Chemical Analysis Report

CEN-DIST-2016-07-14-02

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

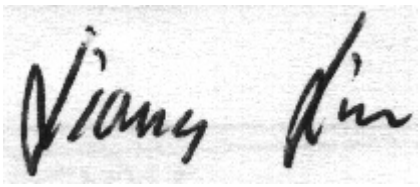
Event Description: **Orange Creek**
Request ID: **RQ-2016-07-11-52**
Customer: **CEN-DIST**
Project ID: **SMP**

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

For additional information please contact
Timothy W. Fitzpatrick
Liang-Tsair Lin, Ph.D.
Colin Wright, Ph.D.
Thekkekalathil Chandrasekhar, PhD, QA Officer
Phone (850) 245-8085

Certified by: Liang Lin, Environmental Administrator

Date Certified: 05-AUG-2016 15:44



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: ORNAGE CREEK @ EAST SIDE OF US 301 BRIDGE **Collection Date/Time: 07/13/2016 11:06**

Field ID: G1CE0027 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1816094	EPA 180.1 Rev. 2.0	Turbidity	1.3		NTU	P307971	
	EPA 300.0 Rev. 2.1	Chloride	9.7	A	mg Cl/L	P308927	
		Sulfate	0.21	I	mg SO4/L	P308931	
	SM 2120 B	Color (true)	230		PCU	P307967	
	SM 2320 B-97	Total Alkalinity	22		mg CaCO3/L	P308524	
	SM 2540 C-97	TDS	100		mg/L	P308838	
	SM 2540 D-97	TSS	2	U	mg/L	P308475	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P308528	
1816096	EPA 350.1 Rev. 2.0	Ammonia-N	0.41		mg N/L	P308308	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.2		mg N/L	P308169	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P308715	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P308131	
	SM 5310 B-00	Organic Carbon	32		mg C/L	P308640	
1816098	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P307960	
1816109	EPA 200.7 Rev. 4.4	Calcium	8.77		mg/L	P308145	
		Iron	620		ug/L	P308145	
		Magnesium	2.60		mg/L	P308145	
		Potassium	0.71	I	mg/L	P308145	
		Sodium	6.3		mg/L	P308145	
		Zinc	5.0	U	ug/L	P308145	
	EPA 200.8 Rev. 5.4	Arsenic	0.58		ug/L	P308145	
		Cadmium	0.020	U	ug/L	P308145	
		Chromium	0.23		ug/L	P308145	
		Copper	0.26	I	ug/L	P308145	
		Lead	0.20	I	ug/L	P308145	
		Nickel	0.16	I	ug/L	P308145	
		Silver	0.0050	U	ug/L	P308145	

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: The precision data is unavailable due to the low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0 dissolved: O-Phosphate-P: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: ORNAGE CREEK @ CR 21 **Collection Date/Time: 07/13/2016 11:46**

Field ID: G1CE0028 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1816095	EPA 180.1 Rev. 2.0	Turbidity	1.6		NTU	P307972	
	EPA 300.0 Rev. 2.1	Chloride	8.1		mg Cl/L	P308927	
		Sulfate	4.9		mg SO4/L	P308931	
	SM 2120 B	Color (true)	200		PCU	P307967	
	SM 2320 B-97	Total Alkalinity	32		mg CaCO3/L	P308524	
	SM 2540 C-97	TDS	103		mg/L	P308838	
	SM 2540 D-97	TSS	2	I	mg/L	P308475	
	SM 4500 F-C-97	Fluoride	0.11		mg F/L	P308528	

Field ID: G1CE0028 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1816097	EPA 350.1 Rev. 2.0	Ammonia-N	0.021		mg N/L	P308308	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P308169	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	1.1		mg N/L	P308716	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P308131	
	SM 5310 B-00	Organic Carbon	21		mg C/L	P308640	
1816099	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P307960	
1816110	EPA 200.7 Rev. 4.4	Calcium	14.5		mg/L	P308145	
		Iron	460		ug/L	P308145	
		Magnesium	4.30		mg/L	P308145	
		Potassium	1.1	I	mg/L	P308145	
		Sodium	4.6		mg/L	P308145	
		Zinc	5.0	U	ug/L	P308145	
	EPA 200.8 Rev. 5.4	Arsenic	0.54		ug/L	P308145	
		Cadmium	0.020	U	ug/L	P308145	
		Chromium	0.31		ug/L	P308145	
		Copper	0.44		ug/L	P308145	
		Lead	0.16	I	ug/L	P308145	
		Nickel	0.27		ug/L	P308145	
		Silver	0.0050	U	ug/L	P308145	

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: The precision data is unavailable due to the low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0 dissolved: O-Phosphate-P: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P307971

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P307972

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P308145

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P308145

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
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: P308927

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P308931

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P308308

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P308169

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P308715

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P308716

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P308131

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P307960

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

Reference Method: SM 2120 B
Batch ID: P307967

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P308524

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

Reference Method: SM 2540 C-97
Batch ID: P308838

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P308475

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P308528

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P308640

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: P308145

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	107		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	105		P	85 - 115
Sodium	104		P	85 - 115
Zinc	101		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P308145

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	96.4		P	85 - 115
Cadmium	94.7		P	85 - 115
Chromium	97.8		P	85 - 115
Copper	94.2		P	85 - 115
Lead	95.4		P	85 - 115
Nickel	94.4		P	85 - 115
Silver	96.5		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P308927

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P308931

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P308308

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P308169

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P308715

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: P308716

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: P308131

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	91.0		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P307960

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

Reference Method: SM 2320 B-97
Batch ID: P308524

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P308528

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.4		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P308640

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	92.9		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P308145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1815900	Calcium	107		P	80 - 120
1815900	Iron	107	105	P/P	80 - 120
1815900	Magnesium	104		P	80 - 120
1815900	Potassium	104	103	P/P	80 - 120
1815900	Sodium	107		P	80 - 120
1815900	Zinc	99.4	101	P/P	80 - 120
1816541	Calcium	107		P	80 - 120
1816541	Iron	109		P	80 - 120
1816541	Magnesium	109		P	80 - 120
1816541	Potassium	112		P	80 - 120
1816541	Sodium	107		P	80 - 120
1816541	Zinc	103		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P308145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1815900	Arsenic	99.8	97.9	P/P	80 - 120
1815900	Cadmium	98.6	96.6	P/P	80 - 120
1815900	Chromium	96.9	96.9	P/P	80 - 120
1815900	Copper	92.7	91.7	P/P	80 - 120
1815900	Lead	96.4	94.9	P/P	80 - 120
1815900	Nickel	93.5	91.7	P/P	80 - 120
1815900	Silver	96.8	96.8	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P308145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1816541	Arsenic	101		P	80 - 120
1816541	Cadmium	101		P	80 - 120
1816541	Chromium	101		P	80 - 120
1816541	Copper	97.4		P	80 - 120
1816541	Lead	99.6		P	80 - 120
1816541	Nickel	95.5		P	80 - 120
1816541	Silver	99.1		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P308927

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1816094	Chloride	98.5		P	90 - 110
1816095	Chloride	98.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P308931

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1816094	Sulfate	97.0		P	90 - 110
1816095	Sulfate	95.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P308308

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1816189	Ammonia-N	100	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P308169

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1816082	Kjeldahl Nitrogen	116	108	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P308715

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1815984	NO2NO3-N	99.0	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P308716

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1816116	NO2NO3-N	95.5	96.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P308131

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1816085	Total-P	94.1	96.9	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P308528

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1816215	Fluoride	98.6	99.3	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P308640

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1816039	Organic Carbon	96.5	95.8	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P307971

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816026	Turbidity	0.586	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P307972

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816113	Turbidity	0.103	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P308145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1815900	Calcium	0.860	Spike	P	0 - 20
1815900	Iron	1.97	Spike	P	0 - 20
1815900	Magnesium	2.13	Spike	P	0 - 20
1815900	Potassium	0.897	Spike	P	0 - 20
1815900	Sodium	1.53	Spike	P	0 - 20
1815900	Zinc	2.03	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P308145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1815900	Arsenic	1.91	Spike	P	0 - 20
1815900	Cadmium	2.08	Spike	P	0 - 20
1815900	Chromium	0.00914	Spike	P	0 - 20
1815900	Copper	0.984	Spike	P	0 - 20
1815900	Lead	1.56	Spike	P	0 - 20
1815900	Nickel	1.90	Spike	P	0 - 20
1815900	Silver	0.00458	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P308927

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816094	Chloride	0.0175	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P308308

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816189	Ammonia-N	0.257	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P308169

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816082	Kjeldahl Nitrogen	7.29	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P308715

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1815984	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P308716

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816116	NO2NO3-N	0.603	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P308131

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816085	Total-P	2.88	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P307960

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816098	O-Phosphate-P	0.287	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P307967

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816028	Color (true)	1.31	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-97
Batch ID: P308524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816215	Total Alkalinity	0.0173	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P308838

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816038	TDS	0.615	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P308528

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816215	Fluoride	0.473	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P308640

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1816039	Organic Carbon	0.780	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A70559
Included Lab Sample IDs: 1816098, 1816099

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	98.9	P/P	90 - 110
O-Phosphate-P	99.8	99.5	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A70560
Included Lab Sample IDs: 1816094, 1816095

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	95.2	96.5	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A70562
Included Lab Sample IDs: 1816094, 1816095

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A70562
Included Lab Sample IDs: 1816094, 1816095

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A70647
Included Lab Sample IDs: 1816096, 1816097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A70655
Included Lab Sample IDs: 1816096, 1816097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	102	P/P	90 - 110
Ammonia-N	98.5	97.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A70661
Included Lab Sample IDs: 1816109, 1816110

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A70726
Included Lab Sample IDs: 1816096, 1816097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	101	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A70728
Included Lab Sample IDs: 1816094, 1816095

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	104	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A70728
Included Lab Sample IDs: 1816094, 1816095

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A70730
Included Lab Sample IDs: 1816109, 1816110

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	97.9	97.1	P/P	90 - 110
Cadmium	95.3	95.1	P/P	90 - 110
Chromium	99.0	99.3	P/P	90 - 110
Copper	97.5	95.4	P/P	90 - 110
Lead	94.5	94.1	P/P	90 - 110
Nickel	96.5	94.9	P/P	90 - 110
Silver	96.0	95.5	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A70765
Included Lab Sample IDs: 1816096, 1816097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.6	96.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A70789
Included Lab Sample IDs: 1816097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	106	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A70791
Included Lab Sample IDs: 1816096

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	103	106	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A70802
Included Lab Sample IDs: 1816094, 1816095

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	102	P/P	90 - 110
Sulfate	96.6	96.3	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						0.586	
	Turbidity						0.103	
EPA 200.7 Rev. 4.4	Calcium	103	107	107				0.860
	Iron	107	107	105	109			1.97

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 200.7 Rev. 4.4	Magnesium	104	104	109				2.13
	Potassium	105	104	103	112			0.897
	Sodium	104	107	107				1.53
	Zinc	101	99.4	101	103			2.03
EPA 200.8 Rev. 5.4	Arsenic	96.4	99.8	97.9	101			1.91
	Cadmium	94.7	98.6	96.6	101			2.08
	Chromium	97.8	96.9	96.9	101			0.0091
	Copper	94.2	92.7	91.7	97.4			0.984
	Lead	95.4	96.4	94.9	99.6			1.56
	Nickel	94.4	93.5	91.7	95.5			1.90
	Silver	96.5	96.8	96.8	99.1			0.0045
EPA 300.0 Rev. 2.1	Chloride	99.7	98.5	98.8			0.0175	
	Sulfate	96.0	97.0	95.5				
EPA 350.1 Rev. 2.0	Ammonia-N	102	100	100				0.257
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	116	108				7.29
EPA 353.2 Rev. 2.0	NO2NO3-N	104	99.0	99.0				0.0
	NO2NO3-N	102	95.5	96.5				0.603
EPA 365.1 Rev. 2.0	Total-P	91.0	94.1	96.9				2.88
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101						0.287
SM 2120 B	Color (true)						1.31	
SM 2320 B-97	Total Alkalinity	103					0.0173	
SM 2540 C-97	TDS						0.615	
SM 4500 F-C-97	Fluoride	97.4	98.6	99.3				0.473
SM 5310 B-00	Organic Carbon	92.9	96.5	95.8				0.780

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1816094, 1816095
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1816109, 1816110
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1816109, 1816110
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1816094, 1816095
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1816094, 1816095
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1816096, 1816097
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1816096, 1816097
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1816096, 1816097
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1816096, 1816097
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1816098, 1816099
SM 2120 B / E31780	True Color measured at 450 nm	1816094, 1816095
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1816094, 1816095
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1816094, 1816095
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1816094, 1816095
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1816094, 1816095
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1816096, 1816097

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	07/14/2016			07/14/2016 17:05	Rochelle Y Jackson	1816094, 1816095
EPA 200.7 Rev. 4.4	07/14/2016	07/18/2016	Elliott D. Healy	07/20/2016	Joshua Ayres	1816109, 1816110
EPA 200.8 Rev. 5.4	07/14/2016	07/18/2016	Elliott D. Healy	07/22/2016	Charles J. Peterson	1816109, 1816110
EPA 300.0 Rev. 2.1	07/14/2016			07/30/2016	Ping Hua	1816094, 1816095
EPA 350.1 Rev. 2.0	07/14/2016			07/20/2016	Julie Michelle Frank	1816096, 1816097
EPA 351.2 Rev. 2.0	07/14/2016	07/19/2016	Sofia Elnemr	07/21/2016	Christopher Armour	1816096, 1816097
EPA 353.2 Rev. 2.0	07/14/2016			07/27/2016	Beverly Y. Sanders	1816096, 1816097
EPA 365.1 Rev. 2.0	07/14/2016	07/18/2016	Vijayalakshmi Reddy	07/19/2016	Lipi Saha	1816096, 1816097
EPA 365.1 Rev. 2.0 dissolved	07/14/2016			07/14/2016 14:13	Julia Storbeck	1816098
	07/14/2016			07/14/2016 14:59	Julia Storbeck	1816099
SM 2120 B	07/14/2016			07/14/2016 14:47	Rochelle Y Jackson	1816094
	07/14/2016			07/14/2016 14:48	Rochelle Y Jackson	1816095
SM 2320 B-97	07/14/2016			07/22/2016	Dale L. Simmons	1816094, 1816095
SM 2540 C-97	07/14/2016			07/18/2016	Sima Feizi	1816094, 1816095
SM 2540 D-97	07/14/2016			07/18/2016	Sima Feizi	1816094, 1816095
SM 4500 F-C-97	07/14/2016			07/22/2016	Dale L. Simmons	1816094, 1816095
SM 5310 B-00	07/14/2016			07/25/2016	Sofia Elnemr	1816096, 1816097