

Chemical Analysis Report

CEN-DIST-2016-10-13-01

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-2016-10-10-57**
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
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Thekkekalathil Chandrasekhar, PhD, QA Officer
Phone (850) 245-8085

Certified by: Colin Wright, Environmental Administrator

Date Certified: 04-NOV-2016 12:08

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular background.

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: 10/12/2016 11:08

Field ID: G1CE0028

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1840415	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P313128	
	EPA 300.0 Rev. 2.1	Chloride	12		mg Cl/L	P313678	
		Sulfate	3.2		mg SO4/L	P313681	
	SM 2120 B	Color (true)	630		PCU	P313138	
	SM 2320 B-97	Total Alkalinity	12		mg CaCO3/L	P313458	
	SM 2540 C-97	TDS	135		mg/L	P313961	
	SM 2540 D-97	TSS	2	U	mg/L	P313782	
	SM 4500 F-C-97	Fluoride	0.090	I	mg F/L	P313462	
1840417	EPA 350.1 Rev. 2.0	Ammonia-N	0.015		mg N/L	P313913	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P313774	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.33		mg N/L	P313380	
	EPA 365.1 Rev. 2.0	Total-P	0.19		mg P/L	P313925	
	SM 5310 B-00	Organic Carbon	52		mg C/L	P313265	
1840419	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.15		mg P/L	P313137	
1840423	EPA 200.7 Rev. 4.4	Calcium	11.0		mg/L	P313327	
		Iron	1.21E+03		ug/L	P313327	
		Magnesium	3.30		mg/L	P313327	
		Potassium	1.5		mg/L	P313327	
		Sodium	6.7		mg/L	P313327	
		Zinc	5.0	U	ug/L	P313327	
	EPA 200.8 Rev. 5.4	Arsenic	1.14		ug/L	P313327	
		Cadmium	0.020	U	ug/L	P313327	
		Chromium	0.64		ug/L	P313327	
		Copper	0.40		ug/L	P313327	
		Lead	0.42		ug/L	P313327	
		Nickel	0.52		ug/L	P313327	
		Silver	0.0050	U	ug/L	P313327	

Ref. Method and Comment:

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: Orange Creek @ East Side of US 301 Bridge

Collection Date/Time: 10/12/2016 12:31

Field ID: G1CE0027

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1840416	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P313128	
	EPA 300.0 Rev. 2.1	Chloride	11		mg Cl/L	P313678	
		Sulfate	0.33	I	mg SO4/L	P313681	
	SM 2120 B	Color (true)	200		PCU	P313138	
	SM 2320 B-97	Total Alkalinity	22		mg CaCO3/L	P313458	
	SM 2540 C-97	TDS	78		mg/L	P313961	
	SM 2540 D-97	TSS	2	U	mg/L	P313782	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P313462	
1840418	EPA 350.1 Rev. 2.0	Ammonia-N	0.16		mg N/L	P313913	

Field ID: G1CE0027

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1840418	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.9		mg N/L	P313774	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P313380	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P313925	
	SM 5310 B-00	Organic Carbon	30		mg C/L	P313265	
1840420	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.086		mg P/L	P313137	
1840424	EPA 200.7 Rev. 4.4	Calcium	8.71		mg/L	P313327	
		Iron	370		ug/L	P313327	
		Magnesium	2.76		mg/L	P313327	
		Potassium	0.94	I	mg/L	P313327	
		Sodium	6.5		mg/L	P313327	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P313327	
		Arsenic	0.59		ug/L	P313327	
		Cadmium	0.020	U	ug/L	P313327	
		Chromium	0.19	I	ug/L	P313327	
		Copper	0.10	U	ug/L	P313327	
		Lead	0.10	I	ug/L	P313327	
		Nickel	0.073	I	ug/L	P313327	
		Silver	0.0050	U	ug/L	P313327	

Ref. Method and Comment:
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium 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: P313128

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P313327

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: P313327

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313327

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313678

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313681

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313913

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P313774

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313380

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313925

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313137

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

Reference Method: SM 2120 B
Batch ID: P313138

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report Method Blank Results

Reference Method: SM 2320 B-97
 Batch ID: P313458

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 C-97
 Batch ID: P313961

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
 Batch ID: P313782

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
 Batch ID: P313462

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
 Batch ID: P313265

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: P313327

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	99.4		P	85 - 115
Iron	106		P	85 - 115
Magnesium	100		P	85 - 115
Potassium	99.6		P	85 - 115
Sodium	100		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P313327

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	102		P	85 - 115
Cadmium	97.3		P	85 - 115
Chromium	97.5		P	85 - 115
Copper	100		P	85 - 115
Lead	94.3		P	85 - 115
Nickel	101		P	85 - 115
Silver	95.8		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313678

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313681

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313913

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P313774

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: P313380

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313925

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	96.4		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313137

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

Reference Method: SM 2320 B-97
Batch ID: P313458

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

Reference Method: SM 4500 F-C-97
Batch ID: P313462

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.3		P	92 - 103

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
 Batch ID: P313265

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P313327

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839899	Iron	103		P	80 - 120
1839899	Magnesium	103		P	80 - 120
1839899	Potassium	102		P	80 - 120
1839899	Sodium	102		P	80 - 120
1839899	Zinc	98.1		P	80 - 120
1839987	Calcium	100		P	80 - 120
1839987	Iron	108	104	P/P	80 - 120
1839987	Magnesium	104		P	80 - 120
1839987	Potassium	100		P	80 - 120
1839987	Sodium	99.3		P	80 - 120
1839987	Zinc	102	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P313327

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1839899	Arsenic	103		P	80 - 120
1839899	Cadmium	101		P	80 - 120
1839899	Chromium	97.0		P	80 - 120
1839899	Copper	93.6		P	80 - 120
1839899	Lead	95.9		P	80 - 120
1839899	Nickel	96.3		P	80 - 120
1839899	Silver	95.9		P	80 - 120
1839987	Arsenic	104	106	P/P	80 - 120
1839987	Cadmium	103	106	P/P	80 - 120
1839987	Chromium	98.9	99.9	P/P	80 - 120
1839987	Copper	94.7	96.7	P/P	80 - 120
1839987	Lead	97.2	98.4	P/P	80 - 120
1839987	Nickel	96.3	97.2	P/P	80 - 120
1839987	Silver	96.7	96.9	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P313678

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840493	Chloride	103		P	90 - 110
1840495	Chloride	104		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P313681

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
---------------	-----------	---------	---------	-----------	----------------

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313681

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840493	Sulfate	99.2		P	90 - 110
1840495	Sulfate	99.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313913

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840417	Ammonia-N	102	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P313774

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840456	Kjeldahl Nitrogen	92.0	96.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313380

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840285	NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313925

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840434	Total-P	99.4	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313137

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840471	O-Phosphate-P	99.0	99.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P313462

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840154	Fluoride	99.5	96.9	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P313265

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1840234	Organic Carbon	91.6	93.8	P/P	85 - 115

Quality Assurance Report Precision

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P313128

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840266	Turbidity	1.10	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P313327

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839987	Calcium	2.26	Spike	P	0 - 20
1839987	Iron	3.90	Spike	P	0 - 20
1839987	Magnesium	2.03	Spike	P	0 - 20
1839987	Potassium	0.373	Spike	P	0 - 20
1839987	Sodium	0.132	Spike	P	0 - 20
1839987	Zinc	1.44	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P313327

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1839987	Arsenic	2.07	Spike	P	0 - 20
1839987	Cadmium	2.45	Spike	P	0 - 20
1839987	Chromium	1.02	Spike	P	0 - 20
1839987	Copper	2.12	Spike	P	0 - 20
1839987	Lead	1.26	Spike	P	0 - 20
1839987	Nickel	0.916	Spike	P	0 - 20
1839987	Silver	0.158	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313678

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840493	Chloride	0.492	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P313681

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840493	Sulfate	0.861	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P313913

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840417	Ammonia-N	0.566	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P313774

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840456	Kjeldahl Nitrogen	2.65	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P313380

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840285	NO2NO3-N	0.496	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P313925

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840434	Total-P	1.54	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P313137

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840471	O-Phosphate-P	0.859	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P313138

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840432	Color (true)	4.97	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P313458

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840154	Total Alkalinity	2.03	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P313961

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840533	TDS	1.27	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P313782

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840533	TSS	2.47	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P313462

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840154	Fluoride	2.45	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P313265

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1840234	Organic Carbon	1.92	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 180.1 Rev. 2.0
Run ID: A72211
Included Lab Sample IDs: 1840415, 1840416

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A72213
Included Lab Sample IDs: 1840419, 1840420

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

Reference Method: SM 2120 B
Run ID: A72214
Included Lab Sample IDs: 1840415, 1840416

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

Reference Method: SM 5310 B-00
Run ID: A72250
Included Lab Sample IDs: 1840417, 1840418

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.6	97.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A72281
Included Lab Sample IDs: 1840417, 1840418

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	99.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A72305

Included Lab Sample IDs: 1840415, 1840416

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	103	103	P/P	90 - 110
Chloride	103	103	P/P	90 - 110
Sulfate	99.3	100	P/P	90 - 110
Sulfate	99.5	99.3	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A72309

Included Lab Sample IDs: 1840415, 1840416

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: A72309

Included Lab Sample IDs: 1840415, 1840416

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	101	99.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A72321

Included Lab Sample IDs: 1840423, 1840424

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	99.1	P/P	90 - 110
Calcium	99.1	101	P/P	90 - 110
Iron	101	101	P/P	90 - 110
Iron	101	101	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Magnesium	102	101	P/P	90 - 110
Potassium	101	100	P/P	90 - 110
Potassium	101	101	P/P	90 - 110
Sodium	98.8	99.8	P/P	90 - 110
Sodium	99.8	101	P/P	90 - 110
Zinc	101	99.3	P/P	90 - 110
Zinc	99.3	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A72407

Included Lab Sample IDs: 1840423, 1840424

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.4	99.4	P/P	90 - 110
Cadmium	97.8	98.2	P/P	90 - 110
Chromium	98.0	99.1	P/P	90 - 110
Copper	95.2	94.3	P/P	90 - 110
Lead	92.8	92.7	P/P	90 - 110
Nickel	96.3	94.9	P/P	90 - 110
Silver	95.4	94.8	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A72438
Included Lab Sample IDs: 1840417, 1840418

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	101	P/P	90 - 110
Ammonia-N	99.6	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A72474
Included Lab Sample IDs: 1840417, 1840418

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.9	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A72495
Included Lab Sample IDs: 1840417, 1840418

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	107	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			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						1.10	
EPA 200.7 Rev. 4.4	Calcium	99.4	100					2.26
	Iron	106	103	108	104			3.90
	Magnesium	100	103	104				2.03
	Potassium	99.6	102	100				0.373
	Sodium	100	102	99.3				0.132
	Zinc	101	98.1	102	100			1.44
EPA 200.8 Rev. 5.4	Arsenic	102	103	104	106			2.07
	Cadmium	97.3	101	103	106			2.45
	Chromium	97.5	97.0	98.9	99.9			1.02
	Copper	100	93.6	94.7	96.7			2.12
	Lead	94.3	95.9	97.2	98.4			1.26
	Nickel	101	96.3	96.3	97.2			0.916
	Silver	95.8	95.9	96.7	96.9			0.158
EPA 300.0 Rev. 2.1	Chloride	103	103	104			0.492	
	Sulfate	99.1	99.2	99.8			0.861	
EPA 350.1 Rev. 2.0	Ammonia-N	105	102	102				0.566
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	92.0	96.8				2.65
EPA 353.2 Rev. 2.0	NO2NO3-N	104	101	100				0.496
EPA 365.1 Rev. 2.0	Total-P	96.4	99.4	101				1.54
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	99.0	99.9				0.859
SM 2120 B	Color (true)						4.97	
SM 2320 B-97	Total Alkalinity	103					2.03	
SM 2540 C-97	TDS						1.27	

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision SMP	MS
					LCS	
SM 2540 D-97	TSS				2.47	
SM 4500 F-C-97	Fluoride	97.3	99.5	96.9		2.45
SM 5310 B-00	Organic Carbon	96.3	91.6	93.8		1.92

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1840415, 1840416
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1840423, 1840424
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1840423, 1840424
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1840415, 1840416
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1840415, 1840416
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1840417, 1840418
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1840417, 1840418
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1840417, 1840418
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1840417, 1840418
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1840419, 1840420
SM 2120 B / E31780	True Color measured at 450 nm	1840415, 1840416
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1840415, 1840416
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1840415, 1840416
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1840415, 1840416
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1840415, 1840416
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1840417, 1840418

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	10/13/2016			10/13/2016 15:12	Sima Feizi	1840415, 1840416
EPA 200.7 Rev. 4.4	10/13/2016	10/17/2016	Elliott D. Healy	10/19/2016	Joshua Ayres	1840423, 1840424
EPA 200.8 Rev. 5.4	10/13/2016	10/17/2016	Elliott D. Healy	10/22/2016	Charles J. Peterson	1840423, 1840424
EPA 300.0 Rev. 2.1	10/13/2016			10/22/2016	Julia Storbeck	1840415, 1840416
EPA 350.1 Rev. 2.0	10/13/2016			10/25/2016	Sofia Elnemr	1840417, 1840418
EPA 351.2 Rev. 2.0	10/13/2016	10/25/2016	Adrian Shelby	10/28/2016	Joseph Suarez	1840417, 1840418
EPA 353.2 Rev. 2.0	10/13/2016			10/18/2016	Beverly Y. Sanders	1840417, 1840418
EPA 365.1 Rev. 2.0	10/13/2016	10/26/2016	Vijayalakshmi Reddy	10/27/2016	Lipi Saha	1840417, 1840418
EPA 365.1 Rev. 2.0 dissolved	10/13/2016			10/13/2016 16:01	Julia Storbeck	1840419
	10/13/2016			10/13/2016 16:02	Julia Storbeck	1840420
SM 2120 B	10/13/2016			10/13/2016 16:27	Jared I. Manley	1840415
	10/13/2016			10/13/2016 16:28	Jared I. Manley	1840416
SM 2320 B-97	10/13/2016			10/19/2016	Dale L. Simmons	1840415, 1840416
SM 2540 C-97	10/13/2016			10/17/2016	Sima Feizi	1840415, 1840416
SM 2540 D-97	10/13/2016			10/17/2016	Sima Feizi	1840415, 1840416
SM 4500 F-C-97	10/13/2016			10/19/2016	Dale L. Simmons	1840415, 1840416
SM 5310 B-00	10/13/2016			10/15/2016	Julie Michelle Frank	1840417, 1840418