Chemical Analysis Report

CEN-DIST-2019-05-07-01

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

Event Description: **Lk Washington + LVI**
Request ID: **RQ-2019-05-06-50**
Customer: **CEN-DIST**
Project ID: **SMP**

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Certified by: Colin Wright, Program Administrator

Date Certified: 21-MAY-2019 16:20

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: Lake Pearl @ Center **Collection Date/Time: 05/06/2019 12:35**

Field ID: G2CE0192 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2083713	EPA 180.1 Rev. 2.0	Turbidity	3.2		NTU	P363539	
	EPA 300.0 Rev. 2.1	Chloride	23		mg Cl/L	P363822	
		Sulfate	7.9		mg SO4/L	P363824	
	SM 2120 B	Color (true)	40	A	PCU	P363560	
	SM 2320 B-97	Total Alkalinity	18		mg CaCO3/L	P363808	
	SM 2540 C-97	TDS	87		mg/L	P363789	
	SM 2540 D-97	TSS	6	I	mg/L	P363695	
	SM 4500 F-C-97	Fluoride	0.076	I	mg F/L	P363970	
2083714	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P363780	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.90		mg N/L	P363766	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P363677	
	EPA 365.1 Rev. 2.0	Total-P	0.029		mg P/L	P363663	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P363992	
2083715	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P363530	
2083757	EPA 200.7 Rev. 4.4	Barium	9.1		ug/L	P363686	
		Calcium	10.6		mg/L	P363686	
		Iron	91	I	ug/L	P363686	
		Magnesium	2.49		mg/L	P363686	
		Potassium	2.1		mg/L	P363686	
		Sodium	13.2		mg/L	P363686	
		Zinc	5.0	U	ug/L	P363686	
	EPA 200.8 Rev. 5.4	Aluminum	31		ug/L	P363686	
		Antimony	0.16	I	ug/L	P363686	
		Arsenic	2.20		ug/L	P363686	
		Boron**	33.4		ug/L	P363686	
		Cadmium	0.020	U	ug/L	P363686	
		Chromium	0.40	U	ug/L	P363686	
		Copper	0.96		ug/L	P363686	
		Lead	0.20	U	ug/L	P363686	
		Nickel	0.50	U	ug/L	P363686	
		Selenium	0.20	U	ug/L	P363686	
		Silver	0.010	U	ug/L	P363686	
		Thallium	0.10	U	ug/L	P363686	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P363539

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P363686

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: P363686

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
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 Rev. 2.1
Batch ID: P363822

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363824

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363780

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363766

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P363677

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P363663

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P363530

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

Reference Method: SM 2120 B
Batch ID: P363560

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P363808

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

Reference Method: SM 2540 C-97
Batch ID: P363789

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P363695

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P363970

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P363992

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: P363686

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.5		P	85 - 115
Calcium	99.3		P	85 - 115
Iron	100		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	99.4		P	85 - 115
Sodium	101		P	85 - 115
Zinc	98.2		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P363686

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.0		P	85 - 115
Antimony	98.2		P	85 - 115
Arsenic	102		P	85 - 115
Boron	97.5		P	85 - 115
Cadmium	100		P	85 - 115
Chromium	99.3		P	85 - 115
Copper	99.6		P	85 - 115
Lead	100		P	85 - 115
Nickel	99.9		P	85 - 115
Selenium	101		P	85 - 115
Silver	98.4		P	85 - 115
Thallium	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363822

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363824

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363780

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363766

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P363677

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P363663

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P363530

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

Reference Method: SM 2120 B
Batch ID: P363560

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

Reference Method: SM 2320 B-97
Batch ID: P363808

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P363970

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.1		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P363992

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	88.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P363686

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2083973	Barium	99.0		P	80 - 120
2083973	Calcium	100		P	80 - 120
2083973	Iron	99.5		P	80 - 120
2083973	Magnesium	105		P	80 - 120
2083973	Potassium	97.1		P	80 - 120
2083973	Sodium	102		P	80 - 120
2083973	Zinc	99.6		P	80 - 120
2084515	Barium	98.1	99.9	P/P	80 - 120
2084515	Calcium	100		P	80 - 120
2084515	Iron	101	103	P/P	80 - 120
2084515	Magnesium	101	105	P/P	80 - 120
2084515	Potassium	96.7		P	80 - 120
2084515	Sodium	101		P	80 - 120
2084515	Zinc	102	105	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P363686

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2083973	Aluminum	94.1		P	80 - 120
2083973	Antimony	97.4		P	80 - 120
2083973	Arsenic	99.9		P	80 - 120
2083973	Boron	95.7		P	80 - 120
2083973	Cadmium	98.2		P	80 - 120
2083973	Chromium	99.4		P	80 - 120
2083973	Copper	97.6		P	80 - 120
2083973	Lead	100		P	80 - 120
2083973	Nickel	98.6		P	80 - 120
2083973	Selenium	99.6		P	80 - 120
2083973	Silver	96.8		P	80 - 120
2083973	Thallium	103		P	80 - 120
2084515	Aluminum	93.9	93.5	P/P	80 - 120
2084515	Antimony	98.3	97.1	P/P	80 - 120
2084515	Arsenic	102	99.6	P/P	80 - 120
2084515	Boron	93.8	92.4	P/P	80 - 120
2084515	Cadmium	98.9	98.9	P/P	80 - 120
2084515	Chromium	97.1	96.7	P/P	80 - 120
2084515	Copper	98.2	96.3	P/P	80 - 120
2084515	Lead	99.7	99.1	P/P	80 - 120
2084515	Nickel	98.7	98.1	P/P	80 - 120
2084515	Selenium	99.6	97.1	P/P	80 - 120
2084515	Silver	96.5	94.0	P/P	80 - 120
2084515	Thallium	103	102	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363822

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2083564	Chloride	98.0		P	90 - 110
2084024	Chloride	98.4		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363824

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2083564	Sulfate	97.4		P	90 - 110
2084024	Sulfate	98.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363780

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2083714	Ammonia-N	102	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363766

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2083791	Kjeldahl Nitrogen	109	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P363677

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2083565	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P363663

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2083612	Total-P	96.7	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P363530

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2083715	O-Phosphate-P	96.4	97.6	P/P	90 - 110

Reference Method: SM 5310 B-00
Batch ID: P363992

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2084028	Organic Carbon	90.5	90.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P363539

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083611	Turbidity	2.47	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P363686

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2084515	Barium	1.84	Spike	P	0 - 20
2084515	Calcium	1.03	Spike	P	0 - 20
2084515	Iron	2.61	Spike	P	0 - 20
2084515	Magnesium	2.41	Spike	P	0 - 20
2084515	Potassium	1.42	Spike	P	0 - 20
2084515	Sodium	2.01	Spike	P	0 - 20
2084515	Zinc	2.09	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P363686

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2084515	Aluminum	0.390	Spike	P	0 - 20
2084515	Antimony	1.29	Spike	P	0 - 20
2084515	Arsenic	2.05	Spike	P	0 - 20
2084515	Boron	0.952	Spike	P	0 - 20
2084515	Cadmium	0.0298	Spike	P	0 - 20
2084515	Chromium	0.420	Spike	P	0 - 20
2084515	Copper	1.96	Spike	P	0 - 20
2084515	Lead	0.674	Spike	P	0 - 20
2084515	Nickel	0.644	Spike	P	0 - 20
2084515	Selenium	2.46	Spike	P	0 - 20
2084515	Silver	2.62	Spike	P	0 - 20
2084515	Thallium	0.673	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363822

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083564	Chloride	1.02	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P363824

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083564	Sulfate	1.32	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363780

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083714	Ammonia-N	0.363	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363766

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083791	Kjeldahl Nitrogen	3.02	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P363677

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083565	NO2NO3-N	0.396	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P363663

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083612	Total-P	1.43	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P363530

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083715	O-Phosphate-P	1.24	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P363560

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083713	Color (true)	0.686	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P363808

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083606	Total Alkalinity	0.0673	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P363789

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083606	TDS	0.866	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P363970

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2083606	Fluoride	1.91	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P363992

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2084028	Organic Carbon	0.319	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 300.0 Rev. 2.1
Run ID: A91228
Included Lab Sample IDs: 2083713

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.7	100	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A91257
Included Lab Sample IDs: 2083715

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.3	99.5	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A91261
Included Lab Sample IDs: 2083713

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

Reference Method: SM 2120 B
Run ID: A91271
Included Lab Sample IDs: 2083713

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	101	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A91321
Included Lab Sample IDs: 2083714

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A91350
Included Lab Sample IDs: 2083714

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A91366
Included Lab Sample IDs: 2083757

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	101	P/P	95 - 105
Calcium	101	102	P/P	95 - 105
Iron	100	101	P/P	95 - 105
Magnesium	101	101	P/P	95 - 105
Potassium	100	102	P/P	95 - 105
Sodium	101	106	P/P	95 - 105
Zinc	102	101	P/P	95 - 105

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A91372
Included Lab Sample IDs: 2083713

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A91399
Included Lab Sample IDs: 2083757

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	94.0	93.2	P/P	90 - 110
Antimony	95.6	94.8	P/P	90 - 110
Arsenic	98.5	96.5	P/P	90 - 110
Boron	93.4	95.4	P/P	90 - 110
Cadmium	95.6	95.4	P/P	90 - 110
Chromium	95.4	96.0	P/P	90 - 110
Copper	98.3	95.9	P/P	90 - 110
Lead	98.3	97.4	P/P	90 - 110
Nickel	99.0	95.7	P/P	90 - 110
Selenium	98.7	96.2	P/P	90 - 110
Silver	94.3	93.4	P/P	90 - 110
Thallium	95.3	95.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A91410
Included Lab Sample IDs: 2083714

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A91419
Included Lab Sample IDs: 2083714

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.5	99.0	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A91436
Included Lab Sample IDs: 2083713

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	97.6	100	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A91449
Included Lab Sample IDs: 2083714

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	92.1	91.4	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						2.47	
EPA 200.7 Rev. 4.4	Barium	99.5	99.0	98.1	99.9			1.84
	Calcium	99.3	100	100				1.03
	Iron	100	99.5	101	103			2.61
	Magnesium	107	105	101	105			2.41
	Potassium	99.4	97.1	96.7				1.42
	Sodium	101	102	101				2.01
	Zinc	98.2	99.6	102	105			2.09
EPA 200.8 Rev. 5.4	Aluminum	96.0	94.1	93.9	93.5			0.390
	Antimony	98.2	97.4	98.3	97.1			1.29
	Arsenic	102	99.9	102	99.6			2.05
	Boron	97.5	95.7	93.8	92.4			0.952
	Cadmium	100	98.2	98.9	98.9			0.0298
	Chromium	99.3	99.4	97.1	96.7			0.420
	Copper	99.6	97.6	98.2	96.3			1.96
	Lead	100	100	99.7	99.1			0.674
	Nickel	99.9	98.6	98.7	98.1			0.644
	Selenium	101	99.6	99.6	97.1			2.46
	Silver	98.4	96.8	96.5	94.0			2.62
	Thallium	103	103	103	102			0.673
EPA 300.0 Rev. 2.1	Chloride	97.7	98.0	98.4			1.02	
	Sulfate	98.2	97.4	98.2			1.32	
EPA 350.1 Rev. 2.0	Ammonia-N	103	102	102				0.363
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	109	105				3.02
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	100	100				0.396
EPA 365.1 Rev. 2.0	Total-P	101	96.7	99.0				1.43
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.6	96.4	97.6				1.24
SM 2120 B	Color (true)	102					0.686	
SM 2320 B-97	Total Alkalinity	103					0.0673	
SM 2540 C-97	TDS						0.866	
SM 4500 F-C-97	Fluoride	97.1						1.91
SM 5310 B-00	Organic Carbon	88.8	90.5	90.9				0.319

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2083713
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2083757
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2083757
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2083713
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2083713
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2083714
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2083714
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2083714
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2083714

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	2083715
SM 2120 B / E31780	True Color measured at 450 nm	2083713
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2083713
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2083713
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2083713
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2083713
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2083714

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	05/07/2019			05/07/2019 16:30	Adrian Shelby	2083713
EPA 200.7 Rev. 4.4	05/07/2019	05/09/2019 14:50	Elliott D. Healy	05/10/2019 15:13	Betina Topolski	2083757
EPA 200.8 Rev. 5.4	05/07/2019	05/09/2019 14:50	Elliott D. Healy	05/13/2019 18:33	Martin Acosta	2083757
EPA 300.0 Rev. 2.1	05/07/2019			05/10/2019 17:51	Lipi Saha	2083713
EPA 350.1 Rev. 2.0	05/07/2019			05/09/2019 12:58	Ping Hua	2083714
EPA 351.2 Rev. 2.0	05/07/2019	05/10/2019 12:20	Adrian Shelby	05/14/2019 10:15	Joseph Suarez	2083714
EPA 353.2 Rev. 2.0	05/07/2019			05/09/2019 10:27	Beverly Y. Sanders	2083714
EPA 365.1 Rev. 2.0	05/07/2019	05/09/2019 13:20	Joseph Suarez	05/14/2019 12:03	Rosalyn Ballman	2083714
EPA 365.1 Rev. 2.0 dissolved	05/07/2019			05/07/2019 14:50	Jhamieka S. Greenwood	2083715
SM 2120 B	05/07/2019			05/07/2019 15:16	Mariam Hanna	2083713
SM 2320 B-97	05/07/2019			05/11/2019 22:10	Dale L. Simmons	2083713
SM 2540 C-97	05/07/2019			05/08/2019 16:15	Mariam Hanna	2083713
SM 2540 D-97	05/07/2019			05/08/2019 17:47	Mariam Hanna	2083713
SM 4500 F-C-97	05/07/2019			05/15/2019 06:17	Dale L. Simmons	2083713
SM 5310 B-00	05/07/2019			05/14/2019 08:03	Julia Storbeck	2083714