Chemical Analysis Report

CEN-DIST-2018-07-19-01

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

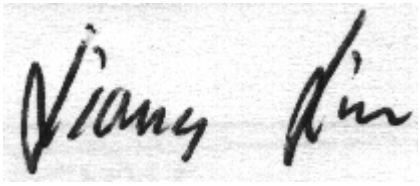
Event Description: **Lk McCoy X4 + LVI**
Request ID: **RQ-2018-07-16-46**
Customer: **CEN-DIST**
Project ID: **SMP**

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.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Liang Lin, Environmental Administrator

Date Certified: 09-AUG-2018 15:07



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 McCOY @ 220m SW OF CENTER OF SOUTHERN LOBE (2993C) **Collection Date/Time: 07/18/2018 10:53**

Field ID: G2CE0144 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2009225	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P348828	
	EPA 300.0 Rev. 2.1	Chloride	17		mg Cl/L	P349150	
		Sulfate	18		mg SO4/L	P349155	
	SM 2120 B	Color (true)	44	A	PCU	P348782	
	SM 2320 B-97	Total Alkalinity	35	A	mg CaCO3/L	P349027	
	SM 2540 C-97	TDS	108		mg/L	P349195	
	SM 2540 D-97	TSS	2	U	mg/L	P349172	
	SM 4500 F-C-97	Fluoride	0.051	I	mg F/L	P349031	
2009229	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P349158	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.75		mg N/L	P348953	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P348973	
	EPA 365.1 Rev. 2.0	Total-P	0.024		mg P/L	P349307	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P349005	
2009233	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P348787	
2009245	EPA 200.7 Rev. 4.4	Calcium	17.6		mg/L	P348964	
		Iron	63	I	ug/L	P348964	
		Magnesium	3.02		mg/L	P348964	
		Potassium	1.8		mg/L	P348964	
		Sodium	9.1		mg/L	P348964	
		Zinc	5.0	U	ug/L	P348964	
	EPA 200.8 Rev. 5.4	Arsenic	2.05		ug/L	P348964	
		Cadmium	0.020	U	ug/L	P348964	
		Chromium	0.40	U	ug/L	P348964	
		Copper	0.62	I	ug/L	P348964	
		Lead	0.050	U	ug/L	P348964	
		Nickel	0.29	I	ug/L	P348964	
		Silver	0.010	U	ug/L	P348964	

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

Sample Location: LAKE McCOY @ 245m NE OF CENTER OF SOUTHERN LOBE (2993C) **Collection Date/Time: 07/18/2018 10:35**

Field ID: G2CE0145 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2009226	EPA 180.1 Rev. 2.0	Turbidity	2.0		NTU	P348828	
	EPA 300.0 Rev. 2.1	Chloride	17		mg Cl/L	P349150	
		Sulfate	17		mg SO4/L	P349155	
	SM 2120 B	Color (true)	44		PCU	P348782	
	SM 2320 B-97	Total Alkalinity	34		mg CaCO3/L	P349027	
	SM 2540 C-97	TDS	107		mg/L	P349196	
	SM 2540 D-97	TSS	2	U	mg/L	P349173	
	SM 4500 F-C-97	Fluoride	0.054	I	mg F/L	P349031	
2009230	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P349158	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.75		mg N/L	P349001	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P348973	
	EPA 365.1 Rev. 2.0	Total-P	0.025		mg P/L	P349307	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P349005	
2009234	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P348787	
2009246	EPA 200.7 Rev. 4.4	Calcium	17.8		mg/L	P348964	
		Iron	30	I	ug/L	P348964	
		Magnesium	3.15		mg/L	P348964	
		Potassium	1.8		mg/L	P348964	
		Sodium	9.4		mg/L	P348964	
		Zinc	5.0	U	ug/L	P348964	
	EPA 200.8 Rev. 5.4	Arsenic	2.27		ug/L	P348964	
		Cadmium	0.020	U	ug/L	P348964	
		Chromium	0.40	U	ug/L	P348964	
		Copper	0.84		ug/L	P348964	
		Lead	0.056	I	ug/L	P348964	
		Nickel	0.20	U	ug/L	P348964	
		Silver	0.010	U	ug/L	P348964	

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

Sample Location: LAKE McCOY @ CENTER OF NORTH LOBE (2993C) **Collection Date/Time: 07/18/2018 11:20**

Field ID: G2CE0171 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2009227	EPA 180.1 Rev. 2.0	Turbidity	2.8		NTU	P348828	
	EPA 300.0 Rev. 2.1	Chloride	17		mg Cl/L	P349150	
		Sulfate	17		mg SO4/L	P349155	
	SM 2120 B	Color (true)	64		PCU	P348782	
	SM 2320 B-97	Total Alkalinity	36		mg CaCO3/L	P349027	
	SM 2540 C-97	TDS	114	A	mg/L	P349196	
	SM 2540 D-97	TSS	3	IA	mg/L	P349173	
	SM 4500 F-C-97	Fluoride	0.052	I	mg F/L	P349031	
2009231	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P349158	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.77		mg N/L	P349001	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P348973	
	EPA 365.1 Rev. 2.0	Total-P	0.032		mg P/L	P349307	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P349005	
2009235	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P348788	
2009247	EPA 200.7 Rev. 4.4	Calcium	18.8		mg/L	P348964	
		Iron	39	I	ug/L	P348964	
		Magnesium	3.25		mg/L	P348964	
		Potassium	1.7		mg/L	P348964	
		Sodium	9.8		mg/L	P348964	
		Zinc	5.0	U	ug/L	P348964	
	EPA 200.8 Rev. 5.4	Arsenic	2.08		ug/L	P348964	
		Cadmium	0.020	U	ug/L	P348964	
		Chromium	0.54	I	ug/L	P348964	
		Copper	1.57		ug/L	P348964	
		Lead	0.050	U	ug/L	P348964	
		Nickel	0.20	U	ug/L	P348964	
		Silver	0.010	U	ug/L	P348964	

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

Sample Location: LAKE McCOY @ CENTER OF SOUTHERN LOBE (2993C) **Collection Date/Time: 07/18/2018 10:43**

Field ID: G2CE0098 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2009228	EPA 180.1 Rev. 2.0	Turbidity	2.1		NTU	P348828	
	EPA 300.0 Rev. 2.1	Chloride	16		mg Cl/L	P349150	
		Sulfate	16		mg SO4/L	P349155	
	SM 2120 B	Color (true)	44		PCU	P348782	
	SM 2320 B-97	Total Alkalinity	34		mg CaCO3/L	P349027	
	SM 2540 C-97	TDS	112		mg/L	P349196	
	SM 2540 D-97	TSS	2	I	mg/L	P349173	
	SM 4500 F-C-97	Fluoride	0.053	I	mg F/L	P349031	
2009232	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P349158	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.76		mg N/L	P349001	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P348974	
	EPA 365.1 Rev. 2.0	Total-P	0.030		mg P/L	P349307	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P349005	
2009236	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P348788	
2009248	EPA 200.7 Rev. 4.4	Calcium	17.9		mg/L	P348964	
		Iron	30	U	ug/L	P348964	
		Magnesium	3.15		mg/L	P348964	
		Potassium	1.9		mg/L	P348964	
		Sodium	9.4		mg/L	P348964	
		Zinc	5.0	U	ug/L	P348964	
	EPA 200.8 Rev. 5.4	Arsenic	2.38		ug/L	P348964	
		Cadmium	0.020	U	ug/L	P348964	
		Chromium	0.40	U	ug/L	P348964	
		Copper	0.81		ug/L	P348964	
		Lead	0.050	U	ug/L	P348964	
		Nickel	0.20	U	ug/L	P348964	
		Silver	0.010	U	ug/L	P348964	

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P348828

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348964

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: P348964

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349150

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349155

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349158

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348953

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P349001

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348973

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348974

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P349307

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348787

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348788

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

Reference Method: SM 2120 B
Batch ID: P348782

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P349027

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

Reference Method: SM 2540 C-97
Batch ID: P349195

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P349196

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P349172

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P349173

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P349031

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P349005

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: P348964

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	104		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	101		P	85 - 115
Sodium	99.0		P	85 - 115
Zinc	99.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348964

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	100		P	85 - 115
Cadmium	98.4		P	85 - 115
Chromium	96.7		P	85 - 115
Copper	96.4		P	85 - 115
Lead	94.6		P	85 - 115
Nickel	98.2		P	85 - 115
Silver	100		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349150

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	108		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349155

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349158

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348953

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P349001

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348973

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348974

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: P349307

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348787

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348788

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.5		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P348782

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P349027

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	106		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P349031

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.1		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P349005

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348964

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009018	Calcium	102		P	80 - 120
2009018	Iron	102		P	80 - 120
2009018	Magnesium	103		P	80 - 120
2009018	Potassium	95.9		P	80 - 120
2009018	Sodium	96.3		P	80 - 120
2009018	Zinc	102		P	80 - 120
2009245	Calcium	103		P	80 - 120
2009245	Iron	101	101	P/P	80 - 120
2009245	Magnesium	104	105	P/P	80 - 120
2009245	Potassium	96.3	96.7	P/P	80 - 120
2009245	Sodium	98.0		P	80 - 120
2009245	Zinc	99.2	98.5	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348964

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009018	Arsenic	98.4		P	80 - 120
2009018	Cadmium	96.9		P	80 - 120
2009018	Chromium	96.7		P	80 - 120
2009018	Copper	93.2		P	80 - 120
2009018	Lead	94.6		P	80 - 120
2009018	Nickel	96.7		P	80 - 120
2009018	Silver	98.6		P	80 - 120
2009245	Arsenic	94.2	100	P/P	80 - 120
2009245	Cadmium	94.2	100	P/P	80 - 120
2009245	Chromium	92.7	98.9	P/P	80 - 120
2009245	Copper	88.5	94.6	P/P	80 - 120
2009245	Lead	90.9	96.4	P/P	80 - 120
2009245	Nickel	90.0	96.8	P/P	80 - 120
2009245	Silver	97.5	102	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349150

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2008993	Chloride	105		P	90 - 110
2009081	Chloride	104		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349155

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2008993	Sulfate	103		P	90 - 110
2009081	Sulfate	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349158

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009258	Ammonia-N	98.1	98.8	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348953

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009229	Kjeldahl Nitrogen	98.0	99.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P349001

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009232	Kjeldahl Nitrogen	101	93.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348973

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009073	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348974

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009232	NO2NO3-N	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P349307

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009230	Total-P	98.6	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348787

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009071	O-Phosphate-P	95.7	95.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348788

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009235	O-Phosphate-P	96.3	96.3	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P349031

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009225	Fluoride	98.4	96.3	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P349005

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2009067	Organic Carbon	92.7	94.1	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P348828

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009162	Turbidity	0.684	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P348964

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009245	Calcium	0.144	Spike	P	0 - 20
2009245	Iron	0.208	Spike	P	0 - 20
2009245	Magnesium	0.256	Spike	P	0 - 20
2009245	Potassium	0.293	Spike	P	0 - 20
2009245	Sodium	0.441	Spike	P	0 - 20
2009245	Zinc	0.734	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P348964

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009245	Arsenic	5.99	Spike	P	0 - 20
2009245	Cadmium	6.27	Spike	P	0 - 20
2009245	Chromium	6.55	Spike	P	0 - 20
2009245	Copper	6.35	Spike	P	0 - 20
2009245	Lead	5.91	Spike	P	0 - 20
2009245	Nickel	7.10	Spike	P	0 - 20
2009245	Silver	4.62	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349150

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008993	Chloride	2.26	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349155

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2008993	Sulfate	3.12	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349158

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009258	Ammonia-N	0.636	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348953

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009229	Kjeldahl Nitrogen	0.764	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P349001

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009232	Kjeldahl Nitrogen	4.94	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348973

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009073	NO2NO3-N	0.257	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348974

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009232	NO2NO3-N	0.976	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P349307

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009230	Total-P	1.82	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348787

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009071	O-Phosphate-P	0.222	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348788

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009235	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P348782

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009225	Color (true)	3.38	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-97
Batch ID: P349027

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009225	Total Alkalinity	0.239	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P349195

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009161	TDS	7.29	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P349196

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009227	TDS	0.873	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P349031

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009225	Fluoride	1.92	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P349005

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2009067	Organic Carbon	1.04	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: SM 2120 B
Run ID: A85347
Included Lab Sample IDs: 2009225, 2009226, 2009227, 2009228

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	104	105	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A85348
Included Lab Sample IDs: 2009233, 2009234, 2009235, 2009236

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.1	97.6	P/P	90 - 110
O-Phosphate-P	98.6	99.7	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A85363
Included Lab Sample IDs: 2009225, 2009226, 2009227, 2009228

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	98.5	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A85414
Included Lab Sample IDs: 2009229, 2009230, 2009231, 2009232

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	102	P/P	90 - 110
NO2NO3-N	102	104	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A85417
Included Lab Sample IDs: 2009225, 2009226, 2009227, 2009228

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

Reference Method: SM 5310 B-00
Run ID: A85418
Included Lab Sample IDs: 2009229, 2009230, 2009231, 2009232

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.4	97.7	P/P	90 - 110
Organic Carbon	97.7	96.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A85424
Included Lab Sample IDs: 2009229

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	98.8	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A85430
Included Lab Sample IDs: 2009225, 2009226, 2009227, 2009228

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	103	P/P	90 - 110
Total Alkalinity	103	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A85430
Included Lab Sample IDs: 2009225, 2009226, 2009227, 2009228

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.6	98.5	P/P	90 - 110
Fluoride	99.0	98.6	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A85442
Included Lab Sample IDs: 2009245, 2009246, 2009247, 2009248

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	99.6	P/P	90 - 110
Calcium	99.7	100	P/P	90 - 110
Iron	100	99.3	P/P	90 - 110
Iron	99.3	100	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Potassium	97.0	98.2	P/P	90 - 110
Potassium	97.3	97.0	P/P	90 - 110
Sodium	97.1	97.7	P/P	90 - 110
Sodium	97.7	95.5	P/P	90 - 110
Zinc	97.9	99.9	P/P	90 - 110
Zinc	99.9	98.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A85448
Included Lab Sample IDs: 2009230, 2009231, 2009232

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.8	95.2	P/P	90 - 110
Kjeldahl Nitrogen	99.2	96.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A85474
Included Lab Sample IDs: 2009229, 2009230, 2009231, 2009232

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.7	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A85564
Included Lab Sample IDs: 2009229, 2009230, 2009231, 2009232

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A85598
Included Lab Sample IDs: 2009245, 2009246, 2009247, 2009248

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.0	98.3	P/P	90 - 110
Cadmium	97.3	97.4	P/P	90 - 110
Chromium	97.5	98.4	P/P	90 - 110
Copper	95.5	97.2	P/P	90 - 110
Lead	95.7	96.3	P/P	90 - 110
Nickel	96.5	97.0	P/P	90 - 110
Silver	99.3	99.0	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						0.684	
EPA 200.7 Rev. 4.4	Calcium	101	102	103				0.144
	Iron	104	102	101	101			0.208
	Magnesium	108	103	104	105			0.256
	Potassium	101	95.9	96.3	96.7			0.293
	Sodium	99.0	96.3	98.0				0.441
	Zinc	99.7	102	99.2	98.5			0.734
EPA 200.8 Rev. 5.4	Arsenic	100	98.4	94.2	100			5.99
	Cadmium	98.4	96.9	94.2	100			6.27
	Chromium	96.7	96.7	92.7	98.9			6.55
	Copper	96.4	93.2	88.5	94.6			6.35
	Lead	94.6	94.6	90.9	96.4			5.91
	Nickel	98.2	96.7	90.0	96.8			7.10
	Silver	100	98.6	97.5	102			4.62
EPA 300.0 Rev. 2.1	Chloride	108	105	104			2.26	
	Sulfate	106	103	103			3.12	
EPA 350.1 Rev. 2.0	Ammonia-N	100	98.1	98.8				0.636
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	98.0	99.3				0.764
	Kjeldahl Nitrogen	104	101	93.3				4.94
EPA 353.2 Rev. 2.0	NO2NO3-N	103	102	102				0.257
	NO2NO3-N	102	102	103				0.976
EPA 365.1 Rev. 2.0	Total-P	98.3	98.6	101				1.82
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.7	95.7	95.3				0.222
	O-Phosphate-P	97.5	96.3	96.3				0.0
SM 2120 B	Color (true)	102					3.38	
SM 2320 B-97	Total Alkalinity	106					0.239	
SM 2540 C-97	TDS						7.29	
	TDS						0.873	
SM 4500 F-C-97	Fluoride	96.1	98.4	96.3				1.92
SM 5310 B-00	Organic Carbon	94.8	92.7	94.1				1.04

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2009225, 2009226, 2009227, 2009228
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2009245, 2009246, 2009247, 2009248
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2009245, 2009246, 2009247, 2009248
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2009225, 2009226, 2009227, 2009228
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2009225, 2009226, 2009227, 2009228
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2009229, 2009230, 2009231, 2009232
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2009229, 2009230, 2009231, 2009232
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2009229, 2009230, 2009231, 2009232
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2009229, 2009230, 2009231, 2009232
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2009233, 2009234, 2009235, 2009236
SM 2120 B / E31780	True Color measured at 450 nm	2009225, 2009226, 2009227, 2009228

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2009225, 2009226, 2009227, 2009228
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2009225, 2009226, 2009227, 2009228
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2009225, 2009226, 2009227, 2009228
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2009225, 2009226, 2009227, 2009228
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2009229, 2009230, 2009231, 2009232

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	07/19/2018			07/19/2018 15:51	Blanca Fach	2009225, 2009226, 2009227, 2009228
EPA 200.7 Rev. 4.4	07/19/2018	07/23/2018 14:40	Elliott D. Healy	07/24/2018 15:36	Betina Topolski	2009245
	07/19/2018	07/23/2018 14:40	Elliott D. Healy	07/24/2018 16:26	Betina Topolski	2009246
	07/19/2018	07/23/2018 14:40	Elliott D. Healy	07/24/2018 16:34	Betina Topolski	2009247
	07/19/2018	07/23/2018 14:40	Elliott D. Healy	07/24/2018 16:41	Betina Topolski	2009248
EPA 200.8 Rev. 5.4	07/19/2018	07/23/2018 14:40	Elliott D. Healy	07/31/2018 17:25	Robert K Palmer	2009245
	07/19/2018	07/23/2018 14:40	Elliott D. Healy	07/31/2018 17:53	Robert K Palmer	2009246
	07/19/2018	07/23/2018 14:40	Elliott D. Healy	07/31/2018 18:02	Robert K Palmer	2009247
	07/19/2018	07/23/2018 14:40	Elliott D. Healy	07/31/2018 18:11	Robert K Palmer	2009248
EPA 300.0 Rev. 2.1	07/19/2018			07/25/2018 14:44	Lipi Saha	2009225
	07/19/2018			07/25/2018 14:56	Lipi Saha	2009226
	07/19/2018			07/25/2018 15:08	Lipi Saha	2009227
	07/19/2018			07/25/2018 15:20	Lipi Saha	2009228
EPA 350.1 Rev. 2.0	07/19/2018			07/25/2018 13:13	Ping Hua	2009229
	07/19/2018			07/25/2018 13:14	Ping Hua	2009230
	07/19/2018			07/25/2018 13:16	Ping Hua	2009231
	07/19/2018			07/25/2018 13:17	Ping Hua	2009232
EPA 351.2 Rev. 2.0	07/19/2018	07/23/2018 11:30	Adrian Shelby	07/24/2018 11:07	Joseph Suarez	2009229
	07/19/2018	07/24/2018 08:13	Adrian Shelby	07/25/2018 09:20	Joseph Suarez	2009230
	07/19/2018	07/24/2018 08:13	Adrian Shelby	07/25/2018 09:22	Joseph Suarez	2009231
	07/19/2018	07/24/2018 08:13	Adrian Shelby	07/25/2018 09:27	Joseph Suarez	2009232
EPA 353.2 Rev. 2.0	07/19/2018			07/23/2018 13:08	Lauren Bottorf	2009229
	07/19/2018			07/23/2018 13:09	Lauren Bottorf	2009230
	07/19/2018			07/23/2018 13:11	Lauren Bottorf	2009231
	07/19/2018			07/23/2018 13:18	Lauren Bottorf	2009232
EPA 365.1 Rev. 2.0	07/19/2018	07/27/2018 12:35	Sima Feizi	07/30/2018 12:39	Beverly Y. Sanders	2009230
	07/19/2018	07/27/2018 12:35	Sima Feizi	07/30/2018 12:40	Beverly Y. Sanders	2009229
	07/19/2018	07/27/2018 12:35	Sima Feizi	07/30/2018 12:41	Beverly Y. Sanders	2009231
	07/19/2018	07/27/2018 12:35	Sima Feizi	07/30/2018 12:42	Beverly Y. Sanders	2009232
EPA 365.1 Rev. 2.0 dissolved	07/19/2018			07/19/2018 15:19	Julia Storbeck	2009235
	07/19/2018			07/19/2018 15:48	Julia Storbeck	2009233
	07/19/2018			07/19/2018 15:49	Julia Storbeck	2009234
	07/19/2018			07/19/2018 15:50	Julia Storbeck	2009236
SM 2120 B	07/19/2018			07/19/2018 15:29	Tanya Welborn	2009225
	07/19/2018			07/19/2018 15:30	Tanya Welborn	2009226
	07/19/2018			07/19/2018 15:31	Tanya Welborn	2009227
	07/19/2018			07/19/2018 15:32	Tanya Welborn	2009228
SM 2320 B-97	07/19/2018			07/23/2018 23:33	Dale L. Simmons	2009225
	07/19/2018			07/24/2018 01:15	Dale L. Simmons	2009226
	07/19/2018			07/24/2018 01:26	Dale L. Simmons	2009227

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 2320 B-97	07/19/2018			07/24/2018 02:03	Dale L. Simmons	2009228
SM 2540 C-97	07/19/2018			07/20/2018 16:46	William L. Brown IV	2009225, 2009226, 2009227, 2009228
SM 2540 D-97	07/19/2018			07/20/2018 17:00	William L. Brown IV	2009225, 2009226, 2009227, 2009228
SM 4500 F-C-97	07/19/2018			07/23/2018 23:25	Dale L. Simmons	2009225
	07/19/2018			07/24/2018 01:15	Dale L. Simmons	2009226
	07/19/2018			07/24/2018 01:26	Dale L. Simmons	2009227
	07/19/2018			07/24/2018 02:03	Dale L. Simmons	2009228
SM 5310 B-00	07/19/2018			07/23/2018 23:37	Megan Treadwell	2009229
	07/19/2018			07/24/2018 00:18	Megan Treadwell	2009230
	07/19/2018			07/24/2018 00:31	Megan Treadwell	2009231
	07/19/2018			07/24/2018 00:44	Megan Treadwell	2009232