Chemical Analysis Report

TLH-ROC-2019-02-11-01

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

Event Description: **Run 2**
Request ID: **RQ-2019-02-04-75**
Customer: **TLH-ROC**
Project ID: **SMP**

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Tallahassee, FL 32399
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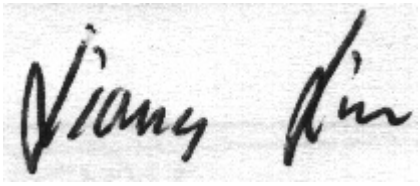
Certified by: Liang Lin, Environmental Administrator

Date Certified: 28-FEB-2019 09:57



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: WACCASASSA RIVER @ OTTER CREEK **Collection Date/Time: 02/11/2019 12:55**

Field ID: G1TLHR0101 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2061583	EPA 180.1 Rev. 2.0	Turbidity	2.3		NTU	P358804	
	EPA 300.0	Bromide	0.051		mg Br/L	P358982	
	SM 2320 B-97	Total Alkalinity	84		mg CaCO3/L	P359115	
	SM 2540 D-97	TSS	6	I	mg/L	P359153	
	SM 4500 F-C-97	Fluoride	0.079	I	mg F/L	P359120	
2061585	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P359056	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.75		mg N/L	P359018	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.12		mg N/L	P358941	
	EPA 365.1 Rev. 2.0	Total-P	0.052		mg P/L	P358859	
	SM 5310 B-00	Organic Carbon	22		mg C/L	P359417	
2061587	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.026		mg P/L	P358814	
2061595	EPA 200.7 Rev. 4.4	Barium	4.8		ug/L	P358715	
		Calcium	36.5		mg/L	P358715	
		Iron	830		ug/L	P358715	
		Magnesium	6.74		mg/L	P358715	
		Manganese	21.0		ug/L	P358715	
		Potassium	0.37	I	mg/L	P358715	
		Sodium	8.6		mg/L	P358715	
		Zinc	5.0	U	ug/L	P358715	
	EPA 200.8 Rev. 5.4	Aluminum	124		ug/L	P358715	
		Antimony	0.050	U	ug/L	P358715	
		Arsenic	0.48		ug/L	P358715	
		Cadmium	0.020	U	ug/L	P358715	
		Chromium	0.71	I	ug/L	P358715	
		Copper	0.40	U	ug/L	P358715	
		Lead	0.20	U	ug/L	P358715	
		Nickel	0.50	U	ug/L	P358715	
		Selenium	0.20	U	ug/L	P358715	
		Silver	0.010	U	ug/L	P358715	
		Thallium	0.10	U	ug/L	P358715	

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: WACCASASSA RIVER @ BOAT RAMP **Collection Date/Time: 02/11/2019 13:10**

Field ID: G1TLHR0032 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2061584	EPA 180.1 Rev. 2.0	Turbidity	1.5		NTU	P358804	
	EPA 300.0	Bromide	0.035	I	mg Br/L	P358982	
	SM 2320 B-97	Total Alkalinity	84		mg CaCO3/L	P359116	
	SM 2540 D-97	TSS	2	I	mg/L	P359153	
	SM 4500 F-C-97	Fluoride	0.078	I	mg F/L	P359121	
2061586	EPA 350.1 Rev. 2.0	Ammonia-N	0.012		mg N/L	P359056	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.78		mg N/L	P359018	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.12		mg N/L	P358941	
	EPA 365.1 Rev. 2.0	Total-P	0.052		mg P/L	P358859	
	SM 5310 B-00	Organic Carbon	22		mg C/L	P359402	
2061588	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.027		mg P/L	P358814	
2061596	EPA 200.7 Rev. 4.4	Barium	5.0		ug/L	P358715	
		Calcium	36.6		mg/L	P358715	
		Iron	740		ug/L	P358715	
		Magnesium	6.44		mg/L	P358715	
		Manganese	23.4		ug/L	P358715	
		Potassium	0.30	U	mg/L	P358715	
		Sodium	6.3		mg/L	P358715	
		Zinc	5.0	U	ug/L	P358715	
	EPA 200.8 Rev. 5.4	Aluminum	89		ug/L	P358715	
		Antimony	0.050	U	ug/L	P358715	
		Arsenic	0.43		ug/L	P358715	
		Cadmium	0.020	U	ug/L	P358715	
		Chromium	0.56	I	ug/L	P358715	
		Copper	0.40	U	ug/L	P358715	
		Lead	0.20	U	ug/L	P358715	
		Nickel	0.50	U	ug/L	P358715	
		Selenium	0.20	U	ug/L	P358715	
		Silver	0.010	U	ug/L	P358715	
		Thallium	0.10	U	ug/L	P358715	

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: P358804

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P358715

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Manganese	1.0	U	ug/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P358715

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0
Batch ID: P358982

Component	Result	Code	Units
Bromide	0.013	U	mg Br/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359056

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P359018

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P358941

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P358859

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P358814

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

Reference Method: SM 2320 B-97
Batch ID: P359115

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

Reference Method: SM 2320 B-97
Batch ID: P359116

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

Reference Method: SM 2540 D-97
Batch ID: P359153

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P359120

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P359121

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P359402

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P359417

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: P358715

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	105		P	85 - 115
Iron	109		P	85 - 115
Magnesium	113		P	85 - 115
Manganese	101		P	85 - 115
Potassium	110		P	85 - 115
Sodium	107		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P358715

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	101		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	105		P	85 - 115
Cadmium	110		P	85 - 115
Chromium	101		P	85 - 115
Copper	101		P	85 - 115
Lead	93.5		P	85 - 115
Nickel	102		P	85 - 115
Selenium	103		P	85 - 115
Silver	103		P	85 - 115
Thallium	103		P	85 - 115

Reference Method: EPA 300.0
Batch ID: P358982

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359056

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P359018

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P358941

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P358859

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: P358814

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

Reference Method: SM 2320 B-97
Batch ID: P359115

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 107

Reference Method: SM 2320 B-97
Batch ID: P359116

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P359120

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.0		P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P359121

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	93.6		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P359402

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.4		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P359417

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P358715

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2061038	Barium	101		P	80 - 120
2061038	Calcium	103		P	80 - 120
2061038	Iron	107		P	80 - 120
2061038	Magnesium	102		P	80 - 120
2061038	Manganese	99.5		P	80 - 120
2061038	Potassium	108		P	80 - 120
2061038	Sodium	108		P	80 - 120
2061038	Zinc	101		P	80 - 120
2061045	Barium	104	102	P/P	80 - 120
2061045	Calcium	102		P	80 - 120
2061045	Iron	108	105	P/P	80 - 120
2061045	Magnesium	111	108	P/P	80 - 120
2061045	Manganese	103	102	P/P	80 - 120
2061045	Potassium	106	102	P/P	80 - 120
2061045	Sodium	107		P	80 - 120
2061045	Zinc	106	104	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P358715

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2061038	Aluminum	99.4		P	80 - 120
2061038	Antimony	102		P	80 - 120
2061038	Arsenic	103		P	80 - 120
2061038	Cadmium	109		P	80 - 120
2061038	Chromium	99.8		P	80 - 120
2061038	Copper	98.0		P	80 - 120
2061038	Lead	98.3		P	80 - 120
2061038	Nickel	98.5		P	80 - 120
2061038	Selenium	101		P	80 - 120
2061038	Silver	104		P	80 - 120
2061038	Thallium	111		P	80 - 120
2061045	Aluminum	102	100	P/P	80 - 120
2061045	Antimony	103	101	P/P	80 - 120
2061045	Arsenic	103	102	P/P	80 - 120
2061045	Cadmium	112	110	P/P	80 - 120
2061045	Chromium	103	100	P/P	80 - 120
2061045	Copper	99.4	97.8	P/P	80 - 120
2061045	Lead	98.4	97.7	P/P	80 - 120
2061045	Nickel	101	98.7	P/P	80 - 120
2061045	Selenium	99.5	98.1	P/P	80 - 120
2061045	Silver	104	103	P/P	80 - 120
2061045	Thallium	110	111	P/P	80 - 120

Reference Method: EPA 300.0
Batch ID: P358982

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2058620	Bromide	96.0		P	90 - 110
2061372	Bromide	96.0		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359056

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2060781	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P359018

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2061585	Kjeldahl Nitrogen	107	99.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P358941

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2061381	NO2NO3-N	97.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P358859

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2061600	Total-P	102	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P358814

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2061677	O-Phosphate-P	95.1	96.1	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P359120

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2061983	Fluoride	97.0	97.0	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P359121

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2061786	Fluoride	92.6	93.1	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P359402

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2062486	Organic Carbon	95.2	94.0	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P359417

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2061196	Organic Carbon	96.3	94.6	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P358804

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061636	Turbidity	4.07	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P358715

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061045	Barium	1.14	Spike	P	0 - 20
2061045	Calcium	2.04	Spike	P	0 - 20
2061045	Iron	2.25	Spike	P	0 - 20
2061045	Magnesium	2.35	Spike	P	0 - 20
2061045	Manganese	1.17	Spike	P	0 - 20
2061045	Potassium	2.85	Spike	P	0 - 20
2061045	Sodium	3.02	Spike	P	0 - 20
2061045	Zinc	1.53	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P358715

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061045	Aluminum	1.49	Spike	P	0 - 20
2061045	Antimony	1.74	Spike	P	0 - 20
2061045	Arsenic	0.756	Spike	P	0 - 20
2061045	Cadmium	2.28	Spike	P	0 - 20
2061045	Chromium	2.89	Spike	P	0 - 20
2061045	Copper	1.60	Spike	P	0 - 20
2061045	Lead	0.739	Spike	P	0 - 20
2061045	Nickel	2.19	Spike	P	0 - 20
2061045	Selenium	1.37	Spike	P	0 - 20
2061045	Silver	1.10	Spike	P	0 - 20
2061045	Thallium	0.462	Spike	P	0 - 20

Reference Method: EPA 300.0
Batch ID: P358982

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2058620	Bromide	0.790	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359056

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2060781	Ammonia-N	0.658	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P359018

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061585	Kjeldahl Nitrogen	4.54	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P358941

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061381	NO2NO3-N	0.243	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P358859

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061600	Total-P	3.34	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P358814

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061677	O-Phosphate-P	0.845	Spike	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P359115

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061983	Total Alkalinity	0.0959	Sample	P	0 - 1.6

Reference Method: SM 2320 B-97
Batch ID: P359116

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061786	Total Alkalinity	0.477	Sample	P	0 - 1.6

Reference Method: SM 4500 F-C-97
Batch ID: P359120

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061983	Fluoride	0.0	Spike	P	0 - 3.5

Reference Method: SM 4500 F-C-97
Batch ID: P359121

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061786	Fluoride	0.474	Spike	P	0 - 3.5

Quality Assurance Report
Precision

Reference Method: SM 5310 B-00
Batch ID: P359402

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2062486	Organic Carbon	0.858	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P359417

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2061196	Organic Carbon	1.32	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A89377
Included Lab Sample IDs: 2061583, 2061584

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	101	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A89380
Included Lab Sample IDs: 2061587, 2061588

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.5	97.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A89387
Included Lab Sample IDs: 2061595, 2061596

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	99.5	99.2	P/P	90 - 110
Calcium	97.8	98.5	P/P	90 - 110
Iron	99.8	99.8	P/P	90 - 110
Magnesium	99.6	99.4	P/P	90 - 110
Manganese	102	101	P/P	90 - 110
Potassium	97.7	98.8	P/P	90 - 110
Sodium	100	99.8	P/P	90 - 110
Zinc	101	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A89405
Included Lab Sample IDs: 2061595, 2061596

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	106	106	P/P	90 - 110
Antimony	105	105	P/P	90 - 110
Arsenic	102	103	P/P	90 - 110
Chromium	105	106	P/P	90 - 110
Copper	106	107	P/P	90 - 110
Lead	102	104	P/P	90 - 110
Nickel	104	105	P/P	90 - 110
Selenium	103	104	P/P	90 - 110
Silver	107	108	P/P	90 - 110
Thallium	104	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A89410
Included Lab Sample IDs: 2061585

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A89420
Included Lab Sample IDs: 2061586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A89420
Included Lab Sample IDs: 2061586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A89422
Included Lab Sample IDs: 2061585, 2061586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	99.5	P/P	90 - 110

Reference Method: EPA 300.0
Run ID: A89435
Included Lab Sample IDs: 2061583, 2061584

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Bromide	102	100	P/P	90 - 110
Bromide	99.0	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A89467
Included Lab Sample IDs: 2061585, 2061586

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A89470
Included Lab Sample IDs: 2061595, 2061596

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	100	95.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A89481
Included Lab Sample IDs: 2061585, 2061586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.7	103	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A89490
Included Lab Sample IDs: 2061583, 2061584

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	99.3	P/P	90 - 110
Total Alkalinity	99.3	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A89490
Included Lab Sample IDs: 2061583, 2061584

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: SM 4500 F-C-97
Run ID: A89490
Included Lab Sample IDs: 2061583, 2061584

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	95.8	94.8	P/P	90 - 110
Fluoride	97.6	95.8	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A89596
Included Lab Sample IDs: 2061586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	93.4	96.2	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A89603
Included Lab Sample IDs: 2061585

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	93.7	94.8	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						4.07	
EPA 200.7 Rev. 4.4	Barium	102	101	104	102			1.14
	Calcium	105	103	102				2.04
	Iron	109	107	108	105			2.25
	Magnesium	113	102	111	108			2.35
	Manganese	101	99.5	103	102			1.17
	Potassium	110	108	106	102			2.85
	Sodium	107	108	107				3.02
	Zinc	101	101	106	104			1.53
EPA 200.8 Rev. 5.4	Aluminum	101	99.4	102	100			1.49
	Antimony	100	102	103	101			1.74
	Arsenic	105	103	103	102			0.756
	Cadmium	110	109	112	110			2.28
	Chromium	101	99.8	103	100			2.89
	Copper	101	98.0	99.4	97.8			1.60
	Lead	93.5	98.3	98.4	97.7			0.739
	Nickel	102	98.5	101	98.7			2.19
	Selenium	103	101	99.5	98.1			1.37
	Silver	103	104	104	103			1.10
	Thallium	103	111	110	111			0.462
EPA 300.0	Bromide	100	96.0	96.0			0.790	
EPA 350.1 Rev. 2.0	Ammonia-N	100	101	102				0.658
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	99.6	107				4.54
EPA 353.2 Rev. 2.0	NO2NO3-N	100	97.0					0.243
EPA 365.1 Rev. 2.0	Total-P	102	102	106				3.34
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.5	95.1	96.1				0.845
SM 2320 B-97	Total Alkalinity	102					0.0959	
	Total Alkalinity	102					0.477	
SM 4500 F-C-97	Fluoride	94.0	97.0	97.0				0.0
	Fluoride	93.6	92.6	93.1				0.474
SM 5310 B-00	Organic Carbon	98.4	95.2	94.0				0.858
	Organic Carbon	95.8	96.3	94.6				1.32

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2061583, 2061584
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2061595, 2061596
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2061595, 2061596
EPA 300.0 / E31780	Bromide in aqueous matrices	2061583, 2061584
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2061585, 2061586
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2061585, 2061586
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2061585, 2061586
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2061585, 2061586
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2061587, 2061588
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2061583, 2061584
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2061583, 2061584

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2061583, 2061584
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2061585, 2061586

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	02/11/2019			02/12/2019 16:03	Adrian Shelby	2061583, 2061584
EPA 200.7 Rev. 4.4	02/11/2019	02/11/2019 16:45	Elliott D. Healy	02/12/2019 18:49	Martin Acosta	2061595
	02/11/2019	02/11/2019 16:45	Elliott D. Healy	02/12/2019 18:54	Martin Acosta	2061596
EPA 200.8 Rev. 5.4	02/11/2019	02/11/2019 16:45	Elliott D. Healy	02/13/2019 23:45	Robert K Palmer	2061595
	02/11/2019	02/11/2019 16:45	Elliott D. Healy	02/13/2019 23:55	Robert K Palmer	2061596
	02/11/2019	02/11/2019 16:45	Elliott D. Healy	02/15/2019 19:24	Robert K Palmer	2061595
	02/11/2019	02/11/2019 16:45	Elliott D. Healy	02/15/2019 19:31	Robert K Palmer	2061596
EPA 300.0	02/11/2019			02/14/2019 20:28	Lipi Saha	2061583
	02/11/2019			02/14/2019 21:19	Lipi Saha	2061584
EPA 350.1 Rev. 2.0	02/11/2019			02/15/2019 12:07	Ping Hua	2061585
	02/11/2019			02/15/2019 12:09	Ping Hua	2061586
EPA 351.2 Rev. 2.0	02/11/2019	02/15/2019 12:45	Adrian Shelby	02/18/2019 12:12	Joseph Suarez	2061585
	02/11/2019	02/15/2019 12:45	Adrian Shelby	02/18/2019 12:17	Joseph Suarez	2061586
EPA 353.2 Rev. 2.0	02/11/2019			02/14/2019 12:06	Beverly Y. Sanders	2061585
	02/11/2019			02/14/2019 12:07	Beverly Y. Sanders	2061586
EPA 365.1 Rev. 2.0	02/11/2019	02/13/2019 12:40	Sima Feizi	02/13/2019 19:02	Rosalyn Ballman	2061585
	02/11/2019	02/13/2019 12:40	Sima Feizi	02/14/2019 13:02	Rosalyn Ballman	2061586
EPA 365.1 Rev. 2.0 dissolved	02/11/2019			02/12/2019 16:03	Jhamieka S. Greenwood	2061587
	02/11/2019			02/12/2019 16:04	Jhamieka S. Greenwood	2061588
SM 2320 B-97	02/11/2019			02/16/2019 12:28	Dale L. Simmons	2061583
	02/11/2019			02/16/2019 15:16	Dale L. Simmons	2061584
SM 2540 D-97	02/11/2019			02/13/2019 15:22	Yijie Li	2061583, 2061584
SM 4500 F-C-97	02/11/2019			02/16/2019 12:28	Dale L. Simmons	2061583
	02/11/2019			02/16/2019 15:16	Dale L. Simmons	2061584
SM 5310 B-00	02/11/2019			02/21/2019 01:13	Julia Storbeck	2061586
	02/11/2019			02/24/2019 10:40	Julia Storbeck	2061585