N/L	P365272	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P365198	
	EPA 365.1 Rev. 2.0	Total-P	0.008		mg P/L	P365233	
	SM 5310 B-00	Organic Carbon	5.8		mg C/L	P365296	
2091042	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P364999	
2091050	EPA 200.7 Rev. 4.4	Barium	5.7		ug/L	P365226	
		Calcium	12.8		mg/L	P365226	
		Iron	30	U	ug/L	P365226	
		Magnesium	2.54		mg/L	P365226	
		Potassium	3.1		mg/L	P365226	
		Sodium	10.1		mg/L	P365226	
		Zinc	5.0	U	ug/L	P365226	
	EPA 200.8 Rev. 5.4	Aluminum	35		ug/L	P365226	
		Antimony	0.20		ug/L	P365226	
		Arsenic	2.43		ug/L	P365226	
		Boron**	29.3		ug/L	P365226	
		Cadmium	0.020	U	ug/L	P365226	
		Chromium	0.40	U	ug/L	P365226	
		Copper	0.59	I	ug/L	P365226	
		Lead	0.20	U	ug/L	P365226	
		Nickel	0.50	U	ug/L	P365226	
		Selenium	0.20	U	ug/L	P365226	
		Silver	0.010	U	ug/L	P365226	
		Thallium	0.10	U	ug/L	P365226	

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 Barber (George) @ Center

Collection Date/Time: 06/03/2019 11:30

Field ID: G2CE0209_DUP

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2091043	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P365009	
	EPA 300.0 Rev. 2.1	Chloride	17		mg Cl/L	P365310	
		Sulfate	16		mg SO4/L	P365313	
		Color (true)	11		PCU	P365014	
	SM 2320 B-97	Total Alkalinity	23		mg CaCO3/L	P365483	
	SM 2540 C-97	TDS	81		mg/L	P365621	
	SM 2540 D-97	TSS	2	I	mg/L	P365626	
	SM 4500 F-C-97	Fluoride	0.035	I	mg F/L	P365484	
2091045	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	I	mg N/L	P365350	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.51		mg N/L	P365272	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P365198	
	EPA 365.1 Rev. 2.0	Total-P	0.009		mg P/L	P365233	
	SM 5310 B-00	Organic Carbon	5.7		mg C/L	P365296	
2091047	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P364999	
2091051	EPA 200.7 Rev. 4.4	Barium	5.8		ug/L	P365226	
		Calcium	13.3		mg/L	P365226	
		Iron	30	U	ug/L	P365226	
		Magnesium	2.63		mg/L	P365226	
		Potassium	3.2		mg/L	P365226	
		Sodium	10.6		mg/L	P365226	
		Zinc	5.0	U	ug/L	P365226	
	EPA 200.8 Rev. 5.4	Aluminum	37		ug/L	P365226	
		Antimony	0.21		ug/L	P365226	
		Arsenic	2.47		ug/L	P365226	
		Boron**	30.9		ug/L	P365226	
		Cadmium	0.020	U	ug/L	P365226	
		Chromium	0.40	U	ug/L	P365226	
		Copper	0.63	I	ug/L	P365226	
		Lead	0.20	U	ug/L	P365226	
		Nickel	0.50	U	ug/L	P365226	
		Selenium	0.20	U	ug/L	P365226	
		Silver	0.010	U	ug/L	P365226	
		Thallium	0.10	U	ug/L	P365226	

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: Field Blank

Collection Date/Time: 06/03/2019 11:40

Field ID: FB_06032019

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2091044	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P365009	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P365310	
		Sulfate	0.20	U	mg SO4/L	P365313	
		Color (true)	2.5	U	PCU	P365014	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P365483	
	SM 2540 C-97	TDS	15	U	mg/L	P365619	
	SM 2540 D-97	TSS	2	U	mg/L	P365624	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P365484	
2091046	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P365350	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P365272	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.011		mg N/L	P365199	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P365233	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P365296	
2091048	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P365002	
2091052	EPA 200.7 Rev. 4.4	Barium	1.0	U	ug/L	P365226	
		Calcium	0.075	U	mg/L	P365226	
		Iron	30	U	ug/L	P365226	
		Magnesium	0.040	U	mg/L	P365226	
		Potassium	0.30	U	mg/L	P365226	
		Sodium	0.50	U	mg/L	P365226	
		Zinc	5.0	U	ug/L	P365226	
		Aluminum	5.0	U	ug/L	P365226	
		Antimony	0.050	U	ug/L	P365226	
		Arsenic	0.050	U	ug/L	P365226	
	EPA 200.8 Rev. 5.4	Boron**	2.0	U	ug/L	P365226	
		Cadmium	0.020	U	ug/L	P365226	
		Chromium	0.40	U	ug/L	P365226	
		Copper	0.40	U	ug/L	P365226	
		Lead	0.20	U	ug/L	P365226	
		Nickel	0.50	U	ug/L	P365226	
		Selenium	0.20	U	ug/L	P365226	
		Silver	0.010	U	ug/L	P365226	
		Thallium	0.10	U	ug/L	P365226	

Ref. Method and Comment:

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

EPA 353.2 Rev. 2.0: The result was confirmed on 06/11/2019.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P365009

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365226

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: P365226

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: P365310

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365313

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365350

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: P365272

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365198

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365199

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365233

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364999

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365002

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

Reference Method: SM 2120 B
Batch ID: P365014

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P365483

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

Reference Method: SM 2540 C-97
Batch ID: P365619

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P365621

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P365624

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P365626

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P365484

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P365296

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: P365226

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	103		P	85 - 115
Calcium	104		P	85 - 115
Iron	106		P	85 - 115
Magnesium	109		P	85 - 115
Potassium	104		P	85 - 115
Sodium	106		P	85 - 115
Zinc	99.8		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365226

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.6		P	85 - 115
Antimony	99.6		P	85 - 115
Arsenic	101		P	85 - 115
Boron	100		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	102		P	85 - 115
Copper	99.7		P	85 - 115
Lead	95.3		P	85 - 115
Nickel	101		P	85 - 115
Selenium	99.5		P	85 - 115
Silver	99.7		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365310

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365313

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365350

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.9		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365272

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365198

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	96.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365199

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	96.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365233

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: P364999

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365002

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

Reference Method: SM 2120 B
Batch ID: P365014

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	104		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P365483

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P365484

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.1		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P365296

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.9		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365226

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2091050	Barium	102		P	80 - 120
2091050	Calcium	106		P	80 - 120
2091050	Iron	105		P	80 - 120
2091050	Magnesium	105		P	80 - 120
2091050	Potassium	100		P	80 - 120
2091050	Sodium	107		P	80 - 120
2091050	Zinc	101		P	80 - 120
2091397	Barium	102	101	P/P	80 - 120
2091397	Calcium	104		P	80 - 120
2091397	Iron	106	105	P/P	80 - 120
2091397	Magnesium	108	107	P/P	80 - 120
2091397	Potassium	106	103	P/P	80 - 120
2091397	Sodium	107	103	P/P	80 - 120
2091397	Zinc	100	99.4	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365226

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2091050	Aluminum	97.4		P	80 - 120
2091050	Antimony	99.7		P	80 - 120
2091050	Arsenic	99.5		P	80 - 120
2091050	Boron	99.3		P	80 - 120
2091050	Cadmium	100		P	80 - 120
2091050	Chromium	100		P	80 - 120
2091050	Copper	98.7		P	80 - 120
2091050	Lead	94.4		P	80 - 120
2091050	Nickel	99.4		P	80 - 120
2091050	Selenium	96.2		P	80 - 120
2091050	Silver	98.5		P	80 - 120
2091050	Thallium	101		P	80 - 120
2091397	Aluminum	97.1	99.1	P/P	80 - 120
2091397	Antimony	98.5	99.4	P/P	80 - 120
2091397	Arsenic	99.1	99.3	P/P	80 - 120
2091397	Boron	98.8	102	P/P	80 - 120
2091397	Cadmium	101	101	P/P	80 - 120
2091397	Chromium	97.9	99.7	P/P	80 - 120
2091397	Copper	96.0	97.2	P/P	80 - 120
2091397	Lead	92.9	94.0	P/P	80 - 120
2091397	Nickel	97.8	99.0	P/P	80 - 120
2091397	Selenium	95.8	96.9	P/P	80 - 120
2091397	Silver	99.8	99.4	P/P	80 - 120
2091397	Thallium	100	102	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365310

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2091040	Chloride	99.3		P	90 - 110
2091106	Chloride	94.8		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365313

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2091040	Sulfate	99.0		P	90 - 110
2091106	Sulfate	95.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365350

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2091068	Ammonia-N	103	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365272

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2091041	Kjeldahl Nitrogen	106	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365198

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090953	NO2NO3-N	96.5	96.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365199

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2091068	NO2NO3-N	97.0	95.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365233

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2091041	Total-P	101	99.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364999

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090951	O-Phosphate-P	98.6	99.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365002

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2091070	O-Phosphate-P	99.2	99.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P365484

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2091382	Fluoride	104	104	P/P	89 - 106

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P365296

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090947	Organic Carbon	93.6	93.3	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P365009

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090998	Turbidity	5.71	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365226

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091397	Barium	1.22	Spike	P	0 - 20
2091397	Calcium	1.32	Spike	P	0 - 20
2091397	Iron	0.437	Spike	P	0 - 20
2091397	Magnesium	0.273	Spike	P	0 - 20
2091397	Potassium	1.73	Spike	P	0 - 20
2091397	Sodium	2.22	Spike	P	0 - 20
2091397	Zinc	0.724	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365226

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091397	Aluminum	1.99	Spike	P	0 - 20
2091397	Antimony	0.928	Spike	P	0 - 20
2091397	Arsenic	0.163	Spike	P	0 - 20
2091397	Boron	3.18	Spike	P	0 - 20
2091397	Cadmium	0.307	Spike	P	0 - 20
2091397	Chromium	1.82	Spike	P	0 - 20
2091397	Copper	1.30	Spike	P	0 - 20
2091397	Lead	1.10	Spike	P	0 - 20
2091397	Nickel	1.19	Spike	P	0 - 20
2091397	Selenium	1.13	Spike	P	0 - 20
2091397	Silver	0.412	Spike	P	0 - 20
2091397	Thallium	2.34	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365310

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091040	Chloride	0.124	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365313

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091040	Sulfate	0.480	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365350

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091068	Ammonia-N	2.19	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365272

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091041	Kjeldahl Nitrogen	1.10	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365198

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090953	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365199

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091068	NO2NO3-N	1.14	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365233

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091041	Total-P	0.830	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364999

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090951	O-Phosphate-P	0.707	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365002

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091070	O-Phosphate-P	0.503	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P365014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091000	Color (true)	0.0815	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
 Batch ID: P365483

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091382	Total Alkalinity	0.0345	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
 Batch ID: P365619

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090910	TDS	6.42	Sample	P	0 - 10

Reference Method: SM 2540 C-97
 Batch ID: P365621

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091112	TDS	2.58	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
 Batch ID: P365484

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2091382	Fluoride	0.0	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
 Batch ID: P365296

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090947	Organic Carbon	0.239	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: A91848

Included Lab Sample IDs: 2091042, 2091047, 2091048

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	98.7	P/P	90 - 110
O-Phosphate-P	99.1	98.9	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A91849

Included Lab Sample IDs: 2091040, 2091043, 2091044

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.0	98.5	P/P	95 - 105

Reference Method: SM 2120 B

Run ID: A91850

Included Lab Sample IDs: 2091040, 2091043, 2091044

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	104	104	P/P	90 - 115

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A91854

Included Lab Sample IDs: 2091040, 2091043, 2091044

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A91913

Included Lab Sample IDs: 2091041, 2091045, 2091046

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	96.0	90.5	P/P	90 - 110
NO2NO3-N	96.5	96.0	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A91953

Included Lab Sample IDs: 2091041, 2091045, 2091046

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.0	95.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A91962

Included Lab Sample IDs: 2091050, 2091051, 2091052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	103	P/P	95 - 105
Barium	103	102	P/P	90 - 110
Calcium	103	104	P/P	90 - 110
Calcium	103	103	P/P	95 - 105
Iron	103	103	P/P	95 - 105
Iron	103	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A91962

Included Lab Sample IDs: 2091050, 2091051, 2091052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Magnesium	102	103	P/P	95 - 105
Magnesium	103	102	P/P	90 - 110
Potassium	102	102	P/P	95 - 105
Potassium	102	102	P/P	90 - 110
Sodium	101	101	P/P	95 - 105
Sodium	101	104	P/P	90 - 110
Zinc	101	104	P/P	95 - 105
Zinc	104	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A91986

Included Lab Sample IDs: 2091041, 2091045, 2091046

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	105	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A91989

Included Lab Sample IDs: 2091041, 2091045, 2091046

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.0	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A92001

Included Lab Sample IDs: 2091041, 2091045, 2091046

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	99.4	P/P	90 - 110
Kjeldahl Nitrogen	98.4	102	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A92039

Included Lab Sample IDs: 2091040, 2091043, 2091044

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: A92039

Included Lab Sample IDs: 2091040, 2091043, 2091044

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	98.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A92153

Included Lab Sample IDs: 2091050, 2091051, 2091052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	98.6	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A92153

Included Lab Sample IDs: 2091050, 2091051, 2091052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.6	103	P/P	90 - 110
Antimony	96.7	97.4	P/P	90 - 110
Antimony	96.9	96.7	P/P	90 - 110
Arsenic	98.0	99.2	P/P	90 - 110
Arsenic	99.5	98.0	P/P	90 - 110
Boron	101	105	P/P	90 - 110
Boron	99.2	101	P/P	90 - 110
Cadmium	99.7	100	P/P	90 - 110
Cadmium	100	99.1	P/P	90 - 110
Chromium	101	103	P/P	90 - 110
Chromium	103	95.9	P/P	90 - 110
Copper	100	99.7	P/P	90 - 110
Copper	99.9	100	P/P	90 - 110
Lead	94.1	95.4	P/P	90 - 110
Lead	95.4	94.8	P/P	90 - 110
Nickel	100	99.8	P/P	90 - 110
Nickel	101	100	P/P	90 - 110
Selenium	97.5	98.4	P/P	90 - 110
Selenium	98.4	97.7	P/P	90 - 110
Silver	96.9	97.6	P/P	90 - 110
Silver	97.6	97.4	P/P	90 - 110
Thallium	94.5	95.0	P/P	90 - 110
Thallium	95.0	94.0	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					5.71	
EPA 200.7 Rev. 4.4	Barium	103	102	102	101		1.22
	Calcium	104	106	104			1.32
	Iron	106	105	106	105		0.437
	Magnesium	109	105	108	107		0.273
	Potassium	104	100	106	103		1.73
	Sodium	106	107	107	103		2.22
	Zinc	99.8	101	100	99.4		0.724
EPA 200.8 Rev. 5.4	Aluminum	98.6	97.4	97.1	99.1		1.99
	Antimony	99.6	99.7	98.5	99.4		0.928
	Arsenic	101	99.5	99.1	99.3		0.163
	Boron	100	99.3	98.8	102		3.18
	Cadmium	101	100	101	101		0.307
	Chromium	102	100	97.9	99.7		1.82
	Copper	99.7	98.7	96.0	97.2		1.30
	Lead	95.3	94.4	92.9	94.0		1.10
	Nickel	101	99.4	97.8	99.0		1.19
	Selenium	99.5	96.2	95.8	96.9		1.13
	Silver	99.7	98.5	99.8	99.4		0.412
	Thallium	102	101	100	102		2.34
EPA 300.0 Rev. 2.1	Chloride	98.9	99.3	94.8		0.124	
	Sulfate	97.5	99.0	95.4		0.480	
EPA 350.1 Rev. 2.0	Ammonia-N	99.9	103	105			2.19
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	106	107			1.10
EPA 353.2 Rev. 2.0	NO2NO3-N	96.0	96.5	96.5			0.0
	NO2NO3-N	96.0	97.0	95.6			1.14
EPA 365.1 Rev. 2.0	Total-P	100	101	99.8			0.830
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.9	98.6	99.3			0.707
	O-Phosphate-P	98.4	99.2	99.7			0.503
SM 2120 B	Color (true)	104				0.0815	
SM 2320 B-97	Total Alkalinity	103				0.0345	
SM 2540 C-97	TDS					6.42	
	TDS					2.58	
SM 4500 F-C-97	Fluoride	97.1	104	104			0.0
SM 5310 B-00	Organic Carbon	96.9	93.6	93.3			0.239

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2091040, 2091043, 2091044
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2091050, 2091051, 2091052
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2091050, 2091051, 2091052
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2091040, 2091043, 2091044
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2091040, 2091043, 2091044
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2091041, 2091045, 2091046
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2091041, 2091045, 2091046
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2091041, 2091045, 2091046

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2091041, 2091045, 2091046
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2091042, 2091047, 2091048
SM 2120 B / E31780	True Color measured at 450 nm	2091040, 2091043, 2091044
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2091040, 2091043, 2091044
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2091040, 2091043, 2091044
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2091040, 2091043, 2091044
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2091040, 2091043, 2091044
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2091041, 2091045, 2091046

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	06/04/2019			06/04/2019 17:24	Julia Storbeck	2091040, 2091043, 2091044
EPA 200.7 Rev. 4.4	06/04/2019	06/06/2019 17:10	Elliott D. Healy	06/07/2019 14:03	Betina Topolski	2091052
	06/04/2019	06/06/2019 17:10	Elliott D. Healy	06/07/2019 15:50	Betina Topolski	2091050
	06/04/2019	06/06/2019 17:10	Elliott D. Healy	06/07/2019 16:10	Betina Topolski	2091051
EPA 200.8 Rev. 5.4	06/04/2019	06/06/2019 17:10	Elliott D. Healy	06/17/2019 22:36	Robert K Palmer	2091052
	06/04/2019	06/06/2019 17:10	Elliott D. Healy	06/18/2019 00:53	Robert K Palmer	2091050
	06/04/2019	06/06/2019 17:10	Elliott D. Healy	06/18/2019 01:23	Robert K Palmer	2091051
EPA 300.0 Rev. 2.1	06/04/2019			06/06/2019 19:57	Lipi Saha	2091040
	06/04/2019			06/06/2019 21:10	Lipi Saha	2091043
	06/04/2019			06/06/2019 21:22	Lipi Saha	2091044
EPA 350.1 Rev. 2.0	06/04/2019			06/06/2019 13:24	Ping Hua	2091041
	06/04/2019			06/06/2019 13:25	Ping Hua	2091045
	06/04/2019			06/06/2019 13:27	Ping Hua	2091046
EPA 351.2 Rev. 2.0	06/04/2019	06/07/2019 12:45	Adrian Shelby	06/10/2019 17:56	Virginia P. Brown	2091041
	06/04/2019	06/07/2019 12:45	Adrian Shelby	06/10/2019 18:04	Virginia P. Brown	2091045
	06/04/2019	06/07/2019 12:45	Adrian Shelby	06/10/2019 18:05	Virginia P. Brown	2091046
EPA 353.2 Rev. 2.0	06/04/2019			06/06/2019 10:49	Beverly Y. Sanders	2091041
	06/04/2019			06/06/2019 10:51	Beverly Y. Sanders	2091045
	06/04/2019			06/06/2019 11:03	Beverly Y. Sanders	2091046
EPA 365.1 Rev. 2.0	06/04/2019	06/07/2019 11:40	Sima Feizi	06/10/2019 14:46	Julia Storbeck	2091041
	06/04/2019	06/07/2019 11:40	Sima Feizi	06/10/2019 14:47	Julia Storbeck	2091045
	06/04/2019	06/07/2019 11:40	Sima Feizi	06/10/2019 14:51	Julia Storbeck	2091046
EPA 365.1 Rev. 2.0 dissolved	06/04/2019			06/04/2019 15:40	Jhamieka S. Greenwood	2091042
	06/04/2019			06/04/2019 15:41	Jhamieka S. Greenwood	2091047
	06/04/2019			06/04/2019 15:51	Jhamieka S. Greenwood	2091048
SM 2120 B	06/04/2019			06/04/2019 17:51	Madeline Funaro	2091040
	06/04/2019			06/04/2019 17:52	Madeline Funaro	2091043
	06/04/2019			06/04/2019 17:53	Madeline Funaro	2091044
SM 2320 B-97	06/04/2019			06/11/2019 19:29	Dale L. Simmons	2091040
	06/04/2019			06/11/2019 19:41	Dale L. Simmons	2091043
	06/04/2019			06/11/2019 19:55	Dale L. Simmons	2091044
SM 2540 C-97	06/04/2019			06/06/2019 15:49	Yijie Li	2091040, 2091043, 2091044
SM 2540 D-97	06/04/2019			06/06/2019 15:49	Yijie Li	2091040, 2091043, 2091044
SM 4500 F-C-97	06/04/2019			06/11/2019 19:29	Dale L. Simmons	2091040
	06/04/2019			06/11/2019 19:41	Dale L. Simmons	2091043
	06/04/2019			06/11/2019 19:55	Dale L. Simmons	2091044
SM 5310 B-00	06/04/2019			06/07/2019 07:59	Julia Storbeck	2091041
	06/04/2019			06/07/2019 08:12	Julia Storbeck	2091045
	06/04/2019			06/07/2019 08:27	Julia Storbeck	2091046