

Chemical Analysis Report

TLH-ROC-2018-11-28-03

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

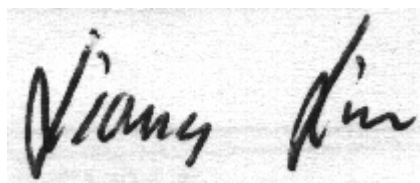
Event Description: **G2 run 9**
Request ID: **RQ-2018-10-29-75**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
Attn: Michael Eckles

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 07-JAN-2019 14:41

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored 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 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: APALACHICOLA BAY NEAR ST. GEORGE ISLAND

Collection Date/Time: 11/28/2018 12:30

Field ID: G2TLHR0036

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2044325	EPA 180.1 Rev. 2.0	Turbidity	6.8		NTU	P355351	
	SM 2320 B-97	Total Alkalinity	54		mg CaCO3/L	P355707	
	SM 2540 D-97	TSS	6	I	mg/L	P355822	
	SM 4500 F-C-97	Fluoride	0.29		mg F/L	P355711	
2044327	EPA 350.1 Rev. 2.0	Ammonia-N	0.025		mg N/L	P355588	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.38	I	mg N/L	P355401	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.16		mg N/L	P355480	
	EPA 365.1 Rev. 2.0	Total-P	0.024		mg P/L	P355324	MS
	SM 5310 B-00	Organic Carbon	4.7		mg C/L	P355514	
2044329	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P355300	
2044355	EPA 200.7 Rev. 4.4	Iron	460		ug/L	P355538	
		Zinc	5.0	U	ug/L	P355538	
	EPA 200.8 Rev. 5.4	Arsenic	0.85		ug/L	P355538	
		Cadmium	0.060	U	ug/L	P355538	
		Chromium	1.2	U	ug/L	P355538	
		Copper	0.62	I	ug/L	P355538	
		Lead	0.23	I	ug/L	P355538	
		Nickel	0.60	U	ug/L	P355538	
		Silver	0.030	U	ug/L	P355538	

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: APALACHICOLA BAY 1200M SOUTH OF US98 BRIDGE **Collection Date/Time: 11/28/2018 13:15**

Field ID: G2TLHR0035

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2044326	EPA 180.1 Rev. 2.0	Turbidity	8.0	A	NTU	P355351	
	SM 2320 B-97	Total Alkalinity	38		mg CaCO3/L	P355560	
	SM 2540 D-97	TSS	9	I	mg/L	P355822	
	SM 4500 F-C-97	Fluoride	0.073	I	mg F/L	P355563	
2044328	EPA 350.1 Rev. 2.0	Ammonia-N	0.015		mg N/L	P355590	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.32		mg N/L	P355402	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.26		mg N/L	P355380	
	EPA 365.1 Rev. 2.0	Total-P	0.030		mg P/L	P355405	
	SM 5310 B-00	Organic Carbon	5.2		mg C/L	P355514	
2044330	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.007	I	mg P/L	P355340	
2044356	EPA 200.7 Rev. 4.4	Iron	930		ug/L	P355476	
		Zinc	5.0	U	ug/L	P355476	
	EPA 200.8 Rev. 5.4	Arsenic	0.45		ug/L	P355476	
		Cadmium	0.020	U	ug/L	P355476	
		Chromium	0.72	I	ug/L	P355476	
		Copper	0.88		ug/L	P356654	
		Lead	0.38		ug/L	P356234	
		Nickel	0.56	I	ug/L	P355476	
		Silver	0.010	U	ug/L	P355476	

Ref. Method and Comment:

SM 2540 D-97: 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: P355351

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355476

Component	Result	Code	Units
Iron	30	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355538

Component	Result	Code	Units
Iron	30	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355476

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355538

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356234

Component	Result	Code	Units
Lead	0.050	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356654

Component	Result	Code	Units
Copper	0.20	U	ug/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355588

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355590

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355401

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355402

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355380

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355480

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355324

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355405

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355300

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

Quality Assurance Report

Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355340

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

Reference Method: SM 2320 B-97
Batch ID: P355560

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2320 B-97
Batch ID: P355707

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 D-97
Batch ID: P355822

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P355563

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P355711

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P355514

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: P355476

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	102		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355538

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	109		P	85 - 115
Zinc	96.1		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355476

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	105		P	85 - 115
Cadmium	109		P	85 - 115
Chromium	106		P	85 - 115
Nickel	104		P	85 - 115
Silver	107		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355538

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	105		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	101		P	85 - 115
Copper	102		P	85 - 115
Lead	106		P	85 - 115
Nickel	103		P	85 - 115
Silver	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356234

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Lead	108		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356654

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	107		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355588

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.9		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355590

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355401

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355402

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355380

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355480

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355324

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355405

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355300

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355340

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.1		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-97
Batch ID: P355560

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.7		P	98 - 107

Reference Method: SM 2320 B-97
Batch ID: P355707

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P355563

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.2		P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P355711

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.4		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P355514

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.0		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355476

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044650	Iron	104		P	80 - 120
2044650	Zinc	99.9		P	80 - 120
2045110	Iron	105	103	P/P	80 - 120
2045110	Zinc	104	102	P/P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355538

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044355	Iron	103	103	P/P	70 - 130
2044355	Zinc	90.0	92.2	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355476

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044650	Arsenic	108		P	80 - 120
2044650	Cadmium	110		P	80 - 120
2044650	Chromium	96.1		P	80 - 120
2044650	Nickel	102		P	80 - 120
2044650	Silver	106		P	80 - 120
2045110	Arsenic	106	107	P/P	80 - 120
2045110	Cadmium	108	108	P/P	80 - 120
2045110	Chromium	106	106	P/P	80 - 120
2045110	Nickel	104	105	P/P	80 - 120
2045110	Silver	106	107	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355538

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044355	Arsenic	115	116	P/P	80 - 120
2044355	Cadmium	101	103	P/P	80 - 120
2044355	Chromium	92.0	90.8	P/P	80 - 120
2044355	Copper	102	103	P/P	80 - 120
2044355	Lead	106	107	P/P	80 - 120
2044355	Nickel	106	106	P/P	80 - 120
2044355	Silver	96.2	99.6	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356234

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044528	Lead	108		P	80 - 120
2044771	Lead	109	109	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356654

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044663	Copper	107		P	80 - 120
2047182	Copper	102	102	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355588

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043890	Ammonia-N	105	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355590

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044328	Ammonia-N	100	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355401

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044466	Kjeldahl Nitrogen	103	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355402

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044473	Kjeldahl Nitrogen	111	107	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355380

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044526	NO2NO3-N	97.5	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355480

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044098	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355324

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044100	Total-P	97.3	86.0	P/F	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355405

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044540	Total-P	98.2	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355300

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043891	O-Phosphate-P	96.5	98.5	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355340

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2044321	O-Phosphate-P	96.0	97.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P355563

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043988	Fluoride	100	99.7	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P355711

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043746	Fluoride	99.0	99.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P355514

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043995	Organic Carbon	98.2	97.4	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P355351

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044326	Turbidity	3.27	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355476

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2045110	Iron	1.48	Spike	P	0 - 20
2045110	Zinc	1.22	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355538

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044355	Iron	0.389	Spike	P	0 - 20
2044355	Zinc	2.47	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355476

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2045110	Arsenic	1.51	Spike	P	0 - 20
2045110	Cadmium	0.312	Spike	P	0 - 20
2045110	Chromium	0.0723	Spike	P	0 - 20
2045110	Nickel	0.391	Spike	P	0 - 20
2045110	Silver	1.04	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355538

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044355	Arsenic	0.855	Spike	P	0 - 20
2044355	Cadmium	2.36	Spike	P	0 - 20
2044355	Chromium	1.30	Spike	P	0 - 20
2044355	Copper	0.545	Spike	P	0 - 20
2044355	Lead	0.638	Spike	P	0 - 20
2044355	Nickel	0.191	Spike	P	0 - 20
2044355	Silver	3.53	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356234

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044771	Lead	0.130	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356654

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2047182	Copper	0.228	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355588

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043890	Ammonia-N	1.04	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355590

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044328	Ammonia-N	0.166	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355401

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044466	Kjeldahl Nitrogen	0.604	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355402

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044473	Kjeldahl Nitrogen	3.38	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355380

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044526	NO2NO3-N	1.02	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355480

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044098	NO2NO3-N	0.489	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355324

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044100	Total-P	12.1	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355405

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044540	Total-P	3.87	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355300

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043891	O-Phosphate-P	1.81	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355340

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2044321	O-Phosphate-P	1.16	Spike	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P355560

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043988	Total Alkalinity	0.379	Sample	P	0 - 1.6

Reference Method: SM 2320 B-97
Batch ID: P355707

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043746	Total Alkalinity	0.211	Sample	P	0 - 1.6

Reference Method: SM 4500 F-C-97
Batch ID: P355563

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043988	Fluoride	0.470	Spike	P	0 - 3.5

Reference Method: SM 4500 F-C-97
Batch ID: P355711

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043746	Fluoride	0.470	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P355514

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043995	Organic Carbon	0.556	Spike	P	0 - 20

Quality Assurance Report

Precision

* 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: A88035

Included Lab Sample IDs: 2044329

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	99.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A88047

Included Lab Sample IDs: 2044330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.9	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A88051

Included Lab Sample IDs: 2044325, 2044326

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A88055

Included Lab Sample IDs: 2044328

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A88100

Included Lab Sample IDs: 2044327

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	98.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A88104

Included Lab Sample IDs: 2044328

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	107	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A88116

Included Lab Sample IDs: 2044327, 2044328

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	93.5	98.0	P/P	90 - 110
Organic Carbon	99.0	93.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A88117

Included Lab Sample IDs: 2044327

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A88120

Included Lab Sample IDs: 2044327

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A88130

Included Lab Sample IDs: 2044328

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

Reference Method: SM 2320 B-97

Run ID: A88134

Included Lab Sample IDs: 2044326

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	98.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A88134

Included Lab Sample IDs: 2044326

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A88138

Included Lab Sample IDs: 2044356

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	101	101	P/P	90 - 110
Zinc	101	106	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A88149

Included Lab Sample IDs: 2044327, 2044328

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A88178

Included Lab Sample IDs: 2044355

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	103	102	P/P	90 - 110
Zinc	98.8	97.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A88191
Included Lab Sample IDs: 2044325

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.2	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A88191
Included Lab Sample IDs: 2044325

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.5	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A88217
Included Lab Sample IDs: 2044356

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	101	P/P	90 - 110
Cadmium	103	103	P/P	90 - 110
Chromium	103	104	P/P	90 - 110
Nickel	101	103	P/P	90 - 110
Silver	103	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A88345
Included Lab Sample IDs: 2044355

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	103	104	P/P	90 - 110
Cadmium	100	100	P/P	90 - 110
Chromium	100	100	P/P	90 - 110
Copper	103	104	P/P	90 - 110
Lead	105	105	P/P	90 - 110
Nickel	104	105	P/P	90 - 110
Silver	102	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A88421
Included Lab Sample IDs: 2044356

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A88578
Included Lab Sample IDs: 2044356

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	107	104	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						3.27	
EPA 200.7 Rev. 4.4	Iron	102	104	105	103			1.48
	Iron	109	103	103				0.389
	Zinc	100	99.9	104	102			1.22
	Zinc	96.1	90.0	92.2				2.47
EPA 200.8 Rev. 5.4	Arsenic	105	108	106	107			1.51
	Arsenic	105	115	116				0.855
	Cadmium	109	110	108	108			0.312
	Cadmium	103	101	103				2.36
	Chromium	106	96.1	106	106			0.0723
	Chromium	101	92.0	90.8				1.30
	Copper	102	102	103				0.545
	Copper	107	107	102	102			0.228
	Lead	106	106	107				0.638
	Lead	108	108	109	109			0.130
	Nickel	104	102	104	105			0.391
	Nickel	103	106	106				0.191
	Silver	107	106	106	107			1.04
	Silver	104	96.2	99.6				3.53
EPA 350.1 Rev. 2.0	Ammonia-N	96.9	105	103				1.04
	Ammonia-N	99.0	100	100				0.166
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	103	104				0.604
	Kjeldahl Nitrogen	103	111	107				3.38
EPA 353.2 Rev. 2.0	NO2NO3-N	102	97.5	98.5				1.02
	NO2NO3-N	102	102	102				0.489
EPA 365.1 Rev. 2.0	Total-P	104	97.3	86.0				12.1
	Total-P	102	98.2	102				3.87
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.3	96.5	98.5				1.81
	O-Phosphate-P	97.1	96.0	97.7				1.16
SM 2320 B-97	Total Alkalinity	98.7					0.379	
	Total Alkalinity	100					0.211	
SM 4500 F-C-97	Fluoride	97.2	100	99.7				0.470
	Fluoride	97.4	99.0	99.7				0.470
SM 5310 B-00	Organic Carbon	98.0	98.2	97.4				0.556

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2044325, 2044326
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2044355, 2044356
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2044355, 2044356
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2044327, 2044328
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2044327, 2044328
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2044327, 2044328
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2044327, 2044328
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2044329, 2044330
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2044325, 2044326

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2044325, 2044326
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2044325, 2044326
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2044327, 2044328

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	11/28/2018			11/29/2018 17:05	Megan Treadwell	2044325, 2044326
EPA 200.7 Rev. 4.4	11/28/2018	12/03/2018 13:40	Elliott D. Healy	12/04/2018 17:16	Betina Topolski	2044356
	11/28/2018	12/04/2018 15:00	Elliott D. Healy	12/05/2018 19:36	Betina Topolski	2044355
EPA 200.8 Rev. 5.4	11/28/2018	12/03/2018 13:40	Elliott D. Healy	12/07/2018 04:03	Robert K Palmer	2044356
	11/28/2018	12/04/2018 15:00	Elliott D. Healy	12/13/2018 01:32	Allison Taylor	2044355
	11/28/2018	12/17/2018 13:00	Elliott D. Healy	12/19/2018 03:23	Allison Taylor	2044356
	11/28/2018	12/27/2018 16:45	Elliott D. Healy	12/28/2018 22:29	Allison Taylor	2044356
EPA 350.1 Rev. 2.0	11/28/2018			12/04/2018 11:30	Ping Hua	2044327
	11/28/2018			12/04/2018 12:24	Ping Hua	2044328
EPA 351.2 Rev. 2.0	11/28/2018	11/30/2018 12:15	Adrian Shelby	12/03/2018 12:14	Joseph Suarez	2044328
	11/28/2018	11/30/2018 12:15	Adrian Shelby	12/04/2018 09:34	Joseph Suarez	2044327
EPA 353.2 Rev. 2.0	11/28/2018			11/30/2018 10:36	Beverly Y. Sanders	2044328
	11/28/2018			12/03/2018 11:46	Lauren Bottorf	2044327
EPA 365.1 Rev. 2.0	11/28/2018	11/29/2018 11:45	Sima Feizi	12/03/2018 14:27	Beverly Y. Sanders	2044327
	11/28/2018	11/30/2018 13:35	Sima Feizi	12/03/2018 15:38	Beverly Y. Sanders	2044328
EPA 365.1 Rev. 2.0 dissolved	11/28/2018			11/28/2018 17:44	Jhamieka S. Greenwood	2044329
	11/28/2018			11/29/2018 17:06	Jhamieka S. Greenwood	2044330
SM 2320 B-97	11/28/2018			12/04/2018 08:17	Dale L. Simmons	2044326
	11/28/2018			12/05/2018 10:10	Dale L. Simmons	2044325
SM 2540 D-97	11/28/2018			11/30/2018 16:02	Yijie Li	2044325, 2044326
SM 4500 F-C-97	11/28/2018			12/04/2018 08:17	Dale L. Simmons	2044326
	11/28/2018			12/05/2018 07:35	Dale L. Simmons	2044325
SM 5310 B-00	11/28/2018			12/03/2018 06:36	Megan Treadwell	2044327
	11/28/2018			12/03/2018 07:13	Megan Treadwell	2044328