

Chemical Analysis Report

CEN-DIST-2019-04-12-01

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

Event Description: **Long Branch**
Request ID: **RQ-2019-04-08-39**
Customer: **CEN-DIST**
Project ID: **BMAP**

Send Reports to:
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Certified by: Colin Wright, Program Administrator

Date Certified: 29-APR-2019 11:27

A handwritten signature in black ink, appearing to read "Colin Wright", is shown 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 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: Long Branch @ 0.7 mi DS of CR 13

Collection Date/Time: 04/11/2019 12:05

Field ID: G2CE0036

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2077733	EPA 180.1 Rev. 2.0	Turbidity	1.8		NTU	P362073	
	EPA 300.0 Rev. 2.1	Chloride	31		mg Cl/L	P362381	
		Sulfate	22		mg SO4/L	P362383	
	SM 2120 B	Color (true)	84		PCU	P362064	
	SM 2320 B-97	Total Alkalinity	82		mg CaCO3/L	P362572	
	SM 2540 C-97	TDS	217	A	mg/L	P362663	
	SM 2540 D-97	TSS	3	IA	mg/L	P362654	
	SM 4500 F-C-97	Fluoride	0.094	I	mg F/L	P362577	
2077734	EPA 350.1 Rev. 2.0	Ammonia-N	0.023		mg N/L	P362565	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.55		mg N/L	P362582	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.13		mg N/L	P362495	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P362430	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P362314	
2077735	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.12		mg P/L	P362056	
2077739	EPA 200.7 Rev. 4.4	Barium	25.4		ug/L	P362242	
		Calcium	43.2		mg/L	P362242	
		Iron	510		ug/L	P362242	
		Magnesium	2.63		mg/L	P362242	
		Potassium	1.7		mg/L	P362242	
		Sodium	17.9		mg/L	P362242	
		Zinc	5.0	U	ug/L	P362242	
	EPA 200.8 Rev. 5.4	Aluminum	72		ug/L	P362242	
		Antimony	0.10	I	ug/L	P362242	
		Arsenic	0.69		ug/L	P362242	
		Boron**	34.4		ug/L	P362242	
		Cadmium	0.020	U	ug/L	P362242	
		Chromium	0.55	I	ug/L	P362242	
		Copper	0.47	I	ug/L	P362242	
		Lead	0.22	I	ug/L	P362242	
		Nickel	0.50	U	ug/L	P362242	
		Selenium	0.20	U	ug/L	P362242	
		Silver	0.010	U	ug/L	P362242	
		Thallium	0.10	U	ug/L	P362242	

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: P362073

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362242

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: P362242

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: P362381

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362383

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362565

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: P362582

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362495

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362430

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P362056

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

Reference Method: SM 2120 B
Batch ID: P362064

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P362572

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

Reference Method: SM 2540 C-97
Batch ID: P362663

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P362654

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P362577

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: P362314

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: P362242

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	101		P	85 - 115
Calcium	102		P	85 - 115
Iron	106		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	100		P	85 - 115
Sodium	98.4		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P362242

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.7		P	85 - 115
Antimony	97.3		P	85 - 115
Arsenic	104		P	85 - 115
Boron	98.5		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	95.1		P	85 - 115
Copper	103		P	85 - 115
Lead	106		P	85 - 115
Nickel	102		P	85 - 115
Selenium	102		P	85 - 115
Silver	107		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362381

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362383

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362565

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: P362582

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362495

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: P362430

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P362056

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.7		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P362064

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.9		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P362572

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.7		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P362577

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.3		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P362314

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.9		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362242

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077739	Barium	98.7	101	P/P	80 - 120
2077739	Calcium	100		P	80 - 120
2077739	Iron	105	108	P/P	80 - 120
2077739	Magnesium	103	106	P/P	80 - 120
2077739	Potassium	95.6	98.6	P/P	80 - 120
2077739	Sodium	97.9		P	80 - 120
2077739	Zinc	102	103	P/P	80 - 120
2077809	Barium	101		P	80 - 120
2077809	Calcium	101		P	80 - 120
2077809	Iron	108		P	80 - 120
2077809	Magnesium	98.2		P	80 - 120
2077809	Potassium	95.9		P	80 - 120
2077809	Sodium	88.7		P	80 - 120
2077809	Zinc	107		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P362242

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077739	Aluminum	99.2	98.2	P/P	80 - 120
2077739	Antimony	101	98.7	P/P	80 - 120
2077739	Arsenic	107	105	P/P	80 - 120
2077739	Boron	106	103	P/P	80 - 120
2077739	Cadmium	104	101	P/P	80 - 120
2077739	Chromium	97.3	95.7	P/P	80 - 120
2077739	Copper	103	101	P/P	80 - 120
2077739	Lead	109	108	P/P	80 - 120
2077739	Nickel	104	101	P/P	80 - 120
2077739	Selenium	105	101	P/P	80 - 120
2077739	Silver	107	106	P/P	80 - 120
2077739	Thallium	103	103	P/P	80 - 120
2077809	Aluminum	101		P	80 - 120
2077809	Antimony	98.8		P	80 - 120
2077809	Arsenic	104		P	80 - 120
2077809	Boron	104		P	80 - 120
2077809	Cadmium	100		P	80 - 120
2077809	Chromium	93.3		P	80 - 120
2077809	Copper	99.6		P	80 - 120
2077809	Lead	107		P	80 - 120
2077809	Nickel	101		P	80 - 120
2077809	Selenium	103		P	80 - 120
2077809	Silver	105		P	80 - 120
2077809	Thallium	103		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362381

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077681	Chloride	102		P	90 - 110
2077766	Chloride	98.4		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362383

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077681	Sulfate	102		P	90 - 110
2077766	Sulfate	99.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362565

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077703	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362582

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077759	Kjeldahl Nitrogen	109	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362495

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077683	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362430

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077703	Total-P	98.6	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P362056

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077685	O-Phosphate-P	94.8	95.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P362577

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077663	Fluoride	101	100	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P362314

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077683	Organic Carbon	102	103	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P362073

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077741	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362242

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077739	Barium	1.90	Spike	P	0 - 20
2077739	Calcium	1.76	Spike	P	0 - 20
2077739	Iron	1.91	Spike	P	0 - 20
2077739	Magnesium	1.78	Spike	P	0 - 20
2077739	Potassium	2.15	Spike	P	0 - 20
2077739	Sodium	1.12	Spike	P	0 - 20
2077739	Zinc	1.83	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P362242

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077739	Aluminum	0.918	Spike	P	0 - 20
2077739	Antimony	1.86	Spike	P	0 - 20
2077739	Arsenic	1.40	Spike	P	0 - 20
2077739	Boron	2.21	Spike	P	0 - 20
2077739	Cadmium	2.75	Spike	P	0 - 20
2077739	Chromium	1.61	Spike	P	0 - 20
2077739	Copper	1.80	Spike	P	0 - 20
2077739	Lead	1.20	Spike	P	0 - 20
2077739	Nickel	3.16	Spike	P	0 - 20
2077739	Selenium	3.70	Spike	P	0 - 20
2077739	Silver	0.930	Spike	P	0 - 20
2077739	Thallium	0.213	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362381

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077766	Chloride	0.0664	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362383

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077766	Sulfate	0.442	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362565

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077703	Ammonia-N	0.473	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362582

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077759	Kjeldahl Nitrogen	4.51	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362495

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077683	NO2NO3-N	0.491	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362430

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077703	Total-P	4.16	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P362056

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077685	O-Phosphate-P	0.631	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P362064

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077681	Color (true)	2.56	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P362572

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077663	Total Alkalinity	0.559	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P362663

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077733	TDS	6.45	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P362577

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077663	Fluoride	0.470	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P362314

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077683	Organic Carbon	0.814	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 365.1 Rev. 2.0 dissolved

Run ID: A90670

Included Lab Sample IDs: 2077735

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.5	97.0	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A90677

Included Lab Sample IDs: 2077733

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

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A90679

Included Lab Sample IDs: 2077733

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A90760

Included Lab Sample IDs: 2077733

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	102	P/P	90 - 110
Sulfate	102	103	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A90771

Included Lab Sample IDs: 2077734

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	105	106	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A90802

Included Lab Sample IDs: 2077739

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.7	100	P/P	90 - 110
Antimony	97.0	96.6	P/P	90 - 110
Arsenic	103	101	P/P	90 - 110
Boron	96.5	103	P/P	90 - 110
Cadmium	99.4	101	P/P	90 - 110
Chromium	99.7	102	P/P	90 - 110
Copper	102	101	P/P	90 - 110
Lead	107	107	P/P	90 - 110
Nickel	101	102	P/P	90 - 110
Selenium	99.2	99.7	P/P	90 - 110
Silver	106	106	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A90845

Included Lab Sample IDs: 2077734

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A90847

Included Lab Sample IDs: 2077734

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A90870

Included Lab Sample IDs: 2077734

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	102	103	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A90871

Included Lab Sample IDs: 2077733

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.5	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A90871

Included Lab Sample IDs: 2077733

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A90892

Included Lab Sample IDs: 2077739

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	99.6	101	P/P	95 - 105
Calcium	101	103	P/P	95 - 105
Iron	102	103	P/P	95 - 105
Magnesium	101	102	P/P	95 - 105
Potassium	98.2	97.6	P/P	95 - 105
Sodium	100	99.5	P/P	95 - 105
Zinc	101	102	P/P	95 - 105

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A90919

Included Lab Sample IDs: 2077734

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A90943

Included Lab Sample IDs: 2077739

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Thallium	95.9	94.5	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					0.0	
EPA 200.7 Rev. 4.4	Barium	101	98.7	101	101		1.90
	Calcium	102	100	101			1.76
	Iron	106	105	108	108		1.91
	Magnesium	107	103	106	98.2		1.78
	Potassium	100	95.6	98.6	95.9		2.15
	Sodium	98.4	97.9	88.7			1.12
	Zinc	100	102	103	107		1.83
EPA 200.8 Rev. 5.4	Aluminum	98.7	99.2	98.2	101		0.918
	Antimony	97.3	101	98.7	98.8		1.86
	Arsenic	104	107	105	104		1.40
	Boron	98.5	106	103	104		2.21
	Cadmium	102	104	101	100		2.75
	Chromium	95.1	97.3	95.7	93.3		1.61
	Copper	103	103	101	99.6		1.80
	Lead	106	109	108	107		1.20
	Nickel	102	104	101	101		3.16
	Selenium	102	105	101	103		3.70
	Silver	107	107	106	105		0.930
	Thallium	100	103	103	103		0.213
EPA 300.0 Rev. 2.1	Chloride	101	98.4	102		0.0664	
	Sulfate	101	99.7	102		0.442	
EPA 350.1 Rev. 2.0	Ammonia-N	100	101	102			0.473
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	109	100			4.51
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.5	102	102			0.491
EPA 365.1 Rev. 2.0	Total-P	103	98.6	104			4.16
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.7	94.8	95.4			0.631
SM 2120 B	Color (true)	99.9				2.56	
SM 2320 B-97	Total Alkalinity	99.7				0.559	
SM 2540 C-97	TDS					6.45	
SM 4500 F-C-97	Fluoride	99.3	101	100			0.470
SM 5310 B-00	Organic Carbon	99.9	102	103			0.814

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2077733
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2077739
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2077739
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2077733
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2077733
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2077734
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2077734
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2077734
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2077734

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2077735
SM 2120 B / E31780	True Color measured at 450 nm	2077733
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2077733
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2077733
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2077733
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2077733
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2077734

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	04/12/2019			04/12/2019 16:21	Adrian Shelby	2077733
EPA 200.7 Rev. 4.4	04/12/2019	04/16/2019 15:05	Elliott D. Healy	04/22/2019 11:06	Betina Topolski	2077739
EPA 200.8 Rev. 5.4	04/12/2019	04/16/2019 15:05	Elliott D. Healy	04/18/2019 01:09	Robert K Palmer	2077739
	04/12/2019	04/16/2019 15:05	Elliott D. Healy	04/23/2019 12:53	Robert K Palmer	2077739
EPA 300.0 Rev. 2.1	04/12/2019			04/17/2019 17:26	Lipi Saha	2077733
EPA 350.1 Rev. 2.0	04/12/2019			04/18/2019 12:49	Ping Hua	2077734
EPA 351.2 Rev. 2.0	04/12/2019	04/22/2019 11:30	Adrian Shelby	04/23/2019 09:37	Joseph Suarez	2077734
EPA 353.2 Rev. 2.0	04/12/2019			04/19/2019 10:52	Beverly Y. Sanders	2077734
EPA 365.1 Rev. 2.0	04/12/2019	04/18/2019 13:40	Sima Feizi	04/19/2019 12:53	Rosalyn Ballman	2077734
EPA 365.1 Rev. 2.0 dissolved	04/12/2019			04/12/2019 13:30	Jhamieka S. Greenwood	2077735
SM 2120 B	04/12/2019			04/12/2019 15:09	Blanca Fach	2077733
SM 2320 B-97	04/12/2019			04/19/2019 13:38	Samantha Davila	2077733
SM 2540 C-97	04/12/2019			04/17/2019 15:19	Yijie Li	2077733
SM 2540 D-97	04/12/2019			04/17/2019 15:19	Yijie Li	2077733
SM 4500 F-C-97	04/12/2019			04/19/2019 13:38	Samantha Davila	2077733
SM 5310 B-00	04/12/2019			04/17/2019 00:54	Julia Storbeck	2077734