

Chemical Analysis Report

CEN-DIST-2022-01-12-01

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

Event Description: **Run 3**
Request ID: **RQ-2022-01-10-17**
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: Matthew Bearden

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: Colin Wright, Program Administrator

Date Certified: 02-FEB-2022 11:28

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular background.

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: Reedy Lake Basin at Lake Reedy Blvd - Bridge Collection Date/Time: 01/11/2022 11:40

Field ID: G4CE0224

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2299014	EPA 180.1 Rev. 2.0	Turbidity	7.1	A	NTU	P408460	
	EPA 300.0 Rev. 2.1	Chloride	20		mg Cl/L	P409115	
		Sulfate	49		mg SO4/L	P409118	
	SM 2120 B-2011	Color (true)**	7.4		PCU	P408448	
	SM 2320 B-2011	Total Alkalinity	29		mg CaCO3/L	P408539	
	SM 2540 C-2011	TDS	148		mg/L	P408873	
	SM 2540 D-2011	TSS	15	I	mg/L	P408773	
	SM 4500 F-C-2011	Fluoride	0.094	I	mg F/L	P408542	
2299015	EPA 350.1 Rev. 2.0	Ammonia-N	0.01		mg N/L	P408830	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P408668	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P408600	
	EPA 365.1 Rev. 2.0	Total-P	0.036		mg P/L	P408480	MS
	SM 5310 B-2011	Organic Carbon	7.4		mg C/L	P408584	
2299016	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P408454	

Ref. Method and Comment:

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample. The PQL was elevated because of sample matrix interference.

Sample Location: Livingston Creek at Old Avon Park Blvd

Collection Date/Time: 01/11/2022 12:05

Field ID: G4CE0210

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2299011	EPA 180.1 Rev. 2.0	Turbidity	0.65		NTU	P408460	
	EPA 300.0 Rev. 2.1	Chloride	19	A	mg Cl/L	P409115	
		Sulfate	7.7	A	mg SO4/L	P409118	
		Color (true)**	180		PCU	P408448	
	SM 2120 B-2011	Total Alkalinity	13		mg CaCO3/L	P408539	
	SM 2540 C-2011	TDS	106		mg/L	P408873	
	SM 2540 D-2011	TSS	2	UA	mg/L	P408773	
	SM 4500 F-C-2011	Fluoride	0.090	I	mg F/L	P408542	
2299012	EPA 350.1 Rev. 2.0	Ammonia-N	0.012		mg N/L	P408830	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.80		mg N/L	P408887	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.007	I	mg N/L	P408600	
	EPA 365.1 Rev. 2.0	Total-P	0.15		mg P/L	P408480	MS
	SM 5310 B-2011	Organic Carbon	22		mg C/L	P408584	
2299013	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.13		mg P/L	P408454	
2299027	EPA 200.7 Rev. 4.4	Calcium	5.70		mg/L	P408532	
		Iron	110	I	ug/L	P408532	
		Magnesium	4.75		mg/L	P408532	
		Potassium	8.1		mg/L	P408532	
		Sodium	8.1		mg/L	P408532	
		Strontium	113		ug/L	P408532	
		Tin	3.0	U	ug/L	P408532	
		Titanium	0.75	U	ug/L	P408532	
	EPA 200.8 Rev. 5.4	Vanadium	2.0	U	ug/L	P408532	
		Zinc	5.0	U	ug/L	P408532	
		Aluminum	71		ug/L	P408532	
		Antimony	0.050	U	ug/L	P408532	
		Arsenic	0.26		ug/L	P408532	
		Barium	6.27		ug/L	P408532	
		Beryllium	0.011	I	ug/L	P408532	
		Boron**	32.2		ug/L	P408532	
		Cadmium	0.020	U	ug/L	P408532	
		Chromium	0.40	U	ug/L	P408532	
		Cobalt	0.058	I	ug/L	P408532	
		Copper	0.40	U	ug/L	P408532	
		Lead	0.20	U	ug/L	P408532	
		Manganese	5.59		ug/L	P408532	
		Molybdenum	0.15	U	ug/L	P408532	
		Nickel	0.50	U	ug/L	P408532	
		Selenium	0.20	U	ug/L	P408532	
		Silver	0.010	U	ug/L	P408661	
		Thallium	0.10	U	ug/L	P408532	
	SM 2340B	Hardness	33.8		mg/L	P408532	

Field ID: G4CE0210

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
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Ref. Method and Comment:
SM 2540 D-2011: 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 calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for boron and manganese are unavailable for one of two spiked samples 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: P408460

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P408532

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
Strontium	2.0	U	ug/L
Tin	3.0	U	ug/L
Titanium	0.75	U	ug/L
Vanadium	2.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408532

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	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
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408661

Component	Result	Code	Units
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409115

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409118

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408830

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408668

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408887

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408600

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408480

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408454

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

Reference Method: SM 2120 B-2011
Batch ID: P408448

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P408539

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-2011
Batch ID: P408873

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P408773

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P408542

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P408584

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: P408532

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	107		P	85 - 115
Iron	111		P	85 - 115
Magnesium	105		P	85 - 115
Potassium	103		P	85 - 115
Sodium	104		P	85 - 115
Strontium	103		P	85 - 115
Tin	109		P	85 - 115
Titanium	106		P	85 - 115
Vanadium	104		P	85 - 115
Zinc	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408532

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	98.6		P	85 - 115
Barium	106		P	85 - 115
Beryllium	102		P	85 - 115
Boron	97.1		P	85 - 115
Cadmium	99.3		P	85 - 115
Chromium	103		P	85 - 115
Cobalt	99.2		P	85 - 115
Copper	100		P	85 - 115
Lead	95.9		P	85 - 115
Manganese	103		P	85 - 115
Molybdenum	99.7		P	85 - 115
Nickel	101		P	85 - 115
Selenium	98.8		P	85 - 115
Thallium	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408661

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Silver	98.3		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409115

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409118

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	96.6		P	90 - 110

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408830

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: P408668

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	104		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408887

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.8		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408600

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	106		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408480

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	109		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408454

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

Reference Method: SM 2120 B-2011
Batch ID: P408448

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.0		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P408539

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	97.7		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P408542

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P408584

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.2		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P408532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299120	Calcium	105		P	80 - 120
2299120	Iron	109	109	P/P	80 - 120
2299120	Magnesium	103		P	80 - 120
2299120	Potassium	102		P	80 - 120
2299120	Sodium	105		P	80 - 120
2299120	Strontium	102	101	P/P	80 - 120
2299120	Tin	110	108	P/P	80 - 120
2299120	Titanium	106	105	P/P	80 - 120
2299120	Vanadium	105	104	P/P	80 - 120
2299120	Zinc	103	102	P/P	80 - 120
2299211	Iron	111		P	80 - 120
2299211	Magnesium	104		P	80 - 120
2299211	Potassium	107		P	80 - 120
2299211	Sodium	100		P	80 - 120
2299211	Strontium	102		P	80 - 120
2299211	Tin	103		P	80 - 120
2299211	Titanium	105		P	80 - 120
2299211	Vanadium	106		P	80 - 120
2299211	Zinc	103		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P408532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299120	Aluminum	99.7	99.3	P/P	80 - 120
2299120	Antimony	102	101	P/P	80 - 120
2299120	Arsenic	100	99.5	P/P	80 - 120
2299120	Barium	106	104	P/P	80 - 120
2299120	Beryllium	99.5	99.7	P/P	80 - 120
2299120	Cadmium	101	99.6	P/P	80 - 120
2299120	Chromium	106	104	P/P	80 - 120
2299120	Cobalt	100	97.7	P/P	80 - 120
2299120	Copper	101	99.3	P/P	80 - 120
2299120	Lead	96.4	95.1	P/P	80 - 120
2299120	Molybdenum	103	101	P/P	80 - 120
2299120	Nickel	103	101	P/P	80 - 120
2299120	Selenium	100	99.8	P/P	80 - 120
2299120	Thallium	106	105	P/P	80 - 120
2299211	Aluminum	97.4		P	80 - 120
2299211	Antimony	104		P	80 - 120
2299211	Arsenic	105		P	80 - 120
2299211	Barium	105		P	80 - 120
2299211	Beryllium	103		P	80 - 120
2299211	Boron	90.6		P	80 - 120
2299211	Cadmium	102		P	80 - 120
2299211	Chromium	106		P	80 - 120
2299211	Cobalt	102		P	80 - 120
2299211	Copper	101		P	80 - 120
2299211	Lead	97.6		P	80 - 120
2299211	Manganese	104		P	80 - 120
2299211	Molybdenum	104		P	80 - 120
2299211	Nickel	104		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299211	Selenium	104		P	80 - 120
2299211	Thallium	109		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408661

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299211	Silver	99.0		P	80 - 120
2299432	Silver	98.6	98.1	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409115

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299011	Chloride	99.8		P	90 - 110
2299037	Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409118

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299011	Sulfate	94.2		P	90 - 110
2299037	Sulfate	96.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408830

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299219	Ammonia-N	98.4	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408668

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299243	Kjeldahl Nitrogen	92.6	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408887

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299293	Kjeldahl Nitrogen	98.9	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408600

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2298925	NO2NO3-N	106	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408480

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408480

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2298926	Total-P	111	113	F/F	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408454

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299016	O-Phosphate-P	90.4	91.5	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P408542

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2298602	Fluoride	99.0	99.7	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P408584

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2298654	Organic Carbon	101	103	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P408460

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299014	Turbidity	1.12	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P408532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299120	Calcium	0.600	Spike	P	0 - 20
2299120	Iron	0.646	Spike	P	0 - 20
2299120	Magnesium	0.814	Spike	P	0 - 20
2299120	Potassium	1.08	Spike	P	0 - 20
2299120	Sodium	1.46	Spike	P	0 - 20
2299120	Strontium	0.546	Spike	P	0 - 20
2299120	Tin	1.71	Spike	P	0 - 20
2299120	Titanium	0.484	Spike	P	0 - 20
2299120	Vanadium	0.680	Spike	P	0 - 20
2299120	Zinc	0.772	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299120	Aluminum	0.464	Spike	P	0 - 20
2299120	Antimony	1.82	Spike	P	0 - 20
2299120	Arsenic	0.521	Spike	P	0 - 20
2299120	Barium	1.43	Spike	P	0 - 20
2299120	Beryllium	0.190	Spike	P	0 - 20
2299120	Boron	0.359	Spike	P	0 - 20
2299120	Cadmium	1.26	Spike	P	0 - 20
2299120	Chromium	1.94	Spike	P	0 - 20
2299120	Cobalt	2.34	Spike	P	0 - 20
2299120	Copper	1.89	Spike	P	0 - 20
2299120	Lead	1.36	Spike	P	0 - 20
2299120	Manganese	1.15	Spike	P	0 - 20
2299120	Molybdenum	1.60	Spike	P	0 - 20
2299120	Nickel	2.16	Spike	P	0 - 20
2299120	Selenium	0.552	Spike	P	0 - 20
2299120	Thallium	0.812	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P408661

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299432	Silver	0.538	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409115

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299011	Chloride	1.07	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P409118

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299011	Sulfate	0.906	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408830

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299219	Ammonia-N	0.444	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408668

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299243	Kjeldahl Nitrogen	5.64	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408887

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299293	Kjeldahl Nitrogen	2.79	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408600

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2298925	NO2NO3-N	0.621	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408480

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2298926	Total-P	1.33	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408454

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299016	O-Phosphate-P	1.21	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B-2011
Batch ID: P408448

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299022	Color (true)	1.94	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P408539

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2298602	Total Alkalinity	1.59	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P408873

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299081	TDS	5.45	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P408542

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2298602	Fluoride	0.531	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P408584

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2298654	Organic Carbon	1.17	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B-2011

Run ID: A109826

Included Lab Sample IDs: 2299011, 2299014

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	102	P/P	85 - 115
Color (true)	102	103	P/P	85 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A109828

Included Lab Sample IDs: 2299013, 2299016

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.1	99.4	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A109829

Included Lab Sample IDs: 2299011, 2299014

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	99.0	P/P	95 - 105

Reference Method: SM 2320 B-2011

Run ID: A109873

Included Lab Sample IDs: 2299011, 2299014

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	98.1	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A109873

Included Lab Sample IDs: 2299011, 2299014

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A109898

Included Lab Sample IDs: 2299027

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	99.9	P/P	90 - 110
Antimony	102	101	P/P	90 - 110
Arsenic	101	99.8	P/P	90 - 110
Barium	102	102	P/P	90 - 110
Beryllium	99.8	100	P/P	90 - 110
Boron	97.3	96.6	P/P	90 - 110
Cadmium	100	100	P/P	90 - 110
Chromium	101	101	P/P	90 - 110
Cobalt	97.6	96.6	P/P	90 - 110
Copper	100	99.3	P/P	90 - 110
Lead	93.8	92.6	P/P	90 - 110
Manganese	103	102	P/P	90 - 110
Molybdenum	99.1	99.1	P/P	90 - 110
Nickel	100	99.4	P/P	90 - 110
Selenium	102	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A109898

Included Lab Sample IDs: 2299027

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Thallium	104	102	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A109902

Included Lab Sample IDs: 2299012, 2299015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.8	95.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A109906

Included Lab Sample IDs: 2299012, 2299015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	106	106	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A109916

Included Lab Sample IDs: 2299027

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	103	103	P/P	90 - 110
Iron	105	105	P/P	90 - 110
Magnesium	102	103	P/P	90 - 110
Potassium	100	100	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Strontium	101	99.9	P/P	90 - 110
Tin	102	102	P/P	90 - 110
Titanium	101	99.4	P/P	90 - 110
Vanadium	99.8	99.1	P/P	90 - 110
Zinc	100	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A109934

Included Lab Sample IDs: 2299027

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	98.7	94.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A109948

Included Lab Sample IDs: 2299012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A109958

Included Lab Sample IDs: 2299015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A109958

Included Lab Sample IDs: 2299015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.2	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A109992

Included Lab Sample IDs: 2299015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	102	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A110040

Included Lab Sample IDs: 2299011, 2299014

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	103	P/P	90 - 110
Chloride	102	102	P/P	90 - 110
Sulfate	98.7	99.7	P/P	90 - 110
Sulfate	99.2	98.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A110092

Included Lab Sample IDs: 2299012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	93.6	99.8	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			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						1.12	
EPA 200.7 Rev. 4.4	Calcium	107	105					0.600
	Iron	111	109	109	111			0.646
	Magnesium	105	103	104				0.814
	Potassium	103	102	107				1.08
	Sodium	104	105	100				1.46
	Strontium	103	102	101	102			0.546
	Tin	109	110	108	103			1.71
	Titanium	106	106	105	105			0.484
	Vanadium	104	105	104	106			0.680
	Zinc	105	103	102	103			0.772
EPA 200.8 Rev. 5.4	Aluminum	103	99.7	99.3	97.4			0.464
	Antimony	101	102	101	104			1.82
	Arsenic	98.6	100	99.5	105			0.521
	Barium	106	106	104	105			1.43
	Beryllium	102	99.5	99.7	103			0.190
	Boron	97.1	90.6					0.359
	Cadmium	99.3	101	99.6	102			1.26
	Chromium	103	106	104	106			1.94
	Cobalt	99.2	100	97.7	102			2.34
	Copper	100	101	99.3	101			1.89
	Lead	95.9	96.4	95.1	97.6			1.36
	Manganese	103	104					1.15
	Molybdenum	99.7	103	101	104			1.60
	Nickel	101	103	101	104			2.16
	Selenium	98.8	100	99.8	104			0.552
	Silver	98.3	98.6	98.1	99.0			0.538
	Thallium	105	106	105	109			0.812
EPA 300.0 Rev. 2.1	Chloride	100	99.8	102			1.07	
	Sulfate	96.6	94.2	96.3			0.906	
EPA 350.1 Rev. 2.0	Ammonia-N	98.6	98.4	99.2				0.444
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	92.6	103				5.64
	Kjeldahl Nitrogen	95.8	98.9	103				2.79
EPA 353.2 Rev. 2.0	NO2NO3-N	106	106	104				0.621
EPA 365.1 Rev. 2.0	Total-P	109	111	113				1.33
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.8	90.4	91.5				1.21
SM 2120 B-2011	Color (true)	99.0					1.94	
SM 2320 B-2011	Total Alkalinity	97.7					1.59	
SM 2540 C-2011	TDS						5.45	
SM 4500 F-C-2011	Fluoride	100	99.0	99.7				0.531
SM 5310 B-2011	Organic Carbon	95.2	101	103				1.17

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2299011, 2299014
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2299027
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2299027
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2299011, 2299014
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2299011, 2299014
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2299012, 2299015

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2299012, 2299015
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2299012, 2299015
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2299012, 2299015
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2299013, 2299016
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2299011, 2299014
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2299011, 2299014
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2299027
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2299011, 2299014
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2299011, 2299014
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2299011, 2299014
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2299012, 2299015

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	01/12/2022			01/12/2022 16:21	Khloe J Berg	2299011, 2299014
EPA 200.7 Rev. 4.4	01/12/2022	01/14/2022 11:00	Vijayalakshmi Reddy	01/18/2022 18:36	Josef B Mick	2299027
EPA 200.8 Rev. 5.4	01/12/2022	01/14/2022 11:00	Vijayalakshmi Reddy	01/14/2022 17:56	Alexander Thompson	2299027
	01/12/2022	01/19/2022 10:13	Emily M Philpot	01/19/2022 19:30	Alexander Thompson	2299027
EPA 300.0 Rev. 2.1	01/12/2022			01/27/2022 14:54	Roberta Tatti	2299011
	01/12/2022			01/27/2022 17:44	Roberta Tatti	2299014
EPA 350.1 Rev. 2.0	01/12/2022			01/21/2022 12:10	Ping Hua	2299015
	01/12/2022			01/21/2022 12:59	Ping Hua	2299012
EPA 351.2 Rev. 2.0	01/12/2022	01/20/2022 09:13	Samantha L Bates	01/21/2022 13:03	Alexandra J Mattheus	2299015
	01/12/2022	01/26/2022 10:32	Samantha L Bates	01/27/2022 12:15	Alexandra J Mattheus	2299012
EPA 353.2 Rev. 2.0	01/12/2022			01/18/2022 10:08	Beverly Y. Sanders	2299012
	01/12/2022			01/18/2022 10:10	Beverly Y. Sanders	2299015
EPA 365.1 Rev. 2.0	01/12/2022	01/14/2022 16:50	Simonne.V. Calhoun	01/18/2022 12:22	Shengyu Ding	2299012
	01/12/2022	01/14/2022 16:50	Simonne.V. Calhoun	01/19/2022 15:01	Shengyu Ding	2299015
EPA 365.1 Rev. 2.0 dissolved	01/12/2022			01/12/2022 15:36	James L Waggerby	2299016
	01/12/2022			01/12/2022 15:41	James L Waggerby	2299013
SM 2120 B-2011	01/12/2022			01/12/2022 15:15	Blanca Fach	2299014
	01/12/2022			01/12/2022 15:49	Blanca Fach	2299011
SM 2320 B-2011	01/12/2022			01/14/2022 06:20	Dale L. Simmons	2299011
	01/12/2022			01/14/2022 06:31	Dale L. Simmons	2299014
SM 2340B	01/12/2022			01/18/2022 18:36	Josef B Mick	2299027
SM 2540 C-2011	01/12/2022			01/13/2022 14:02	Yijie Li	2299011, 2299014
SM 2540 D-2011	01/12/2022			01/13/2022 14:02	Yijie Li	2299011, 2299014
SM 4500 F-C-2011	01/12/2022			01/14/2022 06:20	Dale L. Simmons	2299011
	01/12/2022			01/14/2022 06:31	Dale L. Simmons	2299014
SM 5310 B-2011	01/12/2022			01/14/2022 22:04	Khloe J Berg	2299012
	01/12/2022			01/14/2022 22:19	Khloe J Berg	2299015