Chemical Analysis Report

NE-DIST-2017-05-26-02

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

Event Description: **Suwannee North-5/25/17**
Request ID: **RQ-2017-05-22-09**
Customer: **NE-DIST**
Project ID: **SMP**

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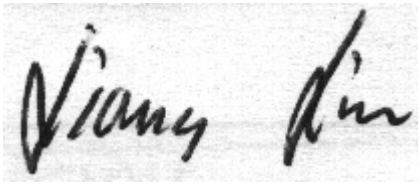
Certified by: Liang Lin, Environmental Administrator

Date Certified: 21-JUN-2017 12:58



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: Field Blank **Collection Date/Time: 05/25/2017 09:55**

Field ID: 123456 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1901898	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P325914	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P326780	
		Sulfate	0.20	U	mg SO4/L	P326782	
	SM 2120 B	Color (true)	2.5	U	PCU	P325909	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P326075	
	SM 2540 C-97	TDS	15	U	mg/L	P326219	
	SM 2540 D-97	TSS	2	U	mg/L	P326200	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P326077	
1901901	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P326123	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P325941	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P325966	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P325945	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P326080	
1901904	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P325912	
1901910	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P325995	
		Iron	30	U	ug/L	P325995	
		Magnesium	0.040	U	mg/L	P325995	
		Potassium	0.30	U	mg/L	P325995	
		Sodium	0.50	U	mg/L	P325995	
		Zinc	5.0	U	ug/L	P325995	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P325995	
		Cadmium	0.020	U	ug/L	P325995	
		Chromium	0.40	U	ug/L	P325995	
		Copper	0.20	U	ug/L	P325995	
		Lead	0.050	U	ug/L	P326641	
		Nickel	0.20	U	ug/L	P325995	
		Silver	0.010	U	ug/L	P325995	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Chloride: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Suwannee R @ Turner Boat Ramp **Collection Date/Time: 05/25/2017 10:40**

Field ID: G1NE047105252017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1901899	EPA 180.1 Rev. 2.0	Turbidity	2.5		NTU	P325914	
	EPA 300.0 Rev. 2.1	Chloride	8.8		mg Cl/L	P326765	
		Sulfate	3.2		mg SO4/L	P326768	
	SM 2120 B	Color (true)	370		PCU	P325909	
	SM 2320 B-97	Total Alkalinity	11		mg CaCO3/L	P326075	
	SM 2540 C-97	TDS	119		mg/L	P326219	
	SM 2540 D-97	TSS	2	I	mg/L	P326200	
	SM 4500 F-C-97	Fluoride	0.19		mg F/L	P326250	RPD

Field ID: G1NE047105252017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1901902	EPA 350.1 Rev. 2.0	Ammonia-N	0.019		mg N/L	P326123	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P325941	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.009	I	mg N/L	P325966	
	EPA 365.1 Rev. 2.0	Total-P	0.29		mg P/L	P325946	
	SM 5310 B-00	Organic Carbon	38		mg C/L	P326080	
1901905	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.22		mg P/L	P325912	
1901911	EPA 200.7 Rev. 4.4	Calcium	6.23		mg/L	P325995	
		Iron	690		ug/L	P325995	
		Magnesium	3.68		mg/L	P325995	
		Potassium	0.33	I	mg/L	P325995	
		Sodium	6.3		mg/L	P325995	
		Zinc	5.0	U	ug/L	P325995	
	EPA 200.8 Rev. 5.4	Arsenic	1.31		ug/L	P325995	
		Cadmium	0.036	I	ug/L	P325995	
		Chromium	0.65	I	ug/L	P325995	
		Copper	0.34	I	ug/L	P325995	
		Lead	0.43		ug/L	P326641	
		Nickel	0.94		ug/L	P325995	
		Silver	0.010	U	ug/L	P325995	

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: Suwannee R @ Cone Bridge **Collection Date/Time: 05/25/2017 09:40**

Field ID: G1NE023805252017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1901900	EPA 180.1 Rev. 2.0	Turbidity	2.3		NTU	P325914	
	EPA 300.0 Rev. 2.1	Chloride	8.5	A	mg Cl/L	P326765	
		Sulfate	5.4	A	mg SO4/L	P326768	
	SM 2120 B	Color (true)	340		PCU	P325909	
	SM 2320 B-97	Total Alkalinity	35		mg CaCO3/L	P326075	
	SM 2540 C-97	TDS	150		mg/L	P326219	
	SM 2540 D-97	TSS	2	I	mg/L	P326200	
	SM 4500 F-C-97	Fluoride	0.22		mg F/L	P326077	
1901903	EPA 350.1 Rev. 2.0	Ammonia-N	0.024		mg N/L	P326123	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P325996	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.018		mg N/L	P325966	
	EPA 365.1 Rev. 2.0	Total-P	0.31		mg P/L	P325946	
	SM 5310 B-00	Organic Carbon	34		mg C/L	P326080	
1901906	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.25		mg P/L	P325912	
1901912	EPA 200.7 Rev. 4.4	Calcium	11.7		mg/L	P325995	
		Iron	540		ug/L	P325995	
		Magnesium	6.18		mg/L	P325995	
		Potassium	0.38	I	mg/L	P325995	
		Sodium	5.9		mg/L	P325995	

Field ID: G1NE023805252017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1901912	EPA 200.7 Rev. 4.4	Zinc	5.0	U	ug/L	P325995	
	EPA 200.8 Rev. 5.4	Arsenic	1.34		ug/L	P325995	
		Cadmium	0.021	I	ug/L	P325995	
		Chromium	0.51	I	ug/L	P325995	
		Copper	0.31	I	ug/L	P325995	
		Lead	0.28		ug/L	P326641	
		Nickel	0.72	I	ug/L	P325995	
		Silver	0.010	U	ug/L	P325995	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: 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: P325914

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325995

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: P325995

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P326641

Component	Result	Code	Units
Lead	0.050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326765

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326768

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326780

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326782

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P326123

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325941

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325996

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325966

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325945

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325946

Component	Result	Code	Units
Total-P	0.005	U	mg P/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325912

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

Reference Method: SM 2120 B
Batch ID: P325909

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P326075

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

Reference Method: SM 2540 C-97
Batch ID: P326219

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P326200

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P326077

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P326250

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P326080

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: P325995

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325995

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	106		P	85 - 115
Magnesium	105		P	85 - 115
Potassium	100		P	85 - 115
Sodium	105		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P325995

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	99.1		P	85 - 115
Cadmium	97.6		P	85 - 115
Chromium	92.7		P	85 - 115
Copper	94.3		P	85 - 115
Nickel	96.2		P	85 - 115
Silver	94.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P326641

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Lead	96.3		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326765

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326768

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326780

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326782

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	92.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P326123

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P326123

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.9		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325941

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.3		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325996

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325966

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325945

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	94.3		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325946

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	95.7		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325912

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

Reference Method: SM 2320 B-97
Batch ID: P326075

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P326077

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P326250

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.0		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P326080

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.1		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325995

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901521	Calcium	106		P	80 - 120
1901521	Iron	105	105	P/P	80 - 120
1901521	Magnesium	105		P	80 - 120
1901521	Potassium	101	99.6	P/P	80 - 120
1901521	Sodium	106		P	80 - 120
1901521	Zinc	99.3	98.4	P/P	80 - 120
1901736	Calcium	96.6		P	80 - 120
1901736	Iron	105		P	80 - 120
1901736	Magnesium	104		P	80 - 120
1901736	Potassium	102		P	80 - 120
1901736	Sodium	99.0		P	80 - 120
1901736	Zinc	100		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P325995

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901521	Arsenic	98.5	97.5	P/P	80 - 120
1901521	Cadmium	103	101	P/P	80 - 120
1901521	Chromium	93.5	93.6	P/P	80 - 120
1901521	Copper	93.8	93.1	P/P	80 - 120
1901521	Nickel	95.5	94.8	P/P	80 - 120
1901521	Silver	94.9	96.0	P/P	80 - 120
1901736	Arsenic	97.8		P	80 - 120
1901736	Cadmium	102		P	80 - 120
1901736	Chromium	89.9		P	80 - 120
1901736	Copper	93.7		P	80 - 120
1901736	Nickel	95.1		P	80 - 120
1901736	Silver	92.3		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P326641

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901502	Lead	100	99.1	P/P	80 - 120
1901737	Lead	101		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326765

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901900	Chloride	101		P	90 - 110
1902025	Chloride	106		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326768

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901900	Sulfate	95.2		P	90 - 110
1902025	Sulfate	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326780

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901806	Chloride	96.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P326123

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901787	Ammonia-N	102	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325941

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901787	Kjeldahl Nitrogen	102	91.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325966

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901839	NO2NO3-N	97.0	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325945

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901790	Total-P	99.4	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325946

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901903	Total-P	96.8	98.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325912

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901805	O-Phosphate-P	95.8	96.5	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P326077

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901803	Fluoride	101	105	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P326250

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1902522	Fluoride	98.8	103	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P326080

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901839	Organic Carbon	92.7	92.6	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P325914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901789	Turbidity	2.64	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325995

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901521	Calcium	0.177	Spike	P	0 - 20
1901521	Iron	0.155	Spike	P	0 - 20
1901521	Magnesium	0.936	Spike	P	0 - 20
1901521	Potassium	0.737	Spike	P	0 - 20
1901521	Sodium	0.0617	Spike	P	0 - 20
1901521	Zinc	0.922	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P325995

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901521	Arsenic	1.06	Spike	P	0 - 20
1901521	Cadmium	2.17	Spike	P	0 - 20
1901521	Chromium	0.187	Spike	P	0 - 20
1901521	Copper	0.688	Spike	P	0 - 20
1901521	Nickel	0.774	Spike	P	0 - 20
1901521	Silver	1.12	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P326641

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901502	Lead	1.19	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326765

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901900	Chloride	0.814	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326768

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901900	Sulfate	1.08	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326780

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901806	Chloride	2.85	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326782

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901806	Sulfate	2.75	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P326123

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901787	Ammonia-N	0.431	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325941

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901787	Kjeldahl Nitrogen	7.39	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325996

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901956	Kjeldahl Nitrogen	2.39	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325966

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901839	NO2NO3-N	2.54	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325945

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901790	Total-P	1.01	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325946

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901903	Total-P	0.876	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325912

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901805	O-Phosphate-P	0.509	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P325909

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901789	Color (true)	1.55	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P326075

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901803	Total Alkalinity	0.218	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P326219

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901786	TDS	3.14	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P326077

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901803	Fluoride	2.42	Spike	P	0 - 3.0

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P326250

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1902522	Fluoride	3.32	Spike	F	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P326080

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901839	Organic Carbon	0.0851	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: SM 2120 B
Run ID: A76713
Included Lab Sample IDs: 1901898, 1901899, 1901900

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.7	99.7	P/P	85 - 115
Color (true)	99.7	103	P/P	85 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A76716
Included Lab Sample IDs: 1901904, 1901905, 1901906

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A76717
Included Lab Sample IDs: 1901898, 1901899, 1901900

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A76743
Included Lab Sample IDs: 1901901, 1901902, 1901903

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	97.0	96.0	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A76790
Included Lab Sample IDs: 1901898, 1901899, 1901900

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	105	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A76790
Included Lab Sample IDs: 1901898, 1901899, 1901900

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	105	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A76790
Included Lab Sample IDs: 1901898, 1901900

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	97.6	97.6	P/P	90 - 110
Fluoride	97.6	98.0	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A76794
Included Lab Sample IDs: 1901901, 1901902, 1901903

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.2	98.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A76799
Included Lab Sample IDs: 1901902, 1901903

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A76803
Included Lab Sample IDs: 1901901, 1901902

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.5	99.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A76815
Included Lab Sample IDs: 1901901, 1901902, 1901903

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A76827
Included Lab Sample IDs: 1901903

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	93.2	98.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A76829
Included Lab Sample IDs: 1901901

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	98.2	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A76847
Included Lab Sample IDs: 1901910, 1901911, 1901912

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	102	P/P	90 - 110
Calcium	101	103	P/P	90 - 110
Iron	103	102	P/P	90 - 110
Magnesium	103	102	P/P	90 - 110
Magnesium	103	103	P/P	90 - 110
Potassium	102	101	P/P	90 - 110
Potassium	102	102	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Sodium	102	104	P/P	90 - 110
Zinc	102	99.4	P/P	90 - 110
Zinc	103	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A76871
Included Lab Sample IDs: 1901910

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

Reference Method: SM 4500 F-C-97
Run ID: A76873
Included Lab Sample IDs: 1901899

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	97.2	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A76899
Included Lab Sample IDs: 1901910

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	95.8	92.3	P/P	90 - 110
Cadmium	94.8	96.3	P/P	90 - 110
Chromium	92.5	92.7	P/P	90 - 110
Silver	96.1	96.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A76936
Included Lab Sample IDs: 1901910

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	94.6	95.6	P/P	90 - 110
Nickel	93.7	95.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A76969
Included Lab Sample IDs: 1901911, 1901912

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	94.9	95.3	P/P	90 - 110
Arsenic	98.7	94.9	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A76969
Included Lab Sample IDs: 1901911, 1901912

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	98.2	96.8	P/P	90 - 110
Cadmium	98.8	98.2	P/P	90 - 110
Chromium	98.6	98.7	P/P	90 - 110
Chromium	98.7	96.3	P/P	90 - 110
Copper	91.6	92.8	P/P	90 - 110
Copper	94.2	91.6	P/P	90 - 110
Nickel	92.1	93.8	P/P	90 - 110
Nickel	95.3	92.1	P/P	90 - 110
Silver	98.0	97.5	P/P	90 - 110
Silver	98.2	98.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A77049
Included Lab Sample IDs: 1901910, 1901911, 1901912

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	92.6	98.4	P/P	90 - 110
Lead	94.3	92.6	P/P	90 - 110
Lead	98.4	95.2	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A77072
Included Lab Sample IDs: 1901898, 1901899, 1901900

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	94.9	95.8	P/P	90 - 110
Chloride	96.2	92.7	P/P	90 - 110
Chloride	96.4	94.9	P/P	90 - 110
Sulfate	101	94.6	P/P	90 - 110
Sulfate	95.2	99.4	P/P	90 - 110
Sulfate	95.7	101	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						2.64	
EPA 200.7 Rev. 4.4	Calcium	105	106	96.6				0.177
	Iron	106	105	105	105			0.155
	Magnesium	105	105	104				0.936
	Potassium	100	101	99.6	102			0.737
	Sodium	105	106	99.0				0.0617
	Zinc	101	99.3	98.4	100			0.922
EPA 200.8 Rev. 5.4	Arsenic	99.1	98.5	97.5	97.8			1.06
	Cadmium	97.6	103	101	102			2.17

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 200.8 Rev. 5.4	Chromium	92.7	93.5	93.6	89.9			0.187
	Copper	94.3	93.8	93.1	93.7			0.688
	Lead	96.3	100	99.1	101			1.19
	Nickel	96.2	95.5	94.8	95.1			0.774
	Silver	94.4	94.9	96.0	92.3			1.12
EPA 300.0 Rev. 2.1	Chloride	102	101	106			0.814	
	Chloride	96.8	96.6				2.85	
	Sulfate	97.6	95.2	100			1.08	
	Sulfate	92.5					2.75	
EPA 350.1 Rev. 2.0	Ammonia-N	98.9	102	101				0.431
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.3	102	91.9				7.39
	Kjeldahl Nitrogen	98.7						2.39
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	97.0	99.5				2.54
EPA 365.1 Rev. 2.0	Total-P	94.3	99.4	101				1.01
	Total-P	95.7	96.8	98.3				0.876
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.1	95.8	96.5				0.509
SM 2120 B	Color (true)						1.55	
SM 2320 B-97	Total Alkalinity	104					0.218	
SM 2540 C-97	TDS						3.14	
SM 4500 F-C-97	Fluoride	97.1	101	105				2.42
	Fluoride	96.0	98.8	103				3.32
SM 5310 B-00	Organic Carbon	96.1	92.7	92.6				0.0851

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1901898, 1901899, 1901900
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1901910, 1901911, 1901912
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1901910, 1901911, 1901912
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1901898, 1901899, 1901900
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1901898, 1901899, 1901900
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1901901, 1901902, 1901903
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1901901, 1901902, 1901903
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1901901, 1901902, 1901903
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1901901, 1901902, 1901903
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1901904, 1901905, 1901906
SM 2120 B / E31780	True Color measured at 450 nm	1901898, 1901899, 1901900
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1901898, 1901899, 1901900
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1901898, 1901899, 1901900
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1901898, 1901899, 1901900
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1901898, 1901899, 1901900
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1901901, 1901902, 1901903

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	05/26/2017			05/26/2017 15:03	Sima Feizi	1901898, 1901899, 1901900
EPA 200.7 Rev. 4.4	05/26/2017	05/30/2017	Elliott D. Healy	06/02/2017	Betina Topolski	1901910
	05/26/2017	05/30/2017	Elliott D. Healy	06/03/2017	Betina Topolski	1901911, 1901912
	05/26/2017	05/30/2017	Elliott D. Healy	06/05/2017	Betina Topolski	1901910
EPA 200.8 Rev. 5.4	05/26/2017	05/30/2017	Elliott D. Healy	06/06/2017	Robert K Palmer	1901910
	05/26/2017	05/30/2017	Elliott D. Healy	06/07/2017	Robert K Palmer	1901910
	05/26/2017	05/30/2017	Elliott D. Healy	06/08/2017	Robert K Palmer	1901911, 1901912
	05/26/2017	06/12/2017	Elliott D. Healy	06/13/2017	Robert K Palmer	1901910, 1901911, 1901912
EPA 300.0 Rev. 2.1	05/26/2017			06/13/2017	Julia Storbeck	1901898, 1901899, 1901900
EPA 350.1 Rev. 2.0	05/26/2017			06/01/2017	Julie Michelle Frank	1901901, 1901902, 1901903
EPA 351.2 Rev. 2.0	05/26/2017	05/30/2017	Adrian Shelby	06/01/2017	Joseph Suarez	1901901, 1901902
	05/26/2017	05/31/2017	Adrian Shelby	06/02/2017	Joseph Suarez	1901903
EPA 353.2 Rev. 2.0	05/26/2017			05/30/2017	Beverly Y. Sanders	1901901, 1901902, 1901903
EPA 365.1 Rev. 2.0	05/26/2017	05/30/2017	Adrian Shelby	06/01/2017	Lipi Saha	1901902, 1901903
	05/26/2017	05/30/2017	Adrian Shelby	06/02/2017	Lipi Saha	1901901
EPA 365.1 Rev. 2.0 dissolved	05/26/2017			05/26/2017 15:00	Anthony C. Onicha	1901904, 1901905
	05/26/2017			05/26/2017 15:03	Anthony C. Onicha	1901906
SM 2120 B	05/26/2017			05/26/2017 14:54	Tanya Welborn	1901898
	05/26/2017			05/26/2017 15:05	Tanya Welborn	1901899
	05/26/2017			05/26/2017 15:06	Tanya Welborn	1901900
SM 2320 B-97	05/26/2017			05/31/2017	Dale L. Simmons	1901898, 1901899, 1901900
SM 2540 C-97	05/26/2017			05/31/2017	Yijie Li	1901898, 1901899, 1901900
SM 2540 D-97	05/26/2017			05/31/2017	Yijie Li	1901898, 1901899, 1901900
SM 4500 F-C-97	05/26/2017			05/31/2017	Dale L. Simmons	1901898, 1901900
	05/26/2017			06/03/2017	Dale L. Simmons	1901899
SM 5310 B-00	05/26/2017			05/31/2017	Julie Michelle Frank	1901901, 1901902, 1901903