

Chemical Analysis Report

CEN-DIST-2017-02-22-02

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

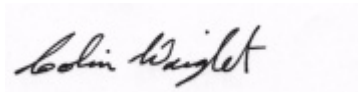
Event Description: **Lk Beauclair X3**
Request ID: **RQ-2017-02-06-57**
Customer: **CEN-DIST**
Project ID: **SMP**

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, Program Administrator

Date Certified: 22-MAR-2017 17:59

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light-colored 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: Lake Beauclair @ North End of East Lobe

Collection Date/Time: 02/21/2017 11:22

Field ID: G1CE0048

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1874643	EPA 180.1 Rev. 2.0	Turbidity	14		NTU	P320310	
	EPA 300.0 Rev. 2.1	Chloride	43		mg Cl/L	P321343	
		Sulfate	43		mg SO4/L	P321345	
	SM 2120 B	Color (true)	19		PCU	P320324	
	SM 2320 B-97	Total Alkalinity	106		mg CaCO3/L	P320590	
	SM 2540 C-97	TDS	260		mg/L	P320846	
	SM 2540 D-97	TSS	20		mg/L	P320838	
	SM 4500 F-C-97	Fluoride	0.22		mg F/L	P320894	
1874646	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P320445	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.8		mg N/L	P320369	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P320553	
	EPA 365.1 Rev. 2.0	Total-P	0.096		mg P/L	P320374	
	SM 5310 B-00	Organic Carbon	17		mg C/L	P320484	
1874649	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P320304	
1874659	EPA 200.7 Rev. 4.4	Calcium	39.2		mg/L	P320872	
		Iron	30	U	ug/L	P320872	
		Magnesium	15.2		mg/L	P320872	
		Potassium	12.5		mg/L	P320872	
		Sodium	20.2		mg/L	P320872	
		Zinc	5.0	U	ug/L	P320872	
	EPA 200.8 Rev. 5.4	Arsenic	2.84		ug/L	P320872	
		Cadmium	0.050	U	ug/L	P320872	
		Chromium	0.30	U	ug/L	P320872	
		Copper	0.65	I	ug/L	P320872	
		Lead	0.20	U	ug/L	P320872	
		Nickel	0.20	U	ug/L	P321467	
		Silver	0.025	U	ug/L	P320872	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Lake Beauclair @ Center

Collection Date/Time: 02/21/2017 11:37

Field ID: G1CE0047

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1874644	EPA 180.1 Rev. 2.0	Turbidity	12		NTU	P320310	
	EPA 300.0 Rev. 2.1	Chloride	42		mg Cl/L	P321343	
		Sulfate	44		mg SO4/L	P321345	
	SM 2120 B	Color (true)	21		PCU	P320324	
	SM 2320 B-97	Total Alkalinity	105		mg CaCO3/L	P320590	
	SM 2540 C-97	TDS	246		mg/L	P320846	
	SM 2540 D-97	TSS	19		mg/L	P320838	
	SM 4500 F-C-97	Fluoride	0.22		mg F/L	P320894	
1874647	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P320445	

Field ID: G1CE0047

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1874647	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.7		mg N/L	P320369	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P320553	
	EPA 365.1 Rev. 2.0	Total-P	0.091		mg P/L	P320373	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P320484	
1874650	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P320304	
1874660	EPA 200.7 Rev. 4.4	Calcium	38.5		mg/L	P320872	
		Iron	30	U	ug/L	P320872	
		Magnesium	15.3		mg/L	P320872	
		Potassium	12.3		mg/L	P320872	
		Sodium	20.0		mg/L	P320872	
		Zinc	5.0	U	ug/L	P320872	
	EPA 200.8 Rev. 5.4	Arsenic	2.86		ug/L	P320872	
		Cadmium	0.050	U	ug/L	P320872	
		Chromium	0.30	U	ug/L	P320872	
		Copper	0.50	U	ug/L	P320872	
		Lead	0.20	U	ug/L	P320872	
		Nickel	0.20	U	ug/L	P321467	
		Silver	0.025	U	ug/L	P320872	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Lake Beauclair @ South End of East Lobe

Collection Date/Time: 02/21/2017 11:50

Field ID: G1CE0049

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1874645	EPA 180.1 Rev. 2.0	Turbidity	13		NTU	P320309	
	EPA 300.0 Rev. 2.1	Chloride	42		mg Cl/L	P321343	
		Sulfate	44		mg SO4/L	P321345	
	SM 2120 B	Color (true)	21		PCU	P320324	
	SM 2320 B-97	Total Alkalinity	107		mg CaCO3/L	P320590	
	SM 2540 C-97	TDS	262		mg/L	P320846	
	SM 2540 D-97	TSS	19		mg/L	P320838	
	SM 4500 F-C-97	Fluoride	0.22		mg F/L	P320894	
1874648	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P320445	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.7		mg N/L	P320369	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P320553	
	EPA 365.1 Rev. 2.0	Total-P	0.076		mg P/L	P320373	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P320484	
1874651	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P320304	
1874661	EPA 200.7 Rev. 4.4	Calcium	39.0		mg/L	P320872	
		Iron	30	U	ug/L	P320872	
		Magnesium	15.1		mg/L	P320872	
		Potassium	12.4		mg/L	P320872	
		Sodium	20.2		mg/L	P320872	

Field ID: G1CE0049

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1874661	EPA 200.7 Rev. 4.4	Zinc	5.0	U	ug/L	P320872	
	EPA 200.8 Rev. 5.4	Arsenic	2.66		ug/L	P320872	
		Cadmium	0.050	U	ug/L	P320872	
		Chromium	0.30	U	ug/L	P320872	
		Copper	0.50	U	ug/L	P320872	
		Lead	0.20	U	ug/L	P320872	
		Nickel	0.20	U	ug/L	P321708	
		Silver	0.025	U	ug/L	P320872	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for nickel 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: P320309

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P320310

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P320872

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: P320872

Component	Result	Code	Units
Arsenic	0.25	U	ug/L
Cadmium	0.050	U	ug/L
Chromium	0.30	U	ug/L
Copper	0.50	U	ug/L
Lead	0.20	U	ug/L
Silver	0.025	U	ug/L

Quality Assurance Report

Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321467

Component	Result	Code	Units
Nickel	0.20	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321708

Component	Result	Code	Units
Nickel	0.20	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321343

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321345

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P320445

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P320369

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P320553

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P320373

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P320374

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: P320304

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

Reference Method: SM 2120 B
Batch ID: P320324

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P320590

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

Reference Method: SM 2540 C-97
Batch ID: P320846

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P320838

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P320894

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P320484

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: P320872

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	99.0		P	85 - 115
Iron	101		P	85 - 115
Magnesium	99.5		P	85 - 115
Potassium	100		P	85 - 115
Sodium	95.2		P	85 - 115
Zinc	99.6		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P320872

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	97.2		P	85 - 115
Cadmium	95.7		P	85 - 115
Chromium	98.9		P	85 - 115
Copper	97.5		P	85 - 115
Lead	98.7		P	85 - 115
Silver	95.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321467

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Nickel	96.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321708

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Nickel	97.2		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321343

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321345

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	92.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P320445

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P320369

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: P320553

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P320373

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	93.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P320374

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	96.7		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P320304

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

Reference Method: SM 2320 B-97
Batch ID: P320590

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

Reference Method: SM 4500 F-C-97
Batch ID: P320894

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.0		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P320484

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.2		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P320872

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874963	Calcium	100		P	80 - 120
1874963	Iron	99.0		P	80 - 120
1874963	Magnesium	101		P	80 - 120
1874963	Potassium	100		P	80 - 120
1874963	Sodium	96.2		P	80 - 120
1874963	Zinc	96.5		P	80 - 120
1875372	Calcium	99.5		P	80 - 120
1875372	Iron	99.8	103	P/P	80 - 120
1875372	Magnesium	99.9		P	80 - 120
1875372	Potassium	102	101	P/P	80 - 120
1875372	Sodium	96.2		P	80 - 120
1875372	Zinc	97.9	98.7	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P320872

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874963	Arsenic	93.8		P	80 - 120
1874963	Cadmium	91.5		P	80 - 120
1874963	Chromium	120		P	80 - 120
1874963	Copper	99.0		P	80 - 120
1874963	Lead	96.5		P	80 - 120
1874963	Silver	93.6		P	80 - 120
1875372	Arsenic	102	99.8	P/P	80 - 120
1875372	Cadmium	108	96.6	P/P	80 - 120
1875372	Chromium	103	101	P/P	80 - 120
1875372	Copper	101	102	P/P	80 - 120
1875372	Lead	105	100	P/P	80 - 120
1875372	Silver	106	96.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321467

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874963	Nickel	95.8		P	80 - 120
1875113	Nickel	98.7	98.0	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321708

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1879781	Nickel	96.3		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321343

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874535	Chloride	97.0		P	90 - 110
1875342	Chloride	98.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321345

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874535	Sulfate	95.9		P	90 - 110
1875342	Sulfate	96.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P320445

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874552	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P320553

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874646	NO2NO3-N	101	102	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P320373

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874537	Total-P	94.8	95.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P320374

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874549	Total-P	95.1	92.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P320304

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874556	O-Phosphate-P	96.4	98.1	P/P	90 - 110

Reference Method: SM 4500 F-C-97
 Batch ID: P320894

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1872795	Fluoride	97.8	100	P/P	91 - 105

Reference Method: SM 5310 B-00
 Batch ID: P320484

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874000	Organic Carbon	94.4	93.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P320309

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874460	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P320310

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874548	Turbidity	0.935	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P320872

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1875372	Calcium	0.251	Spike	P	0 - 20
1875372	Iron	3.37	Spike	P	0 - 20
1875372	Magnesium	2.95	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P320872

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1875372	Potassium	0.537	Spike	P	0 - 20
1875372	Sodium	0.182	Spike	P	0 - 20
1875372	Zinc	0.812	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P320872

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1875372	Arsenic	2.62	Spike	P	0 - 20
1875372	Cadmium	11.3	Spike	P	0 - 20
1875372	Chromium	1.79	Spike	P	0 - 20
1875372	Copper	0.939	Spike	P	0 - 20
1875372	Lead	4.30	Spike	P	0 - 20
1875372	Silver	8.77	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321467

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1875113	Nickel	0.704	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P321708

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1880382	Nickel	1.71	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321343

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874535	Chloride	0.0572	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P321345

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874535	Sulfate	4.22	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P320445

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874552	Ammonia-N	0.809	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P320369

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874648	Kjeldahl Nitrogen	2.66	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P320553

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874646	NO2NO3-N	0.985	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P320373

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874537	Total-P	1.07	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P320374

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874549	Total-P	2.29	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P320304

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874556	O-Phosphate-P	1.49	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P320324

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874557	Color (true)	1.39	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P320590

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1875084	Total Alkalinity	0.163	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P320846

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874548	TDS	8.00	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P320894

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1872795	Fluoride	1.42	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P320484

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874000	Organic Carbon	0.504	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: A74651
Included Lab Sample IDs: 1874649, 1874650, 1874651

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	100	P/P	90 - 110
O-Phosphate-P	99.6	100	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A74653
Included Lab Sample IDs: 1874643, 1874644, 1874645

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	100	P/P	95 - 105
Turbidity	99.0	102	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A74656
Included Lab Sample IDs: 1874643, 1874644, 1874645

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	95.1	95.3	P/P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A74696
Included Lab Sample IDs: 1874646, 1874647, 1874648

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A74707
Included Lab Sample IDs: 1874646, 1874647, 1874648

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A74707

Included Lab Sample IDs: 1874646, 1874647, 1874648

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.2	98.3	P/P	90 - 110
Total-P	98.1	98.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A74711

Included Lab Sample IDs: 1874646, 1874647, 1874648

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	99.1	P/P	90 - 110
Kjeldahl Nitrogen	99.1	98.4	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A74718

Included Lab Sample IDs: 1874646, 1874647, 1874648

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.4	94.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A74741

Included Lab Sample IDs: 1874646, 1874647, 1874648

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	98.0	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A74752

Included Lab Sample IDs: 1874643, 1874644, 1874645

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

Reference Method: SM 4500 F-C-97

Run ID: A74865

Included Lab Sample IDs: 1874643, 1874644, 1874645

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.9	99.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A74936

Included Lab Sample IDs: 1874659, 1874660, 1874661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	99.1	99.5	P/P	90 - 110
Calcium	99.5	100	P/P	90 - 110
Iron	99.7	101	P/P	90 - 110
Iron	99.8	99.7	P/P	90 - 110
Magnesium	100	99.7	P/P	90 - 110
Magnesium	99.7	100	P/P	90 - 110
Potassium	101	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A74936

Included Lab Sample IDs: 1874659, 1874660, 1874661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Potassium	102	103	P/P	90 - 110
Zinc	101	99.9	P/P	90 - 110
Zinc	99.5	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A74949

Included Lab Sample IDs: 1874659, 1874660, 1874661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	102	P/P	90 - 110
Cadmium	102	101	P/P	90 - 110
Chromium	102	103	P/P	90 - 110
Copper	102	101	P/P	90 - 110
Lead	99.9	101	P/P	90 - 110
Silver	100	99.6	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A74965

Included Lab Sample IDs: 1874659, 1874660, 1874661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sodium	97.0	97.3	P/P	90 - 110
Sodium	97.3	98.9	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A74977

Included Lab Sample IDs: 1874643, 1874644, 1874645

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.6	103	P/P	90 - 110
Sulfate	96.8	92.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A75096

Included Lab Sample IDs: 1874659, 1874660

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	104	105	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A75189

Included Lab Sample IDs: 1874661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	103	103	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					0.0	
	Turbidity					0.935	
EPA 200.7 Rev. 4.4	Calcium	99.0	100	99.5			0.251
	Iron	101	99.0	99.8	103		3.37
	Magnesium	99.5	101	99.9			2.95
	Potassium	100	100	102	101		0.537
	Sodium	95.2	96.2	96.2			0.182
	Zinc	99.6	96.5	97.9	98.7		0.812
EPA 200.8 Rev. 5.4	Arsenic	97.2	93.8	102	99.8		2.62
	Cadmium	95.7	91.5	108	96.6		11.3
	Chromium	98.9	120	103	101		1.79
	Copper	97.5	99.0	101	102		0.939
	Lead	98.7	96.5	105	100		4.30
	Nickel	96.5	95.8	98.7	98.0		0.704
	Nickel	97.2	96.3				1.71
	Silver	95.7	93.6	106	96.8		8.77
EPA 300.0 Rev. 2.1	Chloride	98.8	97.0	98.8		0.0572	
	Sulfate	92.7	95.9	96.6		4.22	
EPA 350.1 Rev. 2.0	Ammonia-N	106	101	102			0.809
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105					2.66
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	101	102			0.985
EPA 365.1 Rev. 2.0	Total-P	93.2	94.8	95.9			1.07
	Total-P	96.7	95.1	92.7			2.29
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	96.4	98.1			1.49
SM 2120 B	Color (true)					1.39	
SM 2320 B-97	Total Alkalinity	104				0.163	
SM 2540 C-97	TDS					8.00	
SM 4500 F-C-97	Fluoride	97.0	97.8	100			1.42
SM 5310 B-00	Organic Carbon	98.2	94.4	93.6			0.504

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1874643, 1874644, 1874645
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1874659, 1874660, 1874661
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1874659, 1874660, 1874661
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1874643, 1874644, 1874645
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1874643, 1874644, 1874645
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1874646, 1874647, 1874648
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1874646, 1874647, 1874648
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1874646, 1874647, 1874648
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1874646, 1874647, 1874648
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1874649, 1874650, 1874651
SM 2120 B / E31780	True Color measured at 450 nm	1874643, 1874644, 1874645
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1874643, 1874644, 1874645

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1874643, 1874644, 1874645
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1874643, 1874644, 1874645
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1874643, 1874644, 1874645
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1874646, 1874647, 1874648

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	02/22/2017			02/22/2017 15:55	Sima Feizi	1874643, 1874644, 1874645
EPA 200.7 Rev. 4.4	02/22/2017	03/02/2017	Elliott D. Healy	03/06/2017	Joshua Ayres	1874659, 1874660, 1874661
	02/22/2017	03/02/2017	Elliott D. Healy	03/08/2017	Joshua Ayres	1874659, 1874660, 1874661
EPA 200.8 Rev. 5.4	02/22/2017	03/02/2017	Elliott D. Healy	03/07/2017	Robert K Palmer	1874659, 1874660, 1874661
	02/22/2017	03/13/2017	Elliott D. Healy	03/14/2017	Betina Topolski	1874659, 1874660
	02/22/2017	03/16/2017	Elliott D. Healy	03/18/2017	Betina Topolski	1874661
EPA 300.0 Rev. 2.1	02/22/2017			03/09/2017	Elisa J Lutz	1874643, 1874644, 1874645
EPA 350.1 Rev. 2.0	02/22/2017			02/23/2017	Sofia Elnemr	1874646, 1874647, 1874648
EPA 351.2 Rev. 2.0	02/22/2017	02/23/2017	Adrian Shelby	02/24/2017	Joseph Suarez	1874646, 1874647, 1874648
EPA 353.2 Rev. 2.0	02/22/2017			02/27/2017	Beverly Y. Sanders	1874646, 1874647, 1874648
EPA 365.1 Rev. 2.0	02/22/2017	02/23/2017	Adrian Shelby	02/24/2017	Lipi Saha	1874646, 1874647, 1874648
EPA 365.1 Rev. 2.0 dissolved	02/22/2017			02/22/2017 14:44	Julia Storbeck	1874649
	02/22/2017			02/22/2017 15:02	Julia Storbeck	1874650
	02/22/2017			02/22/2017 15:03	Julia Storbeck	1874651
SM 2120 B	02/22/2017			02/22/2017 16:50	Julie Michelle Frank	1874643
	02/22/2017			02/22/2017 16:51	Julie Michelle Frank	1874644
	02/22/2017			02/22/2017 16:52	Julie Michelle Frank	1874645
SM 2320 B-97	02/22/2017			02/25/2017	Dale L. Simmons	1874643, 1874644, 1874645
SM 2540 C-97	02/22/2017			02/24/2017	Yijie Li	1874643, 1874644, 1874645
SM 2540 D-97	02/22/2017			02/24/2017	Yijie Li	1874643, 1874644, 1874645
SM 4500 F-C-97	02/22/2017			03/03/2017	Dale L. Simmons	1874643, 1874644, 1874645
SM 5310 B-00	02/22/2017			02/23/2017	Julie Michelle Frank	1874646, 1874647, 1874648