Chemical Analysis Report

SO-DIST-2021-12-21-02

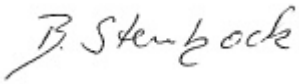
Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **2021 SMP: Tri-County Fair**
Request ID: **RQ-2021-12-20-27**
Customer: **SO-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901-3381
Attn: William Mullen

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: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 13-JAN-2022 17:47



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: Drainage Ditch @ CR 850 **Collection Date/Time: 12/20/2021 09:30**

Field ID: G1SD0061 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2296404	EPA 180.1 Rev. 2.0	Turbidity	8.5		NTU	P407775	
	EPA 300.0 Rev. 2.1	Chloride	20		mg Cl/L	P407903	
		Sulfate	24		mg SO4/L	P407905	
	SM 2120 B-2011	Color (true)	38		PCU	P407773	
	SM 2320 B-2011	Total Alkalinity	226		mg CaCO3/L	P407987	
	SM 2540 C-2011	TDS	313		mg/L	P407915	
	SM 2540 D-2011	TSS	6	I	mg/L	P407819	
	SM 4500 F-C-2011	Fluoride	0.18		mg F/L	P407994	
2296405	EPA 350.1 Rev. 2.0	Ammonia-N	0.089		mg N/L	P408068	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.74		mg N/L	P408017	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.24		mg N/L	P407883	
	EPA 365.1 Rev. 2.0	Total-P	0.075		mg P/L	P407999	MS
	SM 5310 B-2011	Organic Carbon	9.0		mg C/L	P408216	
2296406	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.033		mg P/L	P407770	
2296421	EPA 200.7 Rev. 4.4	Calcium	89.0		mg/L	P407790	
		Iron	1.26E+03		ug/L	P407790	
		Magnesium	8.79		mg/L	P407790	
		Potassium	3.8		mg/L	P407790	
		Sodium	14.7		mg/L	P407790	
		Strontium	258		ug/L	P407790	
		Tin	3.0	U	ug/L	P407790	
		Titanium	1.5	I	ug/L	P407790	
		Vanadium	3.9	I	ug/L	P407790	
		Zinc	7.0	I	ug/L	P407790	
	EPA 200.8 Rev. 5.4	Aluminum	120		ug/L	P407790	
		Antimony	0.087	I	ug/L	P407790	
		Arsenic	0.66		ug/L	P407790	
		Barium	19.4		ug/L	P407790	
		Beryllium	0.016	I	ug/L	P407790	
		Boron**	47.6		ug/L	P407790	
		Cadmium	0.020	U	ug/L	P407790	
		Chromium	0.74	I	ug/L	P407790	
		Cobalt	0.078	I	ug/L	P407790	
		Copper	0.40	U	ug/L	P407790	
		Lead	0.20	U	ug/L	P407790	
		Manganese	12.7		ug/L	P407790	
		Molybdenum	0.56	I	ug/L	P407790	
		Nickel	0.84	I	ug/L	P407790	
		Selenium	0.20	U	ug/L	P407790	
		Silver	0.010	U	ug/L	P407790	
		Thallium	0.10	U	ug/L	P407790	
	SM 2340B	Hardness	258		mg/L	P407790	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P407775

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P407790

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: P407790

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
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407903

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407905

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408068

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408017

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407883

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407999

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407770

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

Reference Method: SM 2120 B-2011
Batch ID: P407773

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P407987

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

Reference Method: SM 2540 C-2011
Batch ID: P407915

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P407819

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P407994

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P408216

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: P407790

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	107		P	85 - 115
Iron	108		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	106		P	85 - 115
Sodium	105		P	85 - 115
Strontium	102		P	85 - 115
Tin	104		P	85 - 115
Titanium	103		P	85 - 115
Vanadium	102		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P407790

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	102		P	85 - 115
Barium	107		P	85 - 115
Beryllium	97.6		P	85 - 115
Boron	98.6		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	103		P	85 - 115
Cobalt	108		P	85 - 115
Copper	102		P	85 - 115
Lead	98.2		P	85 - 115
Manganese	102		P	85 - 115
Molybdenum	103		P	85 - 115
Nickel	104		P	85 - 115
Selenium	104		P	85 - 115
Silver	107		P	85 - 115
Thallium	99.8		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407903

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407905

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	96.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408068

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408017

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407883

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	97.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407999

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407770

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

Reference Method: SM 2120 B-2011
Batch ID: P407773

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	103		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P407987

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.9		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P407994

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.8		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P408216

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.1		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P407790

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296447	Calcium	98.8		P	80 - 120
2296447	Iron	104		P	80 - 120
2296447	Magnesium	99.2		P	80 - 120
2296447	Potassium	103		P	80 - 120
2296447	Sodium	99.5		P	80 - 120
2296447	Strontium	99.6		P	80 - 120
2296447	Tin	98.0		P	80 - 120
2296447	Titanium	101		P	80 - 120
2296447	Vanadium	102		P	80 - 120
2296447	Zinc	102		P	80 - 120
2296531	Calcium	99.7	103	P/P	80 - 120
2296531	Iron	103	106	P/P	80 - 120
2296531	Magnesium	100	105	P/P	80 - 120
2296531	Potassium	109	111	P/P	80 - 120
2296531	Sodium	104	103	P/P	80 - 120
2296531	Strontium	101	101	P/P	80 - 120
2296531	Tin	104	104	P/P	80 - 120
2296531	Titanium	102	103	P/P	80 - 120
2296531	Vanadium	101	102	P/P	80 - 120
2296531	Zinc	104	105	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P407790

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296447	Aluminum	104		P	80 - 120
2296447	Antimony	105		P	80 - 120
2296447	Arsenic	102		P	80 - 120
2296447	Barium	110		P	80 - 120
2296447	Beryllium	95.3		P	80 - 120
2296447	Boron	103		P	80 - 120
2296447	Cadmium	104		P	80 - 120
2296447	Chromium	105		P	80 - 120
2296447	Cobalt	106		P	80 - 120
2296447	Copper	101		P	80 - 120
2296447	Lead	98.6		P	80 - 120
2296447	Manganese	104		P	80 - 120
2296447	Molybdenum	108		P	80 - 120
2296447	Nickel	101		P	80 - 120
2296447	Selenium	101		P	80 - 120
2296447	Silver	107		P	80 - 120
2296447	Thallium	101		P	80 - 120
2296531	Aluminum	105	103	P/P	80 - 120
2296531	Antimony	103	103	P/P	80 - 120
2296531	Arsenic	103	102	P/P	80 - 120
2296531	Barium	110	109	P/P	80 - 120
2296531	Beryllium	96.6	96.4	P/P	80 - 120
2296531	Boron	103	101	P/P	80 - 120
2296531	Cadmium	102	102	P/P	80 - 120
2296531	Chromium	104	104	P/P	80 - 120
2296531	Cobalt	107	108	P/P	80 - 120
2296531	Copper	106	105	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P407790

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296531	Lead	101	100	P/P	80 - 120
2296531	Manganese	102	102	P/P	80 - 120
2296531	Molybdenum	105	105	P/P	80 - 120
2296531	Nickel	105	105	P/P	80 - 120
2296531	Selenium	103	104	P/P	80 - 120
2296531	Silver	107	107	P/P	80 - 120
2296531	Thallium	102	103	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407903

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295799	Chloride	96.9		P	90 - 110
2296187	Chloride	98.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407905

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295799	Sulfate	96.7		P	90 - 110
2296187	Sulfate	97.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408068

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296258	Ammonia-N	96.0	95.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408017

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295142	Kjeldahl Nitrogen	106	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407883

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296368	NO2NO3-N	98.5	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407999

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296312	Total-P	111	102	F/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407770

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296482	O-Phosphate-P	98.3	98.6	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P407994

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296526	Fluoride	98.6	99.2	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P408216

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296188	Organic Carbon	95.2	95.1	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P407775

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296276	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P407790

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296531	Calcium	3.09	Spike	P	0 - 20
2296531	Iron	3.00	Spike	P	0 - 20
2296531	Magnesium	3.74	Spike	P	0 - 20
2296531	Potassium	1.43	Spike	P	0 - 20
2296531	Sodium	0.354	Spike	P	0 - 20
2296531	Strontium	0.262	Spike	P	0 - 20
2296531	Tin	0.156	Spike	P	0 - 20
2296531	Titanium	0.814	Spike	P	0 - 20
2296531	Vanadium	0.407	Spike	P	0 - 20
2296531	Zinc	1.25	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P407790

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296531	Aluminum	1.69	Spike	P	0 - 20
2296531	Antimony	0.126	Spike	P	0 - 20
2296531	Arsenic	0.426	Spike	P	0 - 20
2296531	Barium	0.615	Spike	P	0 - 20
2296531	Beryllium	0.255	Spike	P	0 - 20
2296531	Boron	1.27	Spike	P	0 - 20
2296531	Cadmium	0.0844	Spike	P	0 - 20
2296531	Chromium	0.427	Spike	P	0 - 20
2296531	Cobalt	0.712	Spike	P	0 - 20
2296531	Copper	0.537	Spike	P	0 - 20
2296531	Lead	0.604	Spike	P	0 - 20
2296531	Manganese	0.382	Spike	P	0 - 20
2296531	Molybdenum	0.367	Spike	P	0 - 20
2296531	Nickel	0.438	Spike	P	0 - 20
2296531	Selenium	0.734	Spike	P	0 - 20
2296531	Silver	0.470	Spike	P	0 - 20
2296531	Thallium	1.43	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407903

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295799	Chloride	0.389	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407905

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295799	Sulfate	0.364	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408068

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296258	Ammonia-N	0.511	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408017

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295142	Kjeldahl Nitrogen	2.85	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407883

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296368	NO2NO3-N	0.271	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407999

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296312	Total-P	6.85	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407770

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296482	O-Phosphate-P	0.190	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P407773

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296276	Color (true)	8.09	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P407987

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296526	Total Alkalinity	3.63	Sample	P	0 - 5.2

Quality Assurance Report
Precision

Reference Method: SM 2540 C-2011
Batch ID: P407915

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295938	TDS	2.87	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P407994

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296526	Fluoride	0.492	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P408216

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296188	Organic Carbon	0.127	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A109514
Included Lab Sample IDs: 2296406

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	100	P/P	90 - 110

Reference Method: SM 2120 B-2011
Run ID: A109516
Included Lab Sample IDs: 2296404

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	103	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A109517
Included Lab Sample IDs: 2296404

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A109563
Included Lab Sample IDs: 2296405

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	99.0	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A109573
Included Lab Sample IDs: 2296404

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	102	P/P	90 - 110
Sulfate	100	101	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A109575
Included Lab Sample IDs: 2296421

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.9	97.9	P/P	90 - 110
Iron	101	98.7	P/P	90 - 110
Magnesium	99.9	98.0	P/P	90 - 110
Potassium	98.3	98.3	P/P	90 - 110
Sodium	97.7	97.8	P/P	90 - 110
Strontium	99.5	101	P/P	90 - 110
Tin	99.3	100	P/P	90 - 110
Titanium	95.9	96.4	P/P	90 - 110
Vanadium	96.4	96.8	P/P	90 - 110
Zinc	99.3	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A109624
Included Lab Sample IDs: 2296421

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	101	P/P	90 - 110
Antimony	100	99.3	P/P	90 - 110
Arsenic	100	100	P/P	90 - 110
Barium	101	100	P/P	90 - 110
Beryllium	96.2	94.4	P/P	90 - 110
Boron	99.8	99.6	P/P	90 - 110
Cadmium	99.5	100	P/P	90 - 110
Chromium	97.9	96.7	P/P	90 - 110
Cobalt	101	99.5	P/P	90 - 110
Manganese	97.8	97.5	P/P	90 - 110
Molybdenum	99.6	98.6	P/P	90 - 110
Nickel	97.9	96.9	P/P	90 - 110
Selenium	100	98.9	P/P	90 - 110
Silver	103	103	P/P	90 - 110
Thallium	109	107	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A109633
Included Lab Sample IDs: 2296404

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	97.3	96.8	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A109633
Included Lab Sample IDs: 2296404

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A109643
Included Lab Sample IDs: 2296421

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	100	98.0	P/P	90 - 110
Lead	93.2	93.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A109658
Included Lab Sample IDs: 2296405

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.5	98.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A109698
Included Lab Sample IDs: 2296405

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	98.7	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A109719
Included Lab Sample IDs: 2296405

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	104	106	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A109725
Included Lab Sample IDs: 2296405

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.7	94.2	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						0.0	
EPA 200.7 Rev. 4.4	Calcium	107	98.8	99.7	103			3.09
	Iron	108	104	103	106			3.00
	Magnesium	107	99.2	100	105			3.74
	Potassium	106	103	109	111			1.43
	Sodium	105	99.5	104	103			0.354
	Strontium	102	99.6	101	101			0.262
	Tin	104	98.0	104	104			0.156
	Titanium	103	101	102	103			0.814
	Vanadium	102	102	101	102			0.407
	Zinc	104	102	104	105			1.25
EPA 200.8 Rev. 5.4	Aluminum	102	105	103	104			1.69
	Antimony	102	103	103	105			0.126
	Arsenic	102	103	102	102			0.426
	Barium	107	110	109	110			0.615
	Beryllium	97.6	96.6	96.4	95.3			0.255
	Boron	98.6	103	101	103			1.27
	Cadmium	101	102	102	104			0.0844
	Chromium	103	104	104	105			0.427
	Cobalt	108	107	108	106			0.712
	Copper	102	106	105	101			0.537
	Lead	98.2	101	100	98.6			0.604
	Manganese	102	102	102	104			0.382
	Molybdenum	103	105	105	108			0.367
	Nickel	104	105	105	101			0.438
	Selenium	104	103	104	101			0.734
	Silver	107	107	107	107			0.470
	Thallium	99.8	102	103	101			1.43
EPA 300.0 Rev. 2.1	Chloride	98.4	96.9	98.8			0.389	
	Sulfate	96.7	96.7	97.5			0.364	
EPA 350.1 Rev. 2.0	Ammonia-N	101	96.0	95.4				0.511
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	103	106				2.85
EPA 353.2 Rev. 2.0	NO2NO3-N	97.5	98.5	99.0				0.271
EPA 365.1 Rev. 2.0	Total-P	104	111	102				6.85
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	98.3	98.6				0.190
SM 2120 B-2011	Color (true)	103					8.09	
SM 2320 B-2011	Total Alkalinity	99.9					3.63	
SM 2540 C-2011	TDS						2.87	
SM 4500 F-C-2011	Fluoride	99.8	98.6	99.2				0.492
SM 5310 B-2011	Organic Carbon	94.1	95.2	95.1				0.127

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2296404
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2296421
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2296421
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2296404
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2296404
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2296405
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2296405

Reference Method Descriptions

Method	Description	Associated Samples
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2296405
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2296405
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2296406
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2296404
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2296404
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2296421
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2296404
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2296404
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2296404
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2296405

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	12/21/2021			12/21/2021 16:02	Khloe J Berg	2296404
EPA 200.7 Rev. 4.4	12/21/2021	12/22/2021 10:05	Vijayalakshmi Reddy	12/28/2021 01:56	Josef B Mick	2296421
EPA 200.8 Rev. 5.4	12/21/2021	12/22/2021 10:05	Vijayalakshmi Reddy	01/03/2022 17:17	Alexander Thompson	2296421
	12/21/2021	12/22/2021 10:05	Vijayalakshmi Reddy	12/29/2021 16:55	McKinley C Carter	2296421
EPA 300.0 Rev. 2.1	12/21/2021			12/22/2021 14:50	Roberta Tatti	2296404
EPA 350.1 Rev. 2.0	12/21/2021			01/04/2022 12:26	Ping Hua	2296405
EPA 351.2 Rev. 2.0	12/21/2021	01/04/2022 12:52	Samantha L Bates	01/06/2022 11:22	Alexandra J Mattheus	2296405
EPA 353.2 Rev. 2.0	12/21/2021			12/27/2021 11:17	Beverly Y. Sanders	2296405
EPA 365.1 Rev. 2.0	12/21/2021	01/04/2022 16:25	Simonne.V. Calhoun	01/05/2022 19:11	Sarah A Nixon	2296405
EPA 365.1 Rev. 2.0 dissolved	12/21/2021			12/21/2021 14:52	James L Waggerby	2296406
SM 2120 B-2011	12/21/2021			12/21/2021 16:30	Samantha L Bates	2296404
SM 2320 B-2011	12/21/2021			12/28/2021 19:20	Dale L. Simmons	2296404
SM 2340B	12/21/2021			12/28/2021 01:56	Josef B Mick	2296421
SM 2540 C-2011	12/21/2021			12/21/2021 16:06	Yijie Li	2296404
SM 2540 D-2011	12/21/2021			12/21/2021 16:06	Yijie Li	2296404
SM 4500 F-C-2011	12/21/2021			12/28/2021 19:20	Dale L. Simmons	2296404
SM 5310 B-2011	12/21/2021			01/05/2022 09:22	Touraj Touran	2296405