Chemical Analysis Report

NE-DIST-2018-04-17-02

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

Event Description: **LSJR SW**
Request ID: **RQ-2018-04-09-19**
Customer: **NE-DIST**
Project ID: **SMP**

Send Reports to:
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8800 Baymeadows Way West
Jacksonville, FL 32256-7577
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Certified by: Colin Wright, Program Administrator

Date Certified: 23-MAY-2018 10:20

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 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: BULL CR SW CROSSING CR 215 **Collection Date/Time: 04/16/2018 12:00**

Field ID: 20030480 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1985068	EPA 180.1 Rev. 2.0	Turbidity	3.5		NTU	P343611	
	EPA 300.0 Rev. 2.1	Chloride	11		mg Cl/L	P343705	
		Sulfate	2.8		mg SO4/L	P343707	
	SM 2120 B	Color (true)	300		PCU	P343587	
	SM 2320 B-97	Total Alkalinity	3.4		mg CaCO3/L	P344071	
	SM 2540 C-97	TDS	75		mg/L	P344111	
	SM 2540 D-97	TSS	3	I	mg/L	P344055	
	SM 4500 F-C-97	Fluoride	0.074	I	mg F/L	P344073	
1985069	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P343777	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.72		mg N/L	P343793	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.11		mg N/L	P343747	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P343829	
	SM 5310 B-00	Organic Carbon	24		mg C/L	P343983	
1985070	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.15		mg P/L	P343581	

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: MILL LOG CREEK @ CR 739B (SANDRIDGE RD) **Collection Date/Time: 04/16/2018 13:40**

Field ID: 20030569 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1985071	EPA 180.1 Rev. 2.0	Turbidity	8.5		NTU	P343611	
	EPA 300.0 Rev. 2.1	Chloride	33		mg Cl/L	P343705	
		Sulfate	11		mg SO4/L	P343707	
	SM 2120 B	Color (true)	260		PCU	P343587	
	SM 2320 B-97	Total Alkalinity	14		mg CaCO3/L	P344071	
	SM 2540 C-97	TDS	146		mg/L	P344111	
	SM 2540 D-97	TSS	4	I	mg/L	P344055	
	SM 4500 F-C-97	Fluoride	0.064	I	mg F/L	P344073	
1985073	EPA 350.1 Rev. 2.0	Ammonia-N	0.072		mg N/L	P343777	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P343724	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.071		mg N/L	P343747	
	EPA 365.1 Rev. 2.0	Total-P	0.72		mg P/L	P343829	
	SM 5310 B-00	Organic Carbon	25		mg C/L	P343983	
1985075	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.65		mg P/L	P343581	
1985101	EPA 200.7 Rev. 4.4	Calcium	6.40		mg/L	P343702	
		Iron	590		ug/L	P343702	
		Magnesium	5.06		mg/L	P343702	
		Potassium	12.7		mg/L	P343702	
		Sodium	15.0		mg/L	P343702	
		Zinc	7.9	I	ug/L	P343702	
	EPA 200.8 Rev. 5.4	Arsenic	0.53		ug/L	P343702	
		Cadmium	0.020	U	ug/L	P343702	

Field ID: 20030569 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1985101	EPA 200.8 Rev. 5.4	Chromium	0.65	I	ug/L	P343702	
		Copper	0.72	I	ug/L	P343702	
		Lead	0.38		ug/L	P343702	
		Nickel	0.54	I	ug/L	P343702	
		Silver	0.010	U	ug/L	P343702	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium and potassium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: MILL LOG @ RUSSELL RD. **Collection Date/Time: 04/16/2018 13:20**

Field ID: G2NE1150 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1985072	EPA 180.1 Rev. 2.0	Turbidity	6.9		NTU	P343611	
	EPA 300.0 Rev. 2.1	Chloride	28		mg Cl/L	P343705	
		Sulfate	12		mg SO4/L	P343707	
	SM 2120 B	Color (true)	190		PCU	P343587	
	SM 2320 B-97	Total Alkalinity	16		mg CaCO3/L	P344071	
	SM 2540 C-97	TDS	136		mg/L	P344111	
	SM 2540 D-97	TSS	3	I	mg/L	P344055	
	SM 4500 F-C-97	Fluoride	0.069	I	mg F/L	P344073	
1985074	EPA 350.1 Rev. 2.0	Ammonia-N	0.027		mg N/L	P343777	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.77		mg N/L	P343724	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.098		mg N/L	P343747	
	EPA 365.1 Rev. 2.0	Total-P	0.26		mg P/L	P343829	
	SM 5310 B-00	Organic Carbon	21		mg C/L	P343983	
1985076	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.21		mg P/L	P343581	
1985102	EPA 200.7 Rev. 4.4	Calcium	10.5		mg/L	P343702	
		Iron	700		ug/L	P343702	
		Magnesium	3.38		mg/L	P343702	
		Potassium	8.3		mg/L	P343702	
		Sodium	13.5		mg/L	P343702	
		Zinc	9.8	I	ug/L	P343702	
	EPA 200.8 Rev. 5.4	Arsenic	0.48		ug/L	P343702	
		Cadmium	0.020	U	ug/L	P343702	
		Chromium	0.69	I	ug/L	P343702	
		Copper	0.55	I	ug/L	P343702	
		Lead	0.37		ug/L	P343702	
		Nickel	0.66	I	ug/L	P343702	
		Silver	0.010	U	ug/L	P343702	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium and potassium are unavailable for one of two spiked samples 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: P343611

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343702

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: P343702

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
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343705

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343707

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343777

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343724

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343793

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343747

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343829

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343581

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

Reference Method: SM 2120 B
Batch ID: P343587

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P344071

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

Reference Method: SM 2540 C-97
Batch ID: P344111

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P344055

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P344073

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: P343983

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: P343702

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343702

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	104		P	85 - 115
Cadmium	99.2		P	85 - 115
Chromium	94.1		P	85 - 115
Copper	99.2		P	85 - 115
Lead	95.1		P	85 - 115
Nickel	105		P	85 - 115
Silver	95.2		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343705

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	93.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343707

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343777

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343724

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343793

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343747

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343829

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.7		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343581

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

Reference Method: SM 2320 B-97
Batch ID: P344071

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P344073

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.8		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P343983

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.1		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343702

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1984901	Iron	99.4	101	P/P	80 - 120
1984901	Magnesium	103		P	80 - 120
1984901	Sodium	99.6		P	80 - 120
1984901	Zinc	94.2	97.0	P/P	80 - 120
1985012	Calcium	102		P	80 - 120
1985012	Iron	97.5		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343702

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985012	Magnesium	103		P	80 - 120
1985012	Potassium	91.4		P	80 - 120
1985012	Sodium	99.8		P	80 - 120
1985012	Zinc	97.2		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343702

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1984901	Arsenic	104	104	P/P	80 - 120
1984901	Cadmium	101	100	P/P	80 - 120
1984901	Chromium	90.8	89.4	P/P	80 - 120
1984901	Copper	93.6	94.8	P/P	80 - 120
1984901	Lead	96.1	95.7	P/P	80 - 120
1984901	Nickel	96.4	94.8	P/P	80 - 120
1984901	Silver	95.8	93.1	P/P	80 - 120
1985012	Arsenic	106		P	80 - 120
1985012	Cadmium	102		P	80 - 120
1985012	Chromium	91.5		P	80 - 120
1985012	Copper	95.3		P	80 - 120
1985012	Lead	97.2		P	80 - 120
1985012	Nickel	96.9		P	80 - 120
1985012	Silver	93.9		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343705

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985032	Chloride	98.0		P	90 - 110
1985083	Chloride	98.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343707

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985032	Sulfate	92.8		P	90 - 110
1985083	Sulfate	96.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343777

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985025	Ammonia-N	98.4	99.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343724

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985089	Kjeldahl Nitrogen	106	107	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343793

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985061	Kjeldahl Nitrogen	113	115	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343747

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985025	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343829

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985085	Total-P	99.4	96.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343581

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985028	O-Phosphate-P	99.2	98.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P344073

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1984926	Fluoride	94.9	96.6	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P343983

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1985006	Organic Carbon	94.9	99.4	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P343611

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985059	Turbidity	2.22	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343702

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1984901	Calcium	2.31	Spike	P	0 - 20
1984901	Iron	1.50	Spike	P	0 - 20
1984901	Magnesium	2.86	Spike	P	0 - 20
1984901	Potassium	1.53	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343702

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1984901	Sodium	1.85	Spike	P	0 - 20
1984901	Zinc	2.85	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343702

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1984901	Arsenic	0.319	Spike	P	0 - 20
1984901	Cadmium	0.657	Spike	P	0 - 20
1984901	Chromium	1.56	Spike	P	0 - 20
1984901	Copper	1.22	Spike	P	0 - 20
1984901	Lead	0.427	Spike	P	0 - 20
1984901	Nickel	1.58	Spike	P	0 - 20
1984901	Silver	2.93	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343705

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985032	Chloride	0.246	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343707

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985032	Sulfate	0.742	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343777

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985025	Ammonia-N	0.875	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343724

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985089	Kjeldahl Nitrogen	0.752	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343793

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985061	Kjeldahl Nitrogen	0.928	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343747

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985025	NO2NO3-N	0.438	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343829

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985085	Total-P	2.51	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343581

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985028	O-Phosphate-P	0.442	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P343587

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985080	Color (true)	0.883	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P344071

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1984926	Total Alkalinity	0.0685	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P344111

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985059	TDS	3.83	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P344073

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1984926	Fluoride	0.986	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P343983

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1985006	Organic Carbon	2.75	Spike	P	0 - 20

Quality Assurance Report
Precision

* 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: A83267
Included Lab Sample IDs: 1985068, 1985071, 1985072

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	97.3	P/P	90 - 110
Chloride	98.5	100	P/P	90 - 110
Sulfate	98.8	99.6	P/P	90 - 110
Sulfate	99.6	97.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A83289
Included Lab Sample IDs: 1985070

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	99.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A83290
Included Lab Sample IDs: 1985075, 1985076

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	98.3	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A83292
Included Lab Sample IDs: 1985068, 1985071, 1985072

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.7	101	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A83304
Included Lab Sample IDs: 1985068, 1985071, 1985072

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	99.0	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A83348
Included Lab Sample IDs: 1985069, 1985073, 1985074

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A83354
Included Lab Sample IDs: 1985069, 1985073, 1985074

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	98.7	P/P	90 - 110
Ammonia-N	99.5	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A83362
Included Lab Sample IDs: 1985073, 1985074

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A83387
Included Lab Sample IDs: 1985101, 1985102

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	103	102	P/P	90 - 110
Iron	102	101	P/P	90 - 110
Magnesium	103	101	P/P	90 - 110
Potassium	99.6	98.9	P/P	90 - 110
Sodium	99.9	99.3	P/P	90 - 110
Zinc	102	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A83400
Included Lab Sample IDs: 1985069

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A83406
Included Lab Sample IDs: 1985069, 1985073, 1985074

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	99.8	P/P	90 - 110
Total-P	99.8	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A83408
Included Lab Sample IDs: 1985101, 1985102

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.7	99.4	P/P	90 - 110
Arsenic	99.4	98.8	P/P	90 - 110
Cadmium	98.8	95.9	P/P	90 - 110
Cadmium	99.2	98.8	P/P	90 - 110
Chromium	92.4	90.3	P/P	90 - 110
Chromium	93.4	92.4	P/P	90 - 110
Lead	97.1	98.0	P/P	90 - 110
Lead	98.0	97.6	P/P	90 - 110
Nickel	96.9	96.4	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A83408
Included Lab Sample IDs: 1985101, 1985102

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	97.4	96.9	P/P	90 - 110
Silver	94.7	92.8	P/P	90 - 110
Silver	95.6	94.7	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A83431
Included Lab Sample IDs: 1985069, 1985073, 1985074

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

Reference Method: SM 2320 B-97
Run ID: A83462
Included Lab Sample IDs: 1985068, 1985071, 1985072

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.2	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A83462
Included Lab Sample IDs: 1985068, 1985071, 1985072

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.6	99.1	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A83480
Included Lab Sample IDs: 1985101, 1985102

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	100	97.7	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						2.22	
EPA 200.7 Rev. 4.4	Calcium	105	102					2.31
	Iron	101	99.4	101	97.5			1.50
	Magnesium	105	103	103				2.86
	Potassium	101	91.4					1.53
	Sodium	101	99.6	99.8				1.85
	Zinc	102	94.2	97.0	97.2			2.85
EPA 200.8 Rev. 5.4	Arsenic	104	104	104	106			0.319
	Cadmium	99.2	101	100	102			0.657

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 200.8 Rev. 5.4	Chromium	94.1	90.8	89.4	91.5			1.56
	Copper	99.2	93.6	94.8	95.3			1.22
	Lead	95.1	96.1	95.7	97.2			0.427
	Nickel	105	96.4	94.8	96.9			1.58
	Silver	95.2	95.8	93.1	93.9			2.93
EPA 300.0 Rev. 2.1	Chloride	93.9	98.0	98.2			0.246	
	Sulfate	95.7	92.8	96.3			0.742	
EPA 350.1 Rev. 2.0	Ammonia-N	98.7	98.4	99.5				0.875
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	106	107				0.752
	Kjeldahl Nitrogen	102	113	115				0.928
EPA 353.2 Rev. 2.0	NO2NO3-N	102	101	101				0.438
EPA 365.1 Rev. 2.0	Total-P	99.7	99.4	96.8				2.51
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	104	99.2	98.7				0.442
SM 2120 B	Color (true)						0.883	
SM 2320 B-97	Total Alkalinity	102					0.0685	
SM 2540 C-97	TDS						3.83	
SM 4500 F-C-97	Fluoride	95.8	94.9	96.6				0.986
SM 5310 B-00	Organic Carbon	99.1	94.9	99.4				2.75

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1985068, 1985071, 1985072
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1985101, 1985102
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1985101, 1985102
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1985068, 1985071, 1985072
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1985068, 1985071, 1985072
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1985069, 1985073, 1985074
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1985069, 1985073, 1985074
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1985069, 1985073, 1985074
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1985069, 1985073, 1985074
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1985070, 1985075, 1985076
SM 2120 B / E31780	True Color measured at 450 nm	1985068, 1985071, 1985072
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1985068, 1985071, 1985072
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1985068, 1985071, 1985072
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1985068, 1985071, 1985072
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1985068, 1985071, 1985072
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1985069, 1985073, 1985074

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	04/17/2018			04/17/2018 17:41	William L. Brown IV	1985068, 1985071, 1985072
EPA 200.7 Rev. 4.4	04/17/2018	04/19/2018 11:01	Allison Taylor	04/20/2018 15:01	Betina Topolski	1985101
	04/17/2018	04/19/2018 11:01	Allison Taylor	04/20/2018 15:08	Betina Topolski	1985102
EPA 200.8 Rev. 5.4	04/17/2018	04/19/2018 11:01	Allison Taylor	04/23/2018 21:15	Robert K Palmer	1985101
	04/17/2018	04/19/2018 11:01	Allison Taylor	04/23/2018 21:43	Robert K Palmer	1985102
	04/17/2018	04/19/2018 11:01	Allison Taylor	04/26/2018 13:22	Robert K Palmer	1985101
	04/17/2018	04/19/2018 11:01	Allison Taylor	04/26/2018 13:27	Robert K Palmer	1985102
EPA 300.0 Rev. 2.1	04/17/2018			04/18/2018 22:10	Lipi Saha	1985068
	04/17/2018			04/18/2018 22:22	Lipi Saha	1985071
	04/17/2018			04/18/2018 22:58	Lipi Saha	1985072
EPA 350.1 Rev. 2.0	04/17/2018			04/18/2018 13:42	Ping Hua	1985069
	04/17/2018			04/18/2018 13:44	Ping Hua	1985073
	04/17/2018			04/18/2018 13:51	Ping Hua	1985074
EPA 351.2 Rev. 2.0	04/17/2018	04/19/2018 11:30	Adrian Shelby	04/20/2018 10:18	Joseph Suarez	1985073
	04/17/2018	04/19/2018 11:30	Adrian Shelby	04/20/2018 10:20	Joseph Suarez	1985074
	04/17/2018	04/20/2018 10:50	Adrian Shelby	04/23/2018 13:25	Joseph Suarez	1985069
EPA 353.2 Rev. 2.0	04/17/2018			04/19/2018 12:18	Lauren Bottorf	1985069
	04/17/2018			04/19/2018 12:20	Lauren Bottorf	1985073
	04/17/2018			04/19/2018 12:21	Lauren Bottorf	1985074
EPA 365.1 Rev. 2.0	04/17/2018	04/20/2018 12:57	Sima Feizi	04/23/2018 14:31	Beverly Y. Sanders	1985069
	04/17/2018	04/20/2018 12:57	Sima Feizi	04/23/2018 14:32	Beverly Y. Sanders	1985073
	04/17/2018	04/20/2018 12:57	Sima Feizi	04/23/2018 14:35	Beverly Y. Sanders	1985074
EPA 365.1 Rev. 2.0 dissolved	04/17/2018			04/17/2018 16:04	Megan Treadwell	1985070
	04/17/2018			04/17/2018 17:19	Megan Treadwell	1985076
	04/17/2018			04/17/2018 17:21	Megan Treadwell	1985075
SM 2120 B	04/17/2018			04/17/2018 18:44	Tanya Welborn	1985068, 1985071
	04/17/2018			04/17/2018 18:45	Tanya Welborn	1985072
SM 2320 B-97	04/17/2018			04/26/2018 01:29	Dale L. Simmons	1985068
	04/17/2018			04/26/2018 01:39	Dale L. Simmons	1985071
	04/17/2018			04/26/2018 01:48	Dale L. Simmons	1985072
SM 2540 C-97	04/17/2018			04/21/2018 23:36	Yijie Li	1985068, 1985071, 1985072
SM 2540 D-97	04/17/2018			04/21/2018 23:06	Yijie Li	1985068, 1985071, 1985072
SM 4500 F-C-97	04/17/2018			04/26/2018 01:29	Dale L. Simmons	1985068
	04/17/2018			04/26/2018 01:39	Dale L. Simmons	1985071
	04/17/2018			04/26/2018 01:48	Dale L. Simmons	1985072
SM 5310 B-00	04/17/2018			04/23/2018 18:48	Megan Treadwell	1985069
	04/17/2018			04/23/2018 19:00	Megan Treadwell	1985073
	04/17/2018			04/23/2018 19:13	Megan Treadwell	1985074