

Chemical Analysis Report

CEN-DIST-2016-11-22-02

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

Event Description: **Horse Creek/Elbow Creek+D&B**
Request ID: **RQ-2016-11-21-30**
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
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Certified by: Colin Wright, Environmental Administrator

Date Certified: 20-DEC-2016 12:55

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

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: ELBOW CREEK @ 540 DS OF APOLLO

Collection Date/Time: 11/21/2016 11:50

Field ID: G5CE0070

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852020	EPA 180.1 Rev. 2.0	Turbidity	1.8		NTU	P315621	
	EPA 300.0 Rev. 2.1	Chloride	95		mg Cl/L	P316120	
		Sulfate	32		mg SO4/L	P316116	
	SM 2120 B	Color (true)	86		PCU	P315641	
	SM 2320 B-97	Total Alkalinity	135		mg CaCO3/L	P315810	
	SM 2540 C-97	TDS	366		mg/L	P316227	
	SM 2540 D-97	TSS	3	I	mg/L	P316222	
	SM 4500 F-C-97	Fluoride	0.10		mg F/L	P315813	
1852023	EPA 350.1 Rev. 2.0	Ammonia-N	0.084		mg N/L	P315896	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P316290	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.16		mg N/L	P316024	
	EPA 365.1 Rev. 2.0	Total-P	0.069		mg P/L	P316083	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P315820	
1852026	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.051		mg P/L	P315624	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

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

Sample Location: ELBOW CREEK @ 540 DS OF APOLLO

Collection Date/Time: 11/21/2016 11:55

Field ID: G5CE0070_DUP

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852021	EPA 180.1 Rev. 2.0	Turbidity	1.9		NTU	P315621	
	EPA 300.0 Rev. 2.1	Chloride	95		mg Cl/L	P316120	
		Sulfate	32		mg SO4/L	P316116	
	SM 2120 B	Color (true)	86		PCU	P315641	
	SM 2320 B-97	Total Alkalinity	134		mg CaCO3/L	P315810	
	SM 2540 C-97	TDS	358		mg/L	P316227	
	SM 2540 D-97	TSS	2	I	mg/L	P316222	
	SM 4500 F-C-97	Fluoride	0.11		mg F/L	P315813	
1852024	EPA 350.1 Rev. 2.0	Ammonia-N	0.083		mg N/L	P315896	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.64		mg N/L	P316290	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.15		mg N/L	P316024	
	EPA 365.1 Rev. 2.0	Total-P	0.068		mg P/L	P316083	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P315820	
1852027	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.052		mg P/L	P315624	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

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

Sample Location: FIELD BLANK

Collection Date/Time: 11/21/2016 12:00

Field ID: Field Blank

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852022	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P315621	

Field ID: Field Blank

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852022	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P316113	
		Sulfate	0.20	U	mg SO4/L	P316117	
	SM 2120 B	Color (true)	2.5	U	PCU	P315641	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P315810	
	SM 2540 C-97	TDS	15	U	mg/L	P316226	
	SM 2540 D-97	TSS	2	U	mg/L	P316221	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P315813	
1852025	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P315896	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P316290	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P316024	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P316083	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P315820	
1852028	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P315624	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

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

Sample Location: HORSE CREEK WEST OF US HWY 1 BRIDGE Collection Date/Time: 11/21/2016 12:15

Field ID: G5CE0071

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1852017	EPA 180.1 Rev. 2.0	Turbidity	3.4	A	NTU	P315621	
	SM 2320 B-97	Total Alkalinity	102		mg CaCO3/L	P315886	
	SM 2540 D-97	TSS	8	I	mg/L	P316224	
	SM 4500 F-C-97	Fluoride	0.72		mg F/L	P315888	
1852018	EPA 350.1 Rev. 2.0	Ammonia-N	0.18		mg N/L	P315959	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P316243	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.21		mg N/L	P316216	
	EPA 365.1 Rev. 2.0	Total-P	0.081		mg P/L	P316084	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P315739	
1852019	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.033		mg P/L	P315626	
1852033	EPA 200.7 Rev. 4.4	Iron	230	I	ug/L	P315850	
	EPA 200.8 Rev. 5.4	Arsenic	2.86		ug/L	P315850	
		Cadmium	0.060	U	ug/L	P315850	
		Chromium	0.40	I	ug/L	P315850	
		Copper	1.3		ug/L	P315850	
		Lead	0.38	I	ug/L	P315850	
		Nickel	0.77	I	ug/L	P316456	
		Silver	0.015	U	ug/L	P315850	
		Zinc	6.3	I	ug/L	P315850	

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P315621

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315850

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315850

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L
Silver	0.0050	U	ug/L
Zinc	1.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Component	Result	Code	Units
Nickel	0.25	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316113

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316116

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316117

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316120

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report

Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315896

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315959

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316243

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316290

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316024

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316216

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316083

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316084

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315624

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315626

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

Reference Method: SM 2120 B
Batch ID: P315641

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P315810

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

Reference Method: SM 2320 B-97
Batch ID: P315886

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

Reference Method: SM 2540 C-97
Batch ID: P316226

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P316227

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P316221

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P316222

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P316224

Component	Result	Code	Units
TSS	3	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P315813

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P315888

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P315739

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

Reference Method: SM 5310 B-00
Batch ID: P315820

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: P315850

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	107		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315850

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	101		P	85 - 115
Cadmium	99.9		P	85 - 115
Chromium	101		P	85 - 115
Copper	98.7		P	85 - 115
Lead	96.8		P	85 - 115
Silver	98.2		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Nickel	97.8		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316113

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316113

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316116

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	96.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316117

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	94.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316120

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315896

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315959

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316243

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316290

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316024

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	105		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316216

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: P316083

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316084

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315624

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315626

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

Reference Method: SM 2320 B-97
Batch ID: P315810

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

Reference Method: SM 2320 B-97
Batch ID: P315886

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.4		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P315813

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.4		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P315888

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.5		P	92 - 103

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P315739

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.8		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P315820

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.2		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315850

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852424	Iron	103	102	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315850

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852424	Arsenic	97.6	102	P/P	70 - 130
1852424	Cadmium	88.2	91.0	P/P	70 - 130
1852424	Chromium	79.4	81.2	P/P	70 - 130
1852424	Copper	91.1	91.4	P/P	70 - 130
1852424	Lead	102	101	P/P	70 - 130
1852424	Silver	86.3	85.8	P/P	70 - 130
1852424	Zinc	83.3	90.1	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849922	Nickel	78.6		P	70 - 130
1850586	Nickel	91.2	91.7	P/P	70 - 130

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316113

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851937	Chloride	96.5		P	90 - 110
1851938	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316116

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852092	Sulfate	97.3		P	90 - 110
1852093	Sulfate	99.1		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316120

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852092	Chloride	102		P	90 - 110
1852093	Chloride	102		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315896

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851944	Ammonia-N	98.8	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315959

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852239	Ammonia-N	95.7	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316243

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851483	Kjeldahl Nitrogen	100	99.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316290

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851901	Kjeldahl Nitrogen	110	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316024

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852051	NO2NO3-N	106	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316216

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851929	NO2NO3-N	108	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316083

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852023	Total-P	103	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316084

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852290	Total-P	102	96.1	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315624

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852043	O-Phosphate-P	97.2	98.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315626

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852019	O-Phosphate-P	97.3	99.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P315813

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852076	Fluoride	98.8	99.5	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P315888

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1852235	Fluoride	96.4	97.8	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P315739

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849999	Organic Carbon	96.1	95.7	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P315820

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851897	Organic Carbon	94.2	95.8	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P315621

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852017	Turbidity	0.873	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315850

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852424	Iron	0.133	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315850

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852424	Arsenic	4.53	Spike	P	0 - 20
1852424	Cadmium	3.15	Spike	P	0 - 20
1852424	Chromium	2.24	Spike	P	0 - 20
1852424	Copper	0.339	Spike	P	0 - 20
1852424	Lead	0.616	Spike	P	0 - 20
1852424	Silver	0.611	Spike	P	0 - 20
1852424	Zinc	7.83	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850586	Nickel	0.575	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316113

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851937	Chloride	0.00177	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316117

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851937	Sulfate	0.0167	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316120

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852092	Chloride	2.11	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315896

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851944	Ammonia-N	1.60	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315959

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852239	Ammonia-N	2.94	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316243

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851483	Kjeldahl Nitrogen	0.698	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316290

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851901	Kjeldahl Nitrogen	2.38	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316024

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852051	NO2NO3-N	0.943	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P316216

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851929	NO2NO3-N	0.935	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316083

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852023	Total-P	3.66	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P316084

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852290	Total-P	5.56	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315624

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852043	O-Phosphate-P	1.37	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315626

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852019	O-Phosphate-P	1.60	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
Batch ID: P315641

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851939	Color (true)	0.213	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P315810

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852076	Total Alkalinity	0.162	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P315886

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852235	Total Alkalinity	0.690	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P316226

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851937	TDS	6.32	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P316227

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852039	TDS	4.22	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P315813

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852076	Fluoride	0.490	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P315888

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1852235	Fluoride	0.986	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P315739

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849999	Organic Carbon	0.309	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 5310 B-00
 Batch ID: P315820

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851897	Organic Carbon	1.62	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
 Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
 Run ID: A72966
 Included Lab Sample IDs: 1852017, 1852020, 1852021, 1852022

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	99.5	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Run ID: A72967
 Included Lab Sample IDs: 1852019, 1852026, 1852027, 1852028

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.9	P/P	90 - 110
O-Phosphate-P	99.4	100	P/P	90 - 110

Reference Method: SM 2120 B
 Run ID: A72971
 Included Lab Sample IDs: 1852020, 1852021, 1852022

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	104	P/P	85 - 115

Reference Method: SM 5310 B-00
 Run ID: A73009
 Included Lab Sample IDs: 1852018

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.4	97.3	P/P	90 - 110

Reference Method: SM 2320 B-97
 Run ID: A73035
 Included Lab Sample IDs: 1852020, 1852021, 1852022

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

Reference Method: SM 4500 F-C-97
 Run ID: A73035
 Included Lab Sample IDs: 1852020, 1852021, 1852022

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

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00

Run ID: A73041

Included Lab Sample IDs: 1852023, 1852024, 1852025

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.7	95.4	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A73065

Included Lab Sample IDs: 1852017

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	98.6	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A73065

Included Lab Sample IDs: 1852017

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	97.4	98.1	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A73074

Included Lab Sample IDs: 1852023, 1852024, 1852025

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A73098

Included Lab Sample IDs: 1852018

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.0	98.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A73117

Included Lab Sample IDs: 1852023, 1852024, 1852025

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A73127

Included Lab Sample IDs: 1852033

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	108	109	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A73131

Included Lab Sample IDs: 1852020, 1852021, 1852022

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A73131

Included Lab Sample IDs: 1852020, 1852021, 1852022

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sulfate	97.7	98.3	P/P	90 - 110
Sulfate	98.3	95.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73183

Included Lab Sample IDs: 1852023, 1852024

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73187

Included Lab Sample IDs: 1852018, 1852025

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.2	97.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A73189

Included Lab Sample IDs: 1852018

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73222

Included Lab Sample IDs: 1852033

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	96.8	97.9	P/P	90 - 110
Cadmium	96.7	96.4	P/P	90 - 110
Chromium	96.5	92.0	P/P	90 - 110
Lead	91.2	90.9	P/P	90 - 110
Zinc	98.6	97.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A73234

Included Lab Sample IDs: 1852018

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73248

Included Lab Sample IDs: 1852033

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	97.9	97.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A73249

Included Lab Sample IDs: 1852023, 1852024, 1852025

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	98.7	P/P	90 - 110
Kjeldahl Nitrogen	98.7	96.7	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73271

Included Lab Sample IDs: 1852033

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	97.7	98.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73273

Included Lab Sample IDs: 1852033

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	101	97.7	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					0.873	
EPA 200.7 Rev. 4.4	Iron	107	103	102			0.133
EPA 200.8 Rev. 5.4	Arsenic	101	97.6	102			4.53
	Cadmium	99.9	88.2	91.0			3.15
	Chromium	101	79.4	81.2			2.24
	Copper	98.7	91.1	91.4			0.339
	Lead	96.8	102	101			0.616
	Nickel	97.8	91.2	91.7	78.6		0.575
	Silver	98.2	86.3	85.8			0.611
	Zinc	102	83.3	90.1			7.83
EPA 300.0 Rev. 2.1	Chloride	98.4	96.5	101		0.0017	
	Chloride	99.9	102	102		2.11	
	Sulfate	96.3	97.3	99.1			
	Sulfate	94.0				0.0167	
EPA 350.1 Rev. 2.0	Ammonia-N	106	98.8	101			1.60
	Ammonia-N	98.6	95.7	101			2.94
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	100	99.5			0.698
	Kjeldahl Nitrogen	104	110	107			2.38
EPA 353.2 Rev. 2.0	NO2NO3-N	105	106	106			0.943
	NO2NO3-N	104	108	106			0.935
EPA 365.1 Rev. 2.0	Total-P	105	103	107			3.66
	Total-P	109	102	96.1			5.56
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.6	97.2	98.6			1.37
	O-Phosphate-P	101	97.3	99.4			1.60

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		LCS	Precision	MS
						SMP	
SM 2120 B	Color (true)					0.213	
SM 2320 B-97	Total Alkalinity	103				0.162	
	Total Alkalinity	98.4				0.690	
SM 2540 C-97	TDS					6.32	
	TDS					4.22	
SM 4500 F-C-97	Fluoride	96.4	98.8	99.5			0.490
	Fluoride	96.5	96.4	97.8			0.986
SM 5310 B-00	Organic Carbon	97.8	96.1	95.7			0.309
	Organic Carbon	99.2	94.2	95.8			1.62

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1852017, 1852020, 1852021, 1852022
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1852033
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1852033
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1852020, 1852021, 1852022
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1852020, 1852021, 1852022
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1852018, 1852023, 1852024, 1852025
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1852018, 1852023, 1852024, 1852025
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1852018, 1852023, 1852024, 1852025
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1852018, 1852023, 1852024, 1852025
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1852019, 1852026, 1852027, 1852028
SM 2120 B / E31780	True Color measured at 450 nm	1852020, 1852021, 1852022
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1852017, 1852020, 1852021, 1852022
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1852020, 1852021, 1852022
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1852017, 1852020, 1852021, 1852022
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1852017, 1852020, 1852021, 1852022
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1852018, 1852023, 1852024, 1852025

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	11/22/2016			11/22/2016 15:04	Sima Feizi	1852017, 1852020, 1852021, 1852022
EPA 200.7 Rev. 4.4	11/22/2016	11/29/2016	Elliott D. Healy	12/01/2016	Joshua Ayres	1852033
EPA 200.8 Rev. 5.4	11/22/2016	11/29/2016	Elliott D. Healy	12/06/2016	Charles J. Peterson	1852033
	11/22/2016	11/29/2016	Elliott D. Healy	12/08/2016	Charles J. Peterson	1852033
	11/22/2016	12/08/2016	Elliott D. Healy	12/09/2016	Robert K Palmer	1852033
EPA 300.0 Rev. 2.1	11/22/2016			12/02/2016	Ping Hua	1852020, 1852021, 1852022
EPA 350.1 Rev. 2.0	11/22/2016			11/29/2016	Sofia Elnemr	1852023, 1852024, 1852025
	11/22/2016			11/30/2016	Sofia Elnemr	1852018
EPA 351.2 Rev. 2.0	11/22/2016	12/06/2016	Adrian Shelby	12/07/2016	Joseph Suarez	1852018
	11/22/2016	12/07/2016	Adrian Shelby	12/08/2016	Joseph Suarez	1852023, 1852024, 1852025
EPA 353.2 Rev. 2.0	11/22/2016			12/01/2016	Beverly Y. Sanders	1852023, 1852024, 1852025
	11/22/2016			12/06/2016	Beverly Y. Sanders	1852018
EPA 365.1 Rev. 2.0	11/22/2016	12/02/2016	Adrian Shelby	12/05/2016	Lipi Saha	1852018, 1852023, 1852024, 1852025
EPA 365.1 Rev. 2.0 dissolved	11/22/2016			11/22/2016 15:02	Julia Storbeck	1852019
	11/22/2016			11/22/2016 15:10	Julia Storbeck	1852028
	11/22/2016			11/22/2016 15:14	Julia Storbeck	1852026, 1852027
SM 2120 B	11/22/2016			11/22/2016 15:56	Jared I. Manley	1852020
	11/22/2016			11/22/2016 15:57	Jared I. Manley	1852021
	11/22/2016			11/22/2016 15:58	Jared I. Manley	1852022
SM 2320 B-97	11/22/2016			11/29/2016	Dale L. Simmons	1852017, 1852020, 1852021, 1852022
SM 2540 C-97	11/22/2016			11/26/2016	Yijie Li	1852020, 1852021, 1852022
SM 2540 D-97	11/22/2016			11/26/2016	Yijie Li	1852017, 1852020, 1852021, 1852022
SM 4500 F-C-97	11/22/2016			11/29/2016	Dale L. Simmons	1852017, 1852020, 1852021, 1852022
SM 5310 B-00	11/22/2016			11/23/2016	Julie Michelle Frank	1852018
	11/22/2016			11/28/2016	Julie Michelle Frank	1852023, 1852024, 1852025