Chemical Analysis Report

TLH-ROC-2019-05-01-01

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

Event Description: **Run 6**
Request ID: **RQ-2019-01-21-09**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
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2600 Blair Stone Rd
Tallahassee, FL 32399
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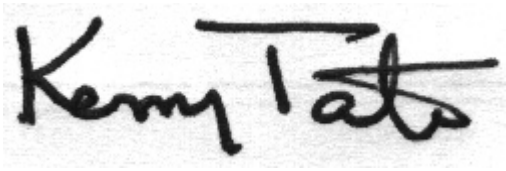
Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 20-MAY-2019 11:37



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: Wards Creek @ CR259 **Collection Date/Time: 05/01/2019 11:35**

Field ID: G1TLHR0103 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2082251	EPA 180.1 Rev. 2.0	Turbidity	19	A	NTU	P363183	
	EPA 300.0 Rev. 2.1	Chloride	6.3		mg Cl/L	P363438	
		Sulfate	0.35	I	mg SO4/L	P363440	
	SM 2120 B	Color (true)	64		PCU	P363223	
	SM 2320 B-97	Total Alkalinity	20		mg CaCO3/L	P363868	
	SM 2540 C-97	TDS	72		mg/L	P363820	
	SM 2540 D-97	TSS	12		mg/L	P363831	
	SM 4500 F-C-97	Fluoride	0.076	I	mg F/L	P363761	
2082252	EPA 350.1 Rev. 2.0	Ammonia-N	0.26		mg N/L	P363627	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P363401	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.054		mg N/L	P363308	
	EPA 365.1 Rev. 2.0	Total-P	0.24		mg P/L	P363348	
	SM 5310 B-00	Organic Carbon	9.8		mg C/L	P363352	
2082253	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.12		mg P/L	P363195	
2082256	EPA 200.7 Rev. 4.4	Barium	31.2		ug/L	P363273	
		Calcium	5.59		mg/L	P363273	
		Iron	1.32E+03		ug/L	P363273	
		Magnesium	2.64		mg/L	P363273	
		Potassium	1.0	I	mg/L	P363273	
		Sodium	4.0		mg/L	P363273	
		Zinc	7.9	I	ug/L	P363273	
	EPA 200.8 Rev. 5.4	Aluminum	806		ug/L	P363273	
		Antimony	0.050	U	ug/L	P363273	
		Arsenic	0.60		ug/L	P363273	
		Boron**	13.3		ug/L	P363273	
		Cadmium	0.020	U	ug/L	P363273	
		Chromium	1.4	I	ug/L	P363273	
		Copper	0.95		ug/L	P363273	
		Lead	0.73		ug/L	P363945	
		Nickel	0.69	I	ug/L	P363273	
		Selenium	0.20	U	ug/L	P363273	
		Silver	0.010	U	ug/L	P363273	
		Thallium	0.10	U	ug/L	P363273	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: The lead result was confirmed on 05/06/2019.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P363183

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P363273

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P363273

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
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 200.8 Rev. 5.4
Batch ID: P363945

Component	Result	Code	Units
Lead	0.20	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363438

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363440

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363627

Component	Result	Code	Units

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363627

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363401

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P363308

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P363348

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P363195

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

Reference Method: SM 2120 B
Batch ID: P363223

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P363868

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

Reference Method: SM 2540 C-97
Batch ID: P363820

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P363831

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P363761

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P363352

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: P363273

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	103		P	85 - 115
Iron	105		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	102		P	85 - 115
Sodium	99.1		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P363273

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	104		P	85 - 115
Boron	101		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	101		P	85 - 115
Copper	101		P	85 - 115
Nickel	102		P	85 - 115
Selenium	102		P	85 - 115
Silver	104		P	85 - 115
Thallium	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P363945

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Lead	98.6		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363438

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: P363440

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363627

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363401

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363401

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P363308

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: P363348

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: P363195

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

Reference Method: SM 2120 B
Batch ID: P363223

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.5		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P363868

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P363761

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.5		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P363352

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P363273

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2081851	Barium	100	99.8	P/P	80 - 120
2081851	Calcium	101		P	80 - 120
2081851	Iron	106	104	P/P	80 - 120
2081851	Magnesium	101		P	80 - 120
2081851	Potassium	103	99.8	P/P	80 - 120
2081851	Sodium	100		P	80 - 120
2081851	Zinc	98.0	97.5	P/P	80 - 120
2081896	Barium	102		P	80 - 120
2081896	Calcium	99.5		P	80 - 120
2081896	Iron	103		P	80 - 120
2081896	Magnesium	102		P	80 - 120
2081896	Potassium	103		P	80 - 120
2081896	Sodium	105		P	80 - 120
2081896	Zinc	100		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P363273

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2081851	Aluminum	99.7	102	P/P	80 - 120
2081851	Antimony	102	104	P/P	80 - 120
2081851	Arsenic	102	104	P/P	80 - 120
2081851	Boron	103	104	P/P	80 - 120
2081851	Cadmium	104	108	P/P	80 - 120
2081851	Chromium	98.8	100	P/P	80 - 120
2081851	Copper	95.8	97.2	P/P	80 - 120
2081851	Nickel	95.8	97.2	P/P	80 - 120
2081851	Selenium	101	102	P/P	80 - 120
2081851	Silver	103	105	P/P	80 - 120
2081851	Thallium	104	107	P/P	80 - 120
2081896	Aluminum	96.1		P	80 - 120
2081896	Antimony	102		P	80 - 120
2081896	Arsenic	103		P	80 - 120
2081896	Boron	106		P	80 - 120
2081896	Cadmium	104		P	80 - 120
2081896	Chromium	101		P	80 - 120
2081896	Copper	99.8		P	80 - 120
2081896	Nickel	101		P	80 - 120
2081896	Selenium	101		P	80 - 120
2081896	Silver	104		P	80 - 120
2081896	Thallium	108		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P363945

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2082386	Lead	96.9	97.6	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363438

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363438

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2082046	Chloride	96.6		P	90 - 110
2082117	Chloride	99.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363440

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2082046	Sulfate	97.8		P	90 - 110
2082117	Sulfate	99.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363627

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2081828	Ammonia-N	102	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363401

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2082105	Kjeldahl Nitrogen	101	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P363308

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2082105	NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P363348

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2082143	Total-P	101	96.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P363195

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2082123	O-Phosphate-P	97.8	98.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P363761

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2082695	Fluoride	98.3	98.3	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P363352

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2082003	Organic Carbon	95.6	97.0	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P363183

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082251	Turbidity	4.85	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P363273

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2081851	Barium	0.533	Spike	P	0 - 20
2081851	Calcium	0.875	Spike	P	0 - 20
2081851	Iron	1.82	Spike	P	0 - 20
2081851	Magnesium	2.13	Spike	P	0 - 20
2081851	Potassium	2.22	Spike	P	0 - 20
2081851	Sodium	1.32	Spike	P	0 - 20
2081851	Zinc	0.486	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P363273

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2081851	Aluminum	1.85	Spike	P	0 - 20
2081851	Antimony	2.33	Spike	P	0 - 20
2081851	Arsenic	1.90	Spike	P	0 - 20
2081851	Boron	1.56	Spike	P	0 - 20
2081851	Cadmium	3.56	Spike	P	0 - 20
2081851	Chromium	1.43	Spike	P	0 - 20
2081851	Copper	1.37	Spike	P	0 - 20
2081851	Nickel	1.42	Spike	P	0 - 20
2081851	Selenium	1.20	Spike	P	0 - 20
2081851	Silver	1.59	Spike	P	0 - 20
2081851	Thallium	2.80	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P363945

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082386	Lead	0.765	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363438

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082046	Chloride	0.375	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363440

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363440

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082046	Sulfate	0.537	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363627

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2081828	Ammonia-N	1.05	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363401

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082105	Kjeldahl Nitrogen	0.185	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P363308

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082105	NO2NO3-N	0.440	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P363348

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082143	Total-P	2.36	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P363195

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082123	O-Phosphate-P	0.713	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P363223

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082165	Color (true)	5.24	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P363868

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082695	Total Alkalinity	0.0473	Sample	P	0 - 2.8

Quality Assurance Report
Precision

Reference Method: SM 2540 C-97
Batch ID: P363820

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082104	TDS	2.60	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P363761

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082695	Fluoride	0.0	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P363352

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2082003	Organic Carbon	0.923	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: A91137
Included Lab Sample IDs: 2082251

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	100	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A91138
Included Lab Sample IDs: 2082253

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.4	97.7	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A91149
Included Lab Sample IDs: 2082251

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	103	100	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A91184
Included Lab Sample IDs: 2082252

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A91202
Included Lab Sample IDs: 2082256

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	100	101	P/P	90 - 110
Calcium	100	102	P/P	90 - 110
Iron	102	102	P/P	90 - 110
Magnesium	102	102	P/P	90 - 110
Potassium	101	101	P/P	90 - 110
Sodium	99.6	102	P/P	90 - 110
Zinc	100	101	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A91203
Included Lab Sample IDs: 2082252

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.8	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A91222
Included Lab Sample IDs: 2082252

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A91227
Included Lab Sample IDs: 2082256

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	103	101	P/P	90 - 110
Antimony	98.4	95.9	P/P	90 - 110
Arsenic	99.8	99.7	P/P	90 - 110
Boron	107	105	P/P	90 - 110
Cadmium	101	99.6	P/P	90 - 110
Chromium	99.7	100	P/P	90 - 110
Copper	98.6	100	P/P	90 - 110
Nickel	97.7	98.4	P/P	90 - 110
Selenium	99.4	99.5	P/P	90 - 110
Silver	102	100	P/P	90 - 110
Thallium	97.5	96.9	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A91228
Included Lab Sample IDs: 2082251

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A91280
Included Lab Sample IDs: 2082252

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	108	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A91300
Included Lab Sample IDs: 2082252

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

Reference Method: SM 4500 F-C-97
Run ID: A91346
Included Lab Sample IDs: 2082251

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.1	99.5	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A91397
Included Lab Sample IDs: 2082251

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	99.1	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A91463
Included Lab Sample IDs: 2082256

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	96.6	95.1	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						4.85	
EPA 200.7 Rev. 4.4	Barium	102	100	99.8	102			0.533
	Calcium	103	101	99.5				0.875
	Iron	105	106	104	103			1.82
	Magnesium	102	101	102				2.13
	Potassium	102	103	99.8	103			2.22
	Sodium	99.1	100	105				1.32
	Zinc	101	98.0	97.5	100			0.486
EPA 200.8 Rev. 5.4	Aluminum	102	99.7	102	96.1			1.85
	Antimony	101	102	104	102			2.33
	Arsenic	104	102	104	103			1.90
	Boron	101	103	104	106			1.56
	Cadmium	103	104	108	104			3.56
	Chromium	101	98.8	100	101			1.43
	Copper	101	95.8	97.2	99.8			1.37
	Lead	98.6	96.9	97.6				0.765
	Nickel	102	95.8	97.2	101			1.42
	Selenium	102	101	102	101			1.20
	Silver	104	103	105	104			1.59
	Thallium	104	104	107	108			2.80
EPA 300.0 Rev. 2.1	Chloride	98.4	96.6	99.3			0.375	
	Sulfate	99.2	97.8	99.5			0.537	
EPA 350.1 Rev. 2.0	Ammonia-N	101	102	100				1.05
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	109	101	101				0.185
EPA 353.2 Rev. 2.0	NO2NO3-N	102	101	100				0.440
EPA 365.1 Rev. 2.0	Total-P	104	101	96.5				2.36
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.6	97.8	98.5				0.713
SM 2120 B	Color (true)	99.5					5.24	
SM 2320 B-97	Total Alkalinity	102					0.0473	
SM 2540 C-97	TDS						2.60	
SM 4500 F-C-97	Fluoride	97.5	98.3	98.3				0.0
SM 5310 B-00	Organic Carbon	98.4	95.6	97.0				0.923

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2082251
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2082256
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2082256
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2082251
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2082251
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2082252
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2082252
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2082252
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2082252

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2082253
SM 2120 B / E31780	True Color measured at 450 nm	2082251
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2082251
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2082251
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2082251
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2082251
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2082252

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	05/01/2019			05/01/2019 16:13	Adrian Shelby	2082251
EPA 200.7 Rev. 4.4	05/01/2019	05/02/2019 17:00	Elliott D. Healy	05/03/2019 15:40	Betina Topolski	2082256
EPA 200.8 Rev. 5.4	05/01/2019	05/02/2019 17:00	Elliott D. Healy	05/06/2019 21:00	Robert K Palmer	2082256
	05/01/2019	05/14/2019 18:00	Elliott D. Healy	05/15/2019 20:01	Martin Acosta	2082256
EPA 300.0 Rev. 2.1	05/01/2019			05/07/2019 00:04	Lipi Saha	2082251
EPA 350.1 Rev. 2.0	05/01/2019			05/07/2019 14:26	Ping Hua	2082252
EPA 351.2 Rev. 2.0	05/01/2019	05/06/2019 12:50	Jhamieka S. Greenwood	05/08/2019 11:10	Joseph Suarez	2082252
EPA 353.2 Rev. 2.0	05/01/2019			05/03/2019 11:18	Beverly Y. Sanders	2082252
EPA 365.1 Rev. 2.0	05/01/2019	05/03/2019 12:30	Sima Feizi	05/06/2019 13:57	Beverly Y. Sanders	2082252
EPA 365.1 Rev. 2.0 dissolved	05/01/2019			05/01/2019 16:31	Jhamieka S. Greenwood	2082253
SM 2120 B	05/01/2019			05/01/2019 17:41	Mariam Hanna	2082251
SM 2320 B-97	05/01/2019			05/13/2019 22:37	Dale L. Simmons	2082251
SM 2540 C-97	05/01/2019			05/03/2019 15:19	Yijie Li	2082251
SM 2540 D-97	05/01/2019			05/03/2019 15:19	Yijie Li	2082251
SM 4500 F-C-97	05/01/2019			05/09/2019 10:12	Dale L. Simmons	2082251
SM 5310 B-00	05/01/2019			05/03/2019 19:49	Lauren Lees	2082252