

Chemical Analysis Report

CEN-DIST-2018-02-21-02

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

Event Description: **Lk Winnimisett (Vol.)**

Request ID: **RQ-2018-02-19-47**

Customer: **CEN-DIST**

Project ID: **SMP**

Send Reports to:

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FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 29-MAR-2018 14:52



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: St. Johns River @ 700m South of Lake Dexter (2893B) **Collection Date/Time: 02/20/2018 11:50**

Field ID: G2CE0164

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1969135	EPA 180.1 Rev. 2.0	Turbidity	2.2	A	NTU	P340363	
	EPA 300.0 Rev. 2.1	Chloride	180		mg Cl/L	P340696	
		Sulfate	47		mg SO4/L	P340698	
	SM 2120 B	Color (true)	130		PCU	P340353	
	SM 2320 B-97	Total Alkalinity	76		mg CaCO3/L	P340875	
	SM 2540 C-97	TDS	528		mg/L	P340668	
	SM 2540 D-97	TSS	4	I	mg/L	P340552	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P341122	
1969136	EPA 350.1 Rev. 2.0	Ammonia-N	0.051		mg N/L	P340858	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P340509	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.12		mg N/L	P340493	
	EPA 365.1 Rev. 2.0	Total-P	0.079		mg P/L	P340515	
	SM 5310 B-00	Organic Carbon	19		mg C/L	P340642	
1969137	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.046		mg P/L	P340387	
1969140	EPA 200.7 Rev. 4.4	Calcium	46.8		mg/L	P340541	
		Iron	270		ug/L	P340541	
		Magnesium	15.7		mg/L	P340541	
		Potassium	4.9		mg/L	P340541	
		Sodium	101		mg/L	P340541	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P340541	
		Arsenic	0.62		ug/L	P340780	
		Cadmium	0.020	U	ug/L	P340780	
		Chromium	0.40	U	ug/L	P340780	
		Copper	0.53	I	ug/L	P340780	
		Lead	0.30		ug/L	P340780	
		Nickel	0.37	I	ug/L	P340780	
		Silver	0.010	U	ug/L	P340780	

Ref. Method and Comment:

SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium and magnesium 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: P340363

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P340541

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L

Quality Assurance Report

Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P340541

Component	Result	Code	Units
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: P340780

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: P340696

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340698

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340858

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P340509

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340493

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340515

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: P340387

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

Reference Method: SM 2120 B
Batch ID: P340353

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P340875

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

Reference Method: SM 2540 C-97
Batch ID: P340668

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P340552

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P341122

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P340642

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: P340541

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	107		P	85 - 115
Iron	110		P	85 - 115
Magnesium	112		P	85 - 115
Potassium	105		P	85 - 115
Sodium	100		P	85 - 115
Zinc	103		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P340780

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	103		P	85 - 115
Cadmium	107		P	85 - 115
Chromium	101		P	85 - 115
Copper	99.7		P	85 - 115
Lead	110		P	85 - 115
Nickel	99.4		P	85 - 115
Silver	87.6		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340696

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340698

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340858

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: P340509

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340493

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: P340515

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P340387

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-97
 Batch ID: P340875

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	95 - 108

Reference Method: SM 4500 F-C-97
 Batch ID: P341122

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.7		P	92 - 103

Reference Method: SM 5310 B-00
 Batch ID: P340642

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P340541

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1968796	Calcium	105		P	80 - 120
1968796	Iron	107	108	P/P	80 - 120
1968796	Magnesium	108	109	P/P	80 - 120
1968796	Potassium	103	105	P/P	80 - 120
1968796	Sodium	99.5		P	80 - 120
1968796	Zinc	101	102	P/P	80 - 120
1969260	Iron	112		P	80 - 120
1969260	Potassium	108		P	80 - 120
1969260	Sodium	103		P	80 - 120
1969260	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P340780

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1968797	Arsenic	104	102	P/P	80 - 120
1968797	Cadmium	109	105	P/P	80 - 120
1968797	Chromium	102	97.8	P/P	80 - 120
1968797	Copper	100	96.0	P/P	80 - 120
1968797	Lead	113	109	P/P	80 - 120
1968797	Nickel	100	93.5	P/P	80 - 120
1968797	Silver	89.0	85.3	P/P	80 - 120
1969259	Arsenic	105		P	80 - 120
1969259	Cadmium	107		P	80 - 120
1969259	Chromium	97.7		P	80 - 120
1969259	Copper	98.9		P	80 - 120
1969259	Lead	111		P	80 - 120
1969259	Nickel	99.2		P	80 - 120
1969259	Silver	88.3		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340696

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1969002	Chloride	94.8		P	90 - 110
1969078	Chloride	95.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340698

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1969002	Sulfate	97.6		P	90 - 110
1969078	Sulfate	97.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340858

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1969144	Ammonia-N	97.1	99.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P340509

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1969080	Kjeldahl Nitrogen	102	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340493

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1969136	NO2NO3-N	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340515

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1969082	Total-P	98.0	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P340387

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1969089	O-Phosphate-P	92.2	93.7	P/P	90 - 110

Reference Method: SM 5310 B-00
Batch ID: P340642

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1969005	Organic Carbon	95.1	97.1	P/P	85 - 115

Quality Assurance Report Precision

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P340363

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969135	Turbidity	4.03	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P340541

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1968796	Calcium	2.48	Spike	P	0 - 20
1968796	Iron	1.07	Spike	P	0 - 20
1968796	Magnesium	0.467	Spike	P	0 - 20
1968796	Potassium	0.859	Spike	P	0 - 20
1968796	Sodium	0.286	Spike	P	0 - 20
1968796	Zinc	0.931	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P340780

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1968797	Arsenic	1.34	Spike	P	0 - 20
1968797	Cadmium	4.19	Spike	P	0 - 20
1968797	Chromium	4.65	Spike	P	0 - 20
1968797	Copper	4.07	Spike	P	0 - 20
1968797	Lead	3.42	Spike	P	0 - 20
1968797	Nickel	3.65	Spike	P	0 - 20
1968797	Silver	4.14	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340696

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969002	Chloride	0.00112	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340698

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969002	Sulfate	0.141	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340858

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969144	Ammonia-N	1.53	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P340509

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969080	Kjeldahl Nitrogen	1.65	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340493

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969136	NO2NO3-N	0.919	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340515

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969082	Total-P	9.67	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P340387

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969089	O-Phosphate-P	1.48	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P340353

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969206	Color (true)	4.65	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P340875

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969661	Total Alkalinity	0.0134	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P340668

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969093	TDS	1.17	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P340552

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969087	TSS	2.20	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P341122

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969250	Fluoride	0.926	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P340642

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1969005	Organic Carbon	1.67	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: A82214
Included Lab Sample IDs: 1969135

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.1	99.4	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A82216
Included Lab Sample IDs: 1969135

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	101	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A82222
Included Lab Sample IDs: 1969137

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A82251
Included Lab Sample IDs: 1969136

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A82271
Included Lab Sample IDs: 1969136

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

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00
Run ID: A82308
Included Lab Sample IDs: 1969136

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.0	95.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A82310
Included Lab Sample IDs: 1969136

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	107	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A82319
Included Lab Sample IDs: 1969140

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	103	104	P/P	90 - 110
Iron	101	102	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Potassium	99.8	100	P/P	90 - 110
Sodium	100	101	P/P	90 - 110
Zinc	103	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A82322
Included Lab Sample IDs: 1969135

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.8	100	P/P	90 - 110
Sulfate	98.9	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A82391
Included Lab Sample IDs: 1969136

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

Reference Method: SM 2320 B-97
Run ID: A82400
Included Lab Sample IDs: 1969135

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	99.1	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A82412
Included Lab Sample IDs: 1969140

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	98.7	99.9	P/P	90 - 110
Chromium	94.0	95.1	P/P	90 - 110
Copper	100	97.1	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A82412
Included Lab Sample IDs: 1969140

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	105	106	P/P	90 - 110
Nickel	101	97.7	P/P	90 - 110
Silver	101	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A82484
Included Lab Sample IDs: 1969135

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.5	97.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A82707
Included Lab Sample IDs: 1969140

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	94.0	98.2	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						4.03	
EPA 200.7 Rev. 4.4	Calcium	107	105					2.48
	Iron	110	107	108	112			1.07
	Magnesium	112	108	109				0.467
	Potassium	105	103	105	108			0.859
	Sodium	100	99.5	103				0.286
	Zinc	103	101	102	101			0.931
EPA 200.8 Rev. 5.4	Arsenic	103	104	102	105			1.34
	Cadmium	107	109	105	107			4.19
	Chromium	101	102	97.8	97.7			4.65
	Copper	99.7	100	96.0	98.9			4.07
	Lead	110	113	109	111			3.42
	Nickel	99.4	100	93.5	99.2			3.65
	Silver	87.6	89.0	85.3	88.3			4.14
EPA 300.0 Rev. 2.1	Chloride	99.0	94.8	95.6			0.0011	
	Sulfate	99.3	97.6	97.6			0.141	
EPA 350.1 Rev. 2.0	Ammonia-N	100	97.1	99.1				1.53
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	102	104				1.65
EPA 353.2 Rev. 2.0	NO2NO3-N	104	102	104				0.919
EPA 365.1 Rev. 2.0	Total-P	101	98.0	109				9.67
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.5	92.2	93.7				1.48
SM 2120 B	Color (true)						4.65	
SM 2320 B-97	Total Alkalinity	100					0.0134	

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery	Precision		
				LCS	SMP	MS
SM 2540 C-97	TDS				1.17	
SM 2540 D-97	TSS				2.20	
SM 4500 F-C-97	Fluoride	94.7				0.926
SM 5310 B-00	Organic Carbon	93.8	95.1 97.1			1.67

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1969135
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1969140
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1969140
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1969135
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1969135
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1969136
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1969136
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1969136
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1969136
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1969137
SM 2120 B / E31780	True Color measured at 450 nm	1969135
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1969135
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1969135
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1969135
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1969135
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1969136

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	02/21/2018			02/21/2018 15:50	Sima Feizi	1969135
EPA 200.7 Rev. 4.4	02/21/2018	02/26/2018	Vijayalakshmi Reddy	02/27/2018	Betina Topolski	1969140
EPA 200.8 Rev. 5.4	02/21/2018	03/01/2018	Vijayalakshmi Reddy	03/02/2018	Nadine Brooks	1969140
	02/21/2018	03/01/2018	Vijayalakshmi Reddy	03/19/2018	Robert K Palmer	1969140
EPA 300.0 Rev. 2.1	02/21/2018			02/27/2018	Julia Storbeck	1969135
EPA 350.1 Rev. 2.0	02/21/2018			03/01/2018	Ping Hua	1969136
EPA 351.2 Rev. 2.0	02/21/2018	02/23/2018	Adrian Shelby	02/27/2018	Joseph Suarez	1969136
EPA 353.2 Rev. 2.0	02/21/2018			02/23/2018	Beverly Y. Sanders	1969136
EPA 365.1 Rev. 2.0	02/21/2018	02/23/2018	Sima Feizi	02/26/2018	Beverly Y. Sanders	1969136
EPA 365.1 Rev. 2.0 dissolved	02/21/2018			02/21/2018 15:30	Megan Treadwell	1969137
SM 2120 B	02/21/2018			02/21/2018 14:58	Tanya Welborn	1969135
SM 2320 B-97	02/21/2018			03/02/2018	Lauren Bottorf	1969135
SM 2540 C-97	02/21/2018			02/23/2018	DeAsia Armster	1969135
SM 2540 D-97	02/21/2018			02/23/2018	DeAsia Armster	1969135
SM 4500 F-C-97	02/21/2018			03/07/2018	Dale L. Simmons	1969135
SM 5310 B-00	02/21/2018			02/26/2018	Megan Treadwell	1969136