

Chemical Analysis Report

CEN-DIST-2017-01-31-01

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

Event Description: **Horse Creek/Elbow Creek**
Request ID: **RQ-2017-01-30-62**
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

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 28-FEB-2017 09:41

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored 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: ELBOW CREEK @ 540M DOWNSTREAM OF APOLLO BLVD.

Collection Date/Time: 01/30/2017 10:55

Field ID: G5CE0070

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1868169	EPA 180.1 Rev. 2.0	Turbidity	3.4	A	NTU	P319020	
	EPA 300.0 Rev. 2.1	Chloride	100		mg Cl/L	P319325	
		Sulfate	32		mg SO4/L	P319328	
	SM 2120 B	Color (true)	81		PCU	P319000	
	SM 2320 B-97	Total Alkalinity	140		mg CaCO3/L	P319273	
	SM 2540 C-97	TDS	413		mg/L	P319425	
	SM 2540 D-97	TSS	4	I	mg/L	P319175	
	SM 4500 F-C-97	Fluoride	0.11		mg F/L	P319276	
1868170	EPA 350.1 Rev. 2.0	Ammonia-N	0.15		mg N/L	P319340	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.81		mg N/L	P319030	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.12		mg N/L	P319173	
	EPA 365.1 Rev. 2.0	Total-P	0.099		mg P/L	P319098	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P319074	
1868171	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.072		mg P/L	P319014	

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: HORSE CREEK W OF US HIGHWAY 1 BRIDGE

Collection Date/Time: 01/30/2017 11:20

Field ID: G5CE0071

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1868163	EPA 180.1 Rev. 2.0	Turbidity	2.8		NTU	P319019	
	SM 2320 B-97	Total Alkalinity	121		mg CaCO3/L	P319274	
	SM 2540 D-97	TSS	3	U	mg/L	P319486	
	SM 4500 F-C-97	Fluoride	0.79		mg F/L	P319277	
1868165	EPA 350.1 Rev. 2.0	Ammonia-N	0.13		mg N/L	P319339	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P319125	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.046		mg N/L	P319163	
	EPA 365.1 Rev. 2.0	Total-P	0.074		mg P/L	P319101	MS
	SM 5310 B-00	Organic Carbon	12		mg C/L	P319076	
1868167	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.045		mg P/L	P319017	
1868175	EPA 200.7 Rev. 4.4	Iron	120	I	ug/L	P319117	
		Zinc	15	U	ug/L	P319117	
	EPA 200.8 Rev. 5.4	Arsenic	3.22		ug/L	P319117	
		Cadmium	0.060	U	ug/L	P319117	
		Chromium	1.2	U	ug/L	P319117	
		Copper	0.91	I	ug/L	P319117	
		Lead	0.27	I	ug/L	P319117	
		Nickel	0.60	U	ug/L	P319117	
		Silver	0.030	U	ug/L	P319117	

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: HORSE CREEK @ CROTON ROAD BRIDGE

Collection Date/Time: 01/30/2017 11:40

Field ID: G5CE0078

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1868164	EPA 180.1 Rev. 2.0	Turbidity	1.9	A	NTU	P319019	
	SM 2320 B-97	Total Alkalinity	100		mg CaCO3/L	P319273	
	SM 2540 D-97	TSS	2	I	mg/L	P319175	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P319276	
1868166	EPA 350.1 Rev. 2.0	Ammonia-N	0.048		mg N/L	P319340	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.67		mg N/L	P319030	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.22		mg N/L	P319173	
	EPA 365.1 Rev. 2.0	Total-P	0.074		mg P/L	P319098	
	SM 5310 B-00	Organic Carbon	16		mg C/L	P319074	
1868168	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.056		mg P/L	P319014	
1868176	EPA 200.7 Rev. 4.4	Iron	85	I	ug/L	P319200	
		Zinc	5.0	U	ug/L	P319200	
	EPA 200.8 Rev. 5.4	Arsenic	2.01		ug/L	P319200	
		Cadmium	0.020	U	ug/L	P319200	
		Chromium	0.60	I	ug/L	P319200	
		Copper	0.81		ug/L	P319200	
		Lead	0.14	I	ug/L	P319200	
		Nickel	0.46	I	ug/L	P319200	
		Silver	0.010	U	ug/L	P319200	

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: P319019

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P319020

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P319117

Component	Result	Code	Units
Iron	30	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P319200

Component	Result	Code	Units
Iron	30	U	ug/L
Zinc	5.0	U	ug/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P319117

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 200.8 Rev. 5.4
Batch ID: P319200

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: P319325

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319328

Component	Result	Code	Units
Sulfate	0.20	U	mg SO ₄ /L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319339

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319340

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319030

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: P319125

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319163

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319173

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319098

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319101

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319014

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319017

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

Reference Method: SM 2120 B
Batch ID: P319000

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P319273

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

Quality Assurance Report Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P319274

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

Reference Method: SM 2540 C-97
Batch ID: P319425

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P319175

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P319486

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P319276

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P319277

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P319074

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Reference Method: SM 5310 B-00
Batch ID: P319076

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: P319117

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319117

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	103		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319200

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	101		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P319117

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	93.5		P	85 - 115
Cadmium	94.2		P	85 - 115
Chromium	94.7		P	85 - 115
Copper	94.6		P	85 - 115
Lead	93.9		P	85 - 115
Nickel	92.2		P	85 - 115
Silver	95.3		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P319200

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	92.6		P	85 - 115
Cadmium	96.3		P	85 - 115
Chromium	97.7		P	85 - 115
Copper	91.7		P	85 - 115
Lead	96.9		P	85 - 115
Nickel	92.3		P	85 - 115
Silver	98.2		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319325

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319328

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319339

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319340

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319030

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: P319125

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319163

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	105		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319173

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	106		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319098

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	92.8		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319101

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	96.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319014

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319017

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-97
Batch ID: P319273

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

Reference Method: SM 2320 B-97
Batch ID: P319274

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

Reference Method: SM 4500 F-C-97
Batch ID: P319276

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.9		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P319277

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

Reference Method: SM 5310 B-00
Batch ID: P319074

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.4		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P319076

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319117

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1867233	Iron	99.9	95.6	P/P	70 - 130
1867233	Zinc	95.7	92.4	P/P	70 - 130

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319200

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868304	Iron	106		P	80 - 120
1868304	Zinc	101		P	80 - 120
1868526	Iron	103	98.5	P/P	80 - 120
1868526	Zinc	103	94.8	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P319117

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1867233	Arsenic	109	109	P/P	80 - 120
1867233	Cadmium	105	105	P/P	80 - 120
1867233	Chromium	94.3	93.7	P/P	80 - 120
1867233	Copper	97.6	97.0	P/P	80 - 120
1867233	Lead	109	106	P/P	80 - 120
1867233	Nickel	106	97.4	P/P	80 - 120
1867233	Silver	104	103	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P319200

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868304	Arsenic	89.9		P	80 - 120
1868304	Cadmium	96.1		P	80 - 120
1868304	Chromium	94.9		P	80 - 120
1868304	Copper	87.2		P	80 - 120
1868304	Lead	93.5		P	80 - 120
1868304	Nickel	88.4		P	80 - 120
1868304	Silver	96.2		P	80 - 120
1868526	Arsenic	94.3	95.6	P/P	80 - 120
1868526	Cadmium	97.5	96.4	P/P	80 - 120
1868526	Chromium	97.4	97.4	P/P	80 - 120
1868526	Copper	92.5	93.1	P/P	80 - 120
1868526	Lead	98.8	98.7	P/P	80 - 120
1868526	Nickel	91.6	91.9	P/P	80 - 120
1868526	Silver	98.4	96.9	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319325

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868181	Chloride	102		P	90 - 110
1868205	Chloride	99.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319328

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868181	Sulfate	97.3		P	90 - 110
1868205	Sulfate	92.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319339

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868121	Ammonia-N	105	107	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319340

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868166	Ammonia-N	107	104	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319030

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868166	Kjeldahl Nitrogen	93.5	99.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319125

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868122	Kjeldahl Nitrogen	99.7	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319163

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868124	NO2NO3-N	103	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319173

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868103	NO2NO3-N	106	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319098

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868193	Total-P	97.4	95.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319101

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868121	Total-P	88.5	83.3	F/F	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319014

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868190	O-Phosphate-P	98.3	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319017

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868127	O-Phosphate-P	96.9	98.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P319276

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868301	Fluoride	96.6	98.3	P/P	91 - 105

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P319277

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868117	Fluoride	93.5	95.0	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P319074

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868166	Organic Carbon	96.1	96.6	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P319076

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1868121	Organic Carbon	90.1	94.4	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P319019

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868164	Turbidity	1.61	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P319020

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868169	Turbidity	3.52	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319117

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1867233	Iron	4.43	Spike	P	0 - 20
1867233	Zinc	3.47	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319200

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868526	Iron	4.92	Spike	P	0 - 20
1868526	Zinc	7.85	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P319117

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1867233	Arsenic	0.497	Spike	P	0 - 20
1867233	Cadmium	0.00592	Spike	P	0 - 20
1867233	Chromium	0.551	Spike	P	0 - 20
1867233	Copper	0.592	Spike	P	0 - 20
1867233	Lead	2.44	Spike	P	0 - 20
1867233	Nickel	8.22	Spike	P	0 - 20
1867233	Silver	0.678	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P319200

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868526	Arsenic	1.23	Spike	P	0 - 20
1868526	Cadmium	1.15	Spike	P	0 - 20
1868526	Chromium	0.00671	Spike	P	0 - 20
1868526	Copper	0.684	Spike	P	0 - 20
1868526	Lead	0.162	Spike	P	0 - 20
1868526	Nickel	0.386	Spike	P	0 - 20
1868526	Silver	1.56	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319325

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868181	Chloride	0.0417	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319328

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868181	Sulfate	3.85	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319339

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868121	Ammonia-N	1.24	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319340

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868166	Ammonia-N	1.13	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319030

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868166	Kjeldahl Nitrogen	3.88	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319125

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868122	Kjeldahl Nitrogen	1.04	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319163

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868124	NO2NO3-N	4.46	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319173

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868103	NO2NO3-N	1.39	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319098

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868193	Total-P	1.36	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319101

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868121	Total-P	5.87	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868190	O-Phosphate-P	2.11	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319017

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868127	O-Phosphate-P	1.61	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
Batch ID: P319000

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868180	Color (true)	0.384	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P319273

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868301	Total Alkalinity	0.234	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P319274

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868117	Total Alkalinity	0.0198	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P319425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868012	TDS	0.217	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P319276

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868301	Fluoride	1.50	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P319277

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868117	Fluoride	0.960	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P319074

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868166	Organic Carbon	0.308	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P319076

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1868121	Organic Carbon	4.27	Spike	P	0 - 20

Quality Assurance Report Precision

* 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: A74192
Included Lab Sample IDs: 1868169

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.4	100	P/P	85 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A74194
Included Lab Sample IDs: 1868167, 1868168, 1868171

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	102	102	P/P	90 - 110
O-Phosphate-P	99.9	102	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A74195
Included Lab Sample IDs: 1868163, 1868164, 1868169

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	97.0	98.0	P/P	95 - 105
Turbidity	98.0	99.0	P/P	95 - 105

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A74206
Included Lab Sample IDs: 1868169

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.4	102	P/P	90 - 110
Sulfate	91.2	97.1	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A74208
Included Lab Sample IDs: 1868165, 1868166, 1868170

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.7	98.0	P/P	90 - 110
Organic Carbon	99.6	90.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A74218
Included Lab Sample IDs: 1868166, 1868170

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	101	P/P	90 - 110
Kjeldahl Nitrogen	103	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A74224

Included Lab Sample IDs: 1868166, 1868170

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A74232

Included Lab Sample IDs: 1868165

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A74235

Included Lab Sample IDs: 1868166, 1868170

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: A74243

Included Lab Sample IDs: 1868165

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	96.5	96.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A74267

Included Lab Sample IDs: 1868165

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

Reference Method: SM 2320 B-97

Run ID: A74269

Included Lab Sample IDs: 1868163, 1868164, 1868169

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	104	P/P	90 - 110
Total Alkalinity	103	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A74269

Included Lab Sample IDs: 1868163, 1868164, 1868169

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.5	99.0	P/P	90 - 110
Fluoride	99.0	98.0	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A74277

Included Lab Sample IDs: 1868175

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A74277

Included Lab Sample IDs: 1868175

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	97.9	97.4	P/P	90 - 110
Zinc	99.3	99.3	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A74289

Included Lab Sample IDs: 1868165, 1868166, 1868170

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	99.4	P/P	90 - 110
Ammonia-N	99.4	99.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A74304

Included Lab Sample IDs: 1868176

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	98.7	97.8	P/P	90 - 110
Zinc	100	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A74331

Included Lab Sample IDs: 1868175

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	105	104	P/P	90 - 110
Cadmium	103	103	P/P	90 - 110
Chromium	104	99.9	P/P	90 - 110
Copper	102	99.6	P/P	90 - 110
Lead	102	102	P/P	90 - 110
Nickel	104	102	P/P	90 - 110
Silver	109	108	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A74420

Included Lab Sample IDs: 1868176

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	97.0	P/P	90 - 110
Cadmium	102	101	P/P	90 - 110
Chromium	105	103	P/P	90 - 110
Copper	99.9	97.8	P/P	90 - 110
Lead	101	100	P/P	90 - 110
Nickel	99.7	97.1	P/P	90 - 110
Silver	107	105	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						1.61	
	Turbidity						3.52	
EPA 200.7 Rev. 4.4	Iron	103	99.9	95.6				4.43
	Iron	101	106	103	98.5			4.92
	Zinc	101	95.7	92.4				3.47
	Zinc	100	101	103	94.8			7.85
EPA 200.8 Rev. 5.4	Arsenic	93.5	109	109				0.497
	Arsenic	92.6	89.9	94.3	95.6			1.23
	Cadmium	94.2	105	105				0.0059
	Cadmium	96.3	96.1	97.5	96.4			1.15
	Chromium	94.7	94.3	93.7				0.551
	Chromium	97.7	94.9	97.4	97.4			0.0067
	Copper	94.6	97.6	97.0				0.592
	Copper	91.7	87.2	92.5	93.1			0.684
	Lead	93.9	109	106				2.44
	Lead	96.9	93.5	98.8	98.7			0.162
	Nickel	92.2	106	97.4				8.22
	Nickel	92.3	88.4	91.6	91.9			0.386
	Silver	95.3	104	103				0.678
	Silver	98.2	96.2	98.4	96.9			1.56
EPA 300.0 Rev. 2.1	Chloride	102	102	99.3			0.0417	
	Sulfate	96.4	97.3	92.7			3.85	
EPA 350.1 Rev. 2.0	Ammonia-N	103	105	107				1.24
	Ammonia-N	102	107	104				1.13
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	93.5	99.4				3.88
	Kjeldahl Nitrogen	103	99.7	98.5				1.04
EPA 353.2 Rev. 2.0	NO2NO3-N	105	103	108				4.46
	NO2NO3-N	106	106	104				1.39
EPA 365.1 Rev. 2.0	Total-P	92.8	97.4	95.8				1.36
	Total-P	96.2	88.5	83.3				5.87
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.3	98.3	100				2.11
	O-Phosphate-P	100	96.9	98.7				1.61
SM 2120 B	Color (true)						0.384	
SM 2320 B-97	Total Alkalinity	103					0.234	
	Total Alkalinity	103					0.0198	
SM 2540 C-97	TDS						0.217	
SM 4500 F-C-97	Fluoride	97.9	96.6	98.3				1.50
	Fluoride	97.4	93.5	95.0				0.960
SM 5310 B-00	Organic Carbon	96.4	96.1	96.6				0.308
	Organic Carbon	97.6	90.1	94.4				4.27

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1868163, 1868164, 1868169
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1868175, 1868176
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1868175, 1868176
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1868169
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1868169

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1868165, 1868166, 1868170
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1868165, 1868166, 1868170
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1868165, 1868166, 1868170
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1868165, 1868166, 1868170
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1868167, 1868168, 1868171
SM 2120 B / E31780	True Color measured at 450 nm	1868169
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1868163, 1868164, 1868169
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1868169
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1868163, 1868164, 1868169
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1868163, 1868164, 1868169
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1868165, 1868166, 1868170

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	01/31/2017			01/31/2017 16:45	Julie Michelle Frank	1868163, 1868164, 1868169
EPA 200.7 Rev. 4.4	01/31/2017	02/01/2017	Elliott D. Healy	02/03/2017	Joshua Ayres	1868175
	01/31/2017	02/02/2017	Elliott D. Healy	02/06/2017	Joshua Ayres	1868176
EPA 200.8 Rev. 5.4	01/31/2017	02/01/2017	Elliott D. Healy	02/07/2017	Betina Topolski	1868175
	01/31/2017	02/02/2017	Elliott D. Healy	02/11/2017	Betina Topolski	1868176
EPA 300.0 Rev. 2.1	01/31/2017			02/03/2017	Ping Hua	1868169
EPA 350.1 Rev. 2.0	01/31/2017			02/02/2017	Sofia Elnemr	1868165, 1868166, 1868170
EPA 351.2 Rev. 2.0	01/31/2017	02/01/2017	Adrian Shelby	02/01/2017	Joseph Suarez	1868166, 1868170
	01/31/2017	02/02/2017	Adrian Shelby	02/03/2017	Joseph Suarez	1868165
EPA 353.2 Rev. 2.0	01/31/2017			02/02/2017	Beverly Y. Sanders	1868165, 1868166, 1868170
EPA 365.1 Rev. 2.0	01/31/2017	02/01/2017	Vijayalakshmi Reddy	02/01/2017	Lipi Saha	1868166, 1868170
	01/31/2017	02/01/2017	Vijayalakshmi Reddy	02/02/2017	Lipi Saha	1868165
EPA 365.1 Rev. 2.0 dissolved	01/31/2017			01/31/2017 15:09	Julie Michelle Frank	1868167
	01/31/2017			01/31/2017 15:15	Julie Michelle Frank	1868168
	01/31/2017			01/31/2017 15:16	Julie Michelle Frank	1868171
SM 2120 B	01/31/2017			01/31/2017 15:04	Jared I. Manley	1868169
SM 2320 B-97	01/31/2017			02/02/2017	Dale L. Simmons	1868164, 1868169
	01/31/2017			02/03/2017	Dale L. Simmons	1868163
SM 2540 C-97	01/31/2017			02/03/2017	Blanca Fach	1868169
SM 2540 D-97	01/31/2017			02/01/2017	Christopher Armour	1868164, 1868169
	01/31/2017			02/03/2017	Blanca Fach	1868163
SM 4500 F-C-97	01/31/2017			02/02/2017	Dale L. Simmons	1868164, 1868169
	01/31/2017			02/03/2017	Dale L. Simmons	1868163
SM 5310 B-00	01/31/2017			01/31/2017	Julie Michelle Frank	1868166, 1868170
	01/31/2017			02/01/2017	Julie Michelle Frank	1868165