Chemical Analysis Report

CEN-DIST-2017-09-15-01

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

Event Description: **Rouse / Drawdy**
Request ID: **RQ-2017-07-24-33**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Mike Linger

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 05-OCT-2017 11:15

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

A - Value reported is the mean of two or more determinations.
B - Results based on colony counts outside the acceptable range.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J - Estimated value and/or the analysis did not meet established quality control criteria.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
N - Presumptive evidence of presence of material.
O - Sampled, but analysis lost or not performed.
Q - Sample held beyond normal holding time.
T - Value reported is less than the criterion of detection.
U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
V - Analyte was detected in both sample and method blank.
X - Too few individuals to calculate SCI value.
Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Lake Drawdy @ 150m NNE of Center **Collection Date/Time: 09/14/2017 09:58**

Field ID: G2CE0079 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1929120	EPA 180.1 Rev. 2.0	Turbidity	1.8		NTU	P331711	
	EPA 300.0 Rev. 2.1	Chloride	20		mg Cl/L	P331810	
		Sulfate	7.7		mg SO4/L	P331807	
	SM 2120 B	Color (true)	93	A	PCU	P331693	
	SM 2320 B-97	Total Alkalinity	6.3		mg CaCO3/L	P331872	
	SM 2540 C-97	TDS	92		mg/L	P332120	
	SM 2540 D-97	TSS	2	I	mg/L	P332123	
	SM 4500 F-C-97	Fluoride	0.039	I	mg F/L	P331873	
1929122	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P331843	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.70		mg N/L	P331865	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P331817	
	EPA 365.1 Rev. 2.0	Total-P	0.021		mg P/L	P331917	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P332047	
1929124	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P331703	
1929128	EPA 200.7 Rev. 4.4	Calcium	5.86		mg/L	P331862	
		Iron	96	I	ug/L	P331862	
		Magnesium	2.03		mg/L	P331862	
		Potassium	2.1		mg/L	P331862	
		Sodium	11.1		mg/L	P331862	
		Zinc	5.0	U	ug/L	P331862	
	EPA 200.8 Rev. 5.4	Arsenic	0.95	I	ug/L	P331862	
		Cadmium	0.020	U	ug/L	P331862	
		Chromium	0.40	U	ug/L	P331862	
		Copper	1.62		ug/L	P331862	
		Lead	0.11	I	ug/L	P331862	
		Nickel	0.20	U	ug/L	P331862	
		Silver	0.010	U	ug/L	P331862	

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: Lake Drawdy @ 150m S of Center **Collection Date/Time: 09/14/2017 10:09**

Field ID: G2CE0078 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1929121	EPA 180.1 Rev. 2.0	Turbidity	1.7	A	NTU	P331711	
	EPA 300.0 Rev. 2.1	Chloride	19		mg Cl/L	P331810	
		Sulfate	6.2		mg SO4/L	P331807	
	SM 2120 B	Color (true)	110		PCU	P331693	
	SM 2320 B-97	Total Alkalinity	5.6		mg CaCO3/L	P331872	
	SM 2540 C-97	TDS	94		mg/L	P332120	
	SM 2540 D-97	TSS	3	I	mg/L	P332123	
	SM 4500 F-C-97	Fluoride	0.038	I	mg F/L	P331873	
1929123	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P331843	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.71		mg N/L	P331865	

Field ID: G2CE0078 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1929123	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P331817	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P331917	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P332047	
1929125	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P331703	
1929129	EPA 200.7 Rev. 4.4	Calcium	5.46		mg/L	P331862	
		Iron	120		ug/L	P331862	
		Magnesium	1.93		mg/L	P331862	
		Potassium	2.0		mg/L	P331862	
		Sodium	10.4		mg/L	P331862	
		Zinc	5.0	U	ug/L	P331862	
	EPA 200.8 Rev. 5.4	Arsenic	0.83	I	ug/L	P331862	
		Cadmium	0.020	U	ug/L	P331862	
		Chromium	0.40	U	ug/L	P331862	
		Copper	1.37		ug/L	P331862	
		Lead	0.16	I	ug/L	P331862	
		Nickel	0.21	I	ug/L	P331862	
		Silver	0.010	U	ug/L	P331862	

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: P331711

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P331862

Component	Result	Code	Units
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: P331862

Component	Result	Code	Units
Arsenic	0.25	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P331807

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P331810

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P331843

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P331865

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P331817

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P331917

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P331703

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

Reference Method: SM 2120 B
Batch ID: P331693

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P331872

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P332120

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P332123

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P331873

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P332047

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: P331862

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	102		P	85 - 115
Iron	104		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	99.9		P	85 - 115
Sodium	101		P	85 - 115
Zinc	98.0		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P331862

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	93.0		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	98.1		P	85 - 115
Copper	96.6		P	85 - 115
Lead	97.3		P	85 - 115
Nickel	97.5		P	85 - 115
Silver	97.5		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P331807

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	96.8		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P331810

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P331843

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P331865

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P331817

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P331917

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P331703

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: P331872

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P331873

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.2		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P332047

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: P331862

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929129	Calcium	104		P	80 - 120
1929129	Iron	104		P	80 - 120
1929129	Magnesium	105		P	80 - 120
1929129	Potassium	98.2		P	80 - 120
1929129	Sodium	100		P	80 - 120
1929129	Zinc	101		P	80 - 120
1929490	Calcium	102		P	80 - 120
1929490	Iron	104	104	P/P	80 - 120
1929490	Magnesium	106	104	P/P	80 - 120
1929490	Potassium	101	99.6	P/P	80 - 120
1929490	Sodium	102	101	P/P	80 - 120
1929490	Zinc	100	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P331862

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929129	Arsenic	87.9		P	80 - 120
1929129	Cadmium	103		P	80 - 120
1929129	Chromium	97.5		P	80 - 120
1929129	Copper	95.5		P	80 - 120
1929129	Lead	97.5		P	80 - 120
1929129	Nickel	96.9		P	80 - 120
1929129	Silver	95.9		P	80 - 120
1929490	Arsenic	88.9	92.6	P/P	80 - 120
1929490	Cadmium	103	103	P/P	80 - 120
1929490	Chromium	98.0	98.1	P/P	80 - 120
1929490	Copper	96.9	96.5	P/P	80 - 120
1929490	Lead	98.5	97.9	P/P	80 - 120
1929490	Nickel	98.4	99.2	P/P	80 - 120
1929490	Silver	97.0	97.0	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P331807

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929010	Sulfate	93.7		P	90 - 110
1929132	Sulfate	95.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P331810

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929010	Chloride	95.6		P	90 - 110
1929132	Chloride	97.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P331843

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929045	Ammonia-N	107	107	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P331865

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929045	Kjeldahl Nitrogen	101	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P331817

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929122	NO2NO3-N	104	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P331917

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929122	Total-P	90.3	90.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P331703

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929125	O-Phosphate-P	93.1	94.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P331873

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929132	Fluoride	96.8	97.4	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P332047

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1929122	Organic Carbon	92.8	94.6	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P331711

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929121	Turbidity	1.74	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P331862

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929490	Calcium	0.00742	Spike	P	0 - 20
1929490	Iron	0.823	Spike	P	0 - 20
1929490	Magnesium	1.10	Spike	P	0 - 20
1929490	Potassium	1.31	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P331862

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929490	Sodium	0.597	Spike	P	0 - 20
1929490	Zinc	0.236	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P331862

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929490	Arsenic	4.08	Spike	P	0 - 20
1929490	Cadmium	0.215	Spike	P	0 - 20
1929490	Chromium	0.0550	Spike	P	0 - 20
1929490	Copper	0.353	Spike	P	0 - 20
1929490	Lead	0.562	Spike	P	0 - 20
1929490	Nickel	0.746	Spike	P	0 - 20
1929490	Silver	0.0420	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P331807

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929132	Sulfate	1.61	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P331810

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929132	Chloride	1.18	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P331843

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929045	Ammonia-N	0.177	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P331865

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929045	Kjeldahl Nitrogen	2.31	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P331817

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929122	NO2NO3-N	0.952	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P331917

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929122	Total-P	0.131	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P331703

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929125	O-Phosphate-P	1.17	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P331693

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929120	Color (true)	0.753	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P331872

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929132	Total Alkalinity	0.303	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P332120

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929038	TDS	1.25	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P331873

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929132	Fluoride	0.495	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P332047

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1929122	Organic Carbon	1.08	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

Quality Assurance Report
Calibration Verification

Reference Method: SM 2120 B
Run ID: A78942
Included Lab Sample IDs: 1929120, 1929121

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	104	104	P/P	85 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A78943
Included Lab Sample IDs: 1929124, 1929125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	98.0	P/P	90 - 110
O-Phosphate-P	98.8	97.6	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A78949
Included Lab Sample IDs: 1929120, 1929121

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: A78987
Included Lab Sample IDs: 1929120, 1929121

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	97.7	101	P/P	90 - 110
Sulfate	98.2	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A78997
Included Lab Sample IDs: 1929122, 1929123

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	102	P/P	90 - 110
NO2NO3-N	103	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A79012
Included Lab Sample IDs: 1929122, 1929123

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

Reference Method: SM 2320 B-97
Run ID: A79025
Included Lab Sample IDs: 1929120, 1929121

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: SM 4500 F-C-97
Run ID: A79025
Included Lab Sample IDs: 1929120, 1929121

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	97.5	97.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A79041
Included Lab Sample IDs: 1929128, 1929129

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	104	104	P/P	90 - 110
Chromium	102	99.9	P/P	90 - 110
Copper	101	101	P/P	90 - 110
Lead	99.4	99.3	P/P	90 - 110
Nickel	101	100	P/P	90 - 110
Silver	97.7	98.1	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A79042
Included Lab Sample IDs: 1929128, 1929129

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	102	P/P	90 - 110
Iron	103	102	P/P	90 - 110
Magnesium	103	102	P/P	90 - 110
Potassium	100	100	P/P	90 - 110
Sodium	98.8	97.7	P/P	90 - 110
Zinc	100	98.3	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A79072
Included Lab Sample IDs: 1929128, 1929129

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	94.0	96.6	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A79077
Included Lab Sample IDs: 1929122, 1929123

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.4	94.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A79085
Included Lab Sample IDs: 1929122, 1929123

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A79103
Included Lab Sample IDs: 1929122, 1929123

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.5	98.8	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						1.74	
EPA 200.7 Rev. 4.4	Calcium	102	104	102				0.0074
	Iron	104	104	104	104			0.823
	Magnesium	106	105	106	104			1.10
	Potassium	99.9	98.2	101	99.6			1.31
	Sodium	101	100	102	101			0.597
	Zinc	98.0	101	100	100			0.236
EPA 200.8 Rev. 5.4	Arsenic	93.0	87.9	88.9	92.6			4.08
	Cadmium	102	103	103	103			0.215
	Chromium	98.1	97.5	98.0	98.1			0.0550
	Copper	96.6	95.5	96.9	96.5			0.353
	Lead	97.3	97.5	98.5	97.9			0.562
	Nickel	97.5	96.9	98.4	99.2			0.746
	Silver	97.5	95.9	97.0	97.0			0.0420
EPA 300.0 Rev. 2.1	Chloride	97.3	97.8	95.6			1.18	
	Sulfate	96.8	95.8	93.7			1.61	
EPA 350.1 Rev. 2.0	Ammonia-N	108	107	107				0.177
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	101	103				2.31
EPA 353.2 Rev. 2.0	NO2NO3-N	104	104	106				0.952
EPA 365.1 Rev. 2.0	Total-P	98.2	90.3	90.4				0.131
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.5	93.1	94.2				1.17
SM 2120 B	Color (true)						0.753	
SM 2320 B-97	Total Alkalinity	101					0.303	
SM 2540 C-97	TDS						1.25	
SM 4500 F-C-97	Fluoride	95.2	96.8	97.4				0.495
SM 5310 B-00	Organic Carbon	95.8	92.8	94.6				1.08

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1929120, 1929121
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1929128, 1929129
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1929128, 1929129
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1929120, 1929121

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1929120, 1929121
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1929122, 1929123
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1929122, 1929123
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1929122, 1929123
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1929122, 1929123
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1929124, 1929125
SM 2120 B / E31780	True Color measured at 450 nm	1929120, 1929121
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1929120, 1929121
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1929120, 1929121
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1929120, 1929121
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1929120, 1929121
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1929122, 1929123

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	09/15/2017			09/15/2017 14:51	DeAsia Armster	1929120, 1929121
EPA 200.7 Rev. 4.4	09/15/2017	09/19/2017	Elliott D. Healy	09/20/2017	Betina Topolski	1929128, 1929129
EPA 200.8 Rev. 5.4	09/15/2017	09/19/2017	Elliott D. Healy	09/20/2017	Nadine Brooks	1929128, 1929129
	09/15/2017	09/19/2017	Elliott D. Healy	09/21/2017	Robert K Palmer	1929128, 1929129
EPA 300.0 Rev. 2.1	09/15/2017			09/19/2017	Julia Storbeck	1929120, 1929121
EPA 350.1 Rev. 2.0	09/15/2017			09/19/2017	Sofia Elnemr	1929122, 1929123
EPA 351.2 Rev. 2.0	09/15/2017	09/20/2017	Adrian Shelby	09/21/2017	Tanya Welborn	1929122, 1929123
EPA 353.2 Rev. 2.0	09/15/2017			09/19/2017	Beverly Y. Sanders	1929122, 1929123
EPA 365.1 Rev. 2.0	09/15/2017	09/20/2017	Sima Feizi	09/22/2017	Lipi Saha	1929122, 1929123
EPA 365.1 Rev. 2.0 dissolved	09/15/2017			09/15/2017 14:39	Megan Treadwell	1929125
	09/15/2017			09/15/2017 15:03	Megan Treadwell	1929124
SM 2120 B	09/15/2017			09/15/2017 15:04	Tanya Welborn	1929120, 1929121
SM 2320 B-97	09/15/2017			09/19/2017	Dale L. Simmons	1929120, 1929121
SM 2540 C-97	09/15/2017			09/18/2017	Yijie Li	1929120, 1929121
SM 2540 D-97	09/15/2017			09/18/2017	Yijie Li	1929120, 1929121
SM 4500 F-C-97	09/15/2017			09/19/2017	Dale L. Simmons	1929120, 1929121
SM 5310 B-00	09/15/2017			09/21/2017	Ping Hua	1929122, 1929123