Chemical Analysis Report

CEN-DIST-2016-09-14-01

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

Event Description: **Orange Creek 2C**
Request ID: **RQ-2016-09-12-64**
Customer: **CEN-DIST**
Project ID: **SMP**

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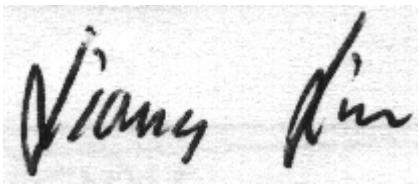
Certified by: Liang Lin, Environmental Administrator

Date Certified: 07-OCT-2016 09:51



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: ORANGE CREEK @ CR 21 **Collection Date/Time: 09/13/2016 10:46**

Field ID: G1CE0028 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1831090	EPA 180.1 Rev. 2.0	Turbidity	1.5	A	NTU	P311134	
	EPA 300.0 Rev. 2.1	Chloride	12		mg Cl/L	P311403	
		Sulfate	5.6		mg SO4/L	P311409	
	SM 2120 B	Color (true)	300		PCU	P311153	
	SM 2320 B-97	Total Alkalinity	34		mg CaCO3/L	P311384	
	SM 2540 C-97	TDS	122		mg/L	P311816	
	SM 2540 D-97	TSS	2	I	mg/L	P311782	
	SM 4500 F-C-97	Fluoride	0.11		mg F/L	P311388	
1831092	EPA 350.1 Rev. 2.0	Ammonia-N	0.021		mg N/L	P311306	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P311640	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.94		mg N/L	P311463	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P311666	
	SM 5310 B-00	Organic Carbon	34		mg C/L	P311510	
1831094	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.13		mg P/L	P311146	
1831098	EPA 200.7 Rev. 4.4	Calcium	16.4		mg/L	P311606	
		Iron	690		ug/L	P311606	
		Magnesium	4.63		mg/L	P311606	
		Potassium	1.7		mg/L	P311606	
		Sodium	6.5		mg/L	P311606	
		Zinc	5.0	U	ug/L	P311606	
	EPA 200.8 Rev. 5.4	Arsenic	1.04		ug/L	P311606	
		Cadmium	0.020	U	ug/L	P311606	
		Chromium	0.49		ug/L	P311606	
		Copper	0.41		ug/L	P311606	
		Lead	0.17	I	ug/L	P311606	
		Nickel	0.59		ug/L	P311606	
		Silver	0.0050	U	ug/L	P311606	

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 potassium are unavailable because of high analyte concentration in the QC sample.

Sample Location: ORANGE CREEK @ EAST SIDE OF US 301 BRIDGE **Collection Date/Time: 09/13/2016 11:48**

Field ID: G1CE0027 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1831091	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P311134	
	EPA 300.0 Rev. 2.1	Chloride	9.0	A	mg Cl/L	P311704	
		Sulfate	0.38	I	mg SO4/L	P311706	
	SM 2120 B	Color (true)	220		PCU	P311153	
	SM 2320 B-97	Total Alkalinity	21		mg CaCO3/L	P311384	
	SM 2540 C-97	TDS	98		mg/L	P311816	
	SM 2540 D-97	TSS	2	U	mg/L	P311782	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P311388	
1831093	EPA 350.1 Rev. 2.0	Ammonia-N	0.24		mg N/L	P311306	

Field ID: G1CE0027 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1831093	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.8		mg N/L	P311414	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P311464	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P311666	
	SM 5310 B-00	Organic Carbon	35		mg C/L	P311510	
1831095	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.094		mg P/L	P311146	
1831099	EPA 200.7 Rev. 4.4	Calcium	8.59		mg/L	P311606	
		Iron	490		ug/L	P311606	
		Magnesium	2.70		mg/L	P311606	
		Potassium	0.55	I	mg/L	P311606	
		Sodium	5.9		mg/L	P311606	
		Zinc	5.0	U	ug/L	P311606	
	EPA 200.8 Rev. 5.4	Arsenic	0.59		ug/L	P311606	
		Cadmium	0.020	U	ug/L	P311606	
		Chromium	0.22		ug/L	P311606	
		Copper	0.10	U	ug/L	P311606	
		Lead	0.11	I	ug/L	P311606	
		Nickel	0.12	I	ug/L	P311606	
		Silver	0.0050	U	ug/L	P311606	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low 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.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for potassium 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: P311134

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311606

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: P311606

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311606

Component	Result	Code	Units
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311403

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311409

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311704

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311706

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311306

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311414

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311640

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311463

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311464

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311666

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P311146

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

Reference Method: SM 2120 B
Batch ID: P311153

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P311384

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

Reference Method: SM 2540 C-97
Batch ID: P311816

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P311782

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P311388

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P311510

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: P311606

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	106		P	85 - 115
Iron	106		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	102		P	85 - 115
Sodium	103		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311606

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	99.9		P	85 - 115
Cadmium	100		P	85 - 115
Chromium	97.5		P	85 - 115
Copper	97.6		P	85 - 115
Lead	95.7		P	85 - 115
Nickel	99.5		P	85 - 115
Silver	96.3		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311403

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311409

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311704

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311706

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311306

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311414

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311640

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311463

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311464

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	105		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311666

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P311146

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	100		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P311384

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P311388

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.0		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P311510

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	108		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311606

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1832786	Calcium	107		P	80 - 120
1832786	Iron	103	108	P/P	80 - 120
1832786	Magnesium	103		P	80 - 120
1832786	Sodium	104		P	80 - 120
1832786	Zinc	101	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311606

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1832786	Arsenic	105	106	P/P	80 - 120
1832786	Cadmium	103	104	P/P	80 - 120
1832786	Chromium	96.6	98.4	P/P	80 - 120
1832786	Copper	95.1	96.8	P/P	80 - 120
1832786	Lead	96.9	98.0	P/P	80 - 120
1832786	Nickel	97.7	98.2	P/P	80 - 120
1832786	Silver	96.5	97.2	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311403

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830659	Chloride	98.5		P	90 - 110
1830660	Chloride	98.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311409

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830659	Sulfate	99.2		P	90 - 110
1830660	Sulfate	98.1		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311704

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1831091	Chloride	99.3		P	90 - 110
1831374	Chloride	99.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311706

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1831091	Sulfate	95.4		P	90 - 110
1831374	Sulfate	94.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311306

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1831051	Ammonia-N	99.6	99.2	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311414

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830960	Kjeldahl Nitrogen	94.8	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311640

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1831051	Kjeldahl Nitrogen	94.9	98.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311463

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1831051	NO2NO3-N	107	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311464

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1831093	NO2NO3-N	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311666

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1831052	Total-P	108	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P311146

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830965	O-Phosphate-P	99.2	99.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P311388

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1831288	Fluoride	98.7	99.8	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P311510

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830962	Organic Carbon	107	108	P/P	85 - 115

Quality Assurance Report
Precision

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P311134

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831090	Turbidity	6.85	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311606

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1832786	Calcium	1.52	Spike	P	0 - 20
1832786	Iron	4.39	Spike	P	0 - 20
1832786	Magnesium	3.88	Spike	P	0 - 20
1832786	Potassium	2.77	Spike	P	0 - 20
1832786	Sodium	2.65	Spike	P	0 - 20
1832786	Zinc	1.21	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311606

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1832786	Arsenic	1.00	Spike	P	0 - 20
1832786	Cadmium	0.932	Spike	P	0 - 20
1832786	Chromium	1.80	Spike	P	0 - 20
1832786	Copper	1.60	Spike	P	0 - 20
1832786	Lead	1.10	Spike	P	0 - 20
1832786	Nickel	0.432	Spike	P	0 - 20
1832786	Silver	0.734	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311403

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830659	Chloride	0.193	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311409

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830659	Sulfate	0.265	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311704

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831091	Chloride	0.000447	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311306

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831051	Ammonia-N	0.375	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311414

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830960	Kjeldahl Nitrogen	4.05	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311640

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831051	Kjeldahl Nitrogen	4.10	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311463

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831051	NO2NO3-N	0.334	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311464

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831093	NO2NO3-N	0.976	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311666

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831052	Total-P	2.77	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P311146

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830965	O-Phosphate-P	0.153	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P311153

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831161	Color (true)	1.51	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-97
Batch ID: P311384

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831288	Total Alkalinity	0.218	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P311816

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831111	TDS	6.74	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P311388

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831288	Fluoride	0.974	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P311510

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830962	Organic Carbon	0.428	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A71576
Included Lab Sample IDs: 1831090

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	102	P/P	90 - 110
Sulfate	97.4	101	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A71618
Included Lab Sample IDs: 1831090, 1831091

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A71621
Included Lab Sample IDs: 1831094, 1831095

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.9	98.4	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2120 B
Run ID: A71622
Included Lab Sample IDs: 1831090, 1831091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	95.4	95.9	P/P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A71673
Included Lab Sample IDs: 1831092, 1831093

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

Reference Method: SM 2320 B-97
Run ID: A71696
Included Lab Sample IDs: 1831090, 1831091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A71696
Included Lab Sample IDs: 1831090, 1831091

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A71707
Included Lab Sample IDs: 1831092, 1831093

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	103	104	P/P	90 - 110
NO2NO3-N	104	107	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A71732
Included Lab Sample IDs: 1831092, 1831093

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A71740
Included Lab Sample IDs: 1831093

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.7	96.4	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A71789
Included Lab Sample IDs: 1831091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	97.4	98.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A71789
Included Lab Sample IDs: 1831091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sulfate	99.3	98.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A71800
Included Lab Sample IDs: 1831092, 1831093

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A71810
Included Lab Sample IDs: 1831098, 1831099

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	105	106	P/P	90 - 110
Calcium	106	105	P/P	90 - 110
Iron	102	104	P/P	90 - 110
Iron	103	102	P/P	90 - 110
Magnesium	103	104	P/P	90 - 110
Magnesium	104	103	P/P	90 - 110
Potassium	103	105	P/P	90 - 110
Potassium	104	103	P/P	90 - 110
Sodium	104	104	P/P	90 - 110
Sodium	104	105	P/P	90 - 110
Zinc	102	102	P/P	90 - 110
Zinc	103	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A71829
Included Lab Sample IDs: 1831092

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.5	96.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A71844
Included Lab Sample IDs: 1831098, 1831099

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	102	100	P/P	90 - 110
Cadmium	97.8	98.7	P/P	90 - 110
Chromium	96.4	97.7	P/P	90 - 110
Copper	100	95.9	P/P	90 - 110
Lead	94.5	94.5	P/P	90 - 110
Nickel	102	98.0	P/P	90 - 110
Silver	95.5	95.8	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					6.85	
EPA 200.7 Rev. 4.4	Calcium	106	107				1.52
	Iron	106	103	108			4.39
	Magnesium	104	103				3.88
	Potassium	102					2.77
	Sodium	103	104				2.65
	Zinc	102	101	102			1.21
EPA 200.8 Rev. 5.4	Arsenic	99.9	105	106			1.00
	Cadmium	100	103	104			0.932
	Chromium	97.5	96.6	98.4			1.80
	Copper	97.6	95.1	96.8			1.60
	Lead	95.7	96.9	98.0			1.10
	Nickel	99.5	97.7	98.2			0.432
	Silver	96.3	96.5	97.2			0.734
EPA 300.0 Rev. 2.1	Chloride	100	98.5	98.5		0.193	
	Chloride	98.0	99.3	99.8		0.0004	
	Sulfate	98.6	99.2	98.1		0.265	
	Sulfate	94.0	95.4	94.3			
EPA 350.1 Rev. 2.0	Ammonia-N	104	99.2	99.6			0.375
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.1	94.8	98.8			4.05
	Kjeldahl Nitrogen	96.0	94.9	98.9			4.10
EPA 353.2 Rev. 2.0	NO2NO3-N	104	107	106			0.334
	NO2NO3-N	105	103	102			0.976
EPA 365.1 Rev. 2.0	Total-P	102	108	105			2.77
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	99.2	99.4			0.153
SM 2120 B	Color (true)					1.51	
SM 2320 B-97	Total Alkalinity	102				0.218	
SM 2540 C-97	TDS					6.74	
SM 4500 F-C-97	Fluoride	99.0	98.7	99.8			0.974
SM 5310 B-00	Organic Carbon	108	107	108			0.428

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1831090, 1831091
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1831098, 1831099
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1831098, 1831099
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1831090, 1831091
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1831090, 1831091
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1831092, 1831093
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1831092, 1831093
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1831092, 1831093
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1831092, 1831093
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1831094, 1831095
SM 2120 B / E31780	True Color measured at 450 nm	1831090, 1831091

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1831090, 1831091
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1831090, 1831091
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1831090, 1831091
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1831090, 1831091
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1831092, 1831093

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	09/14/2016			09/14/2016 15:33	Sima Feizi	1831090, 1831091
EPA 200.7 Rev. 4.4	09/14/2016	09/21/2016	Elliott D. Healy	09/23/2016	Joshua Ayres	1831098, 1831099
EPA 200.8 Rev. 5.4	09/14/2016	09/21/2016	Elliott D. Healy	09/26/2016	Charles J. Peterson	1831098, 1831099
EPA 300.0 Rev. 2.1	09/14/2016			09/17/2016	Ping Hua	1831090
	09/14/2016			09/22/2016	Ping Hua	1831091
EPA 350.1 Rev. 2.0	09/14/2016			09/15/2016	Joseph Suarez	1831092, 1831093
EPA 351.2 Rev. 2.0	09/14/2016	09/19/2016	Adrian Shelby	09/20/2016	Christopher Armour	1831093
	09/14/2016	09/22/2016	Adrian Shelby	09/23/2016	Virginia P. Brown	1831092
EPA 353.2 Rev. 2.0	09/14/2016			09/19/2016	Beverly Y. Sanders	1831092, 1831093
EPA 365.1 Rev. 2.0	09/14/2016	09/22/2016	Lipi Saha	09/23/2016	Lipi Saha	1831092, 1831093
EPA 365.1 Rev. 2.0 dissolved	09/14/2016			09/14/2016 16:35	Julia Storbeck	1831094
	09/14/2016			09/14/2016 16:36	Julia Storbeck	1831095
SM 2120 B	09/14/2016			09/14/2016 20:43	Julie Michelle Frank	1831090
	09/14/2016			09/14/2016 20:44	Julie Michelle Frank	1831091
SM 2320 B-97	09/14/2016			09/17/2016	Dale L. Simmons	1831090, 1831091
SM 2540 C-97	09/14/2016			09/19/2016	Yijie Li	1831090, 1831091
SM 2540 D-97	09/14/2016			09/19/2016	Yijie Li	1831090, 1831091
SM 4500 F-C-97	09/14/2016			09/17/2016	Dale L. Simmons	1831090, 1831091
SM 5310 B-00	09/14/2016			09/19/2016	Sofia Elnemr	1831092, 1831093