

Chemical Analysis Report

CEN-DIST-2016-02-16-02

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

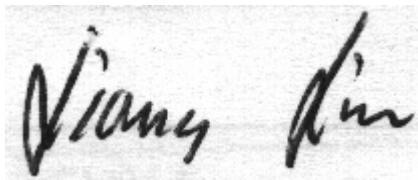
Event Description: **Livingston Creek**
Request ID: **RQ-2016-02-15-49**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
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3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Mike Linger

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 04-MAR-2016 10:23

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 group are included in this report: 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: Livingston Creek @ Ruck's Dairy Road

Collection Date/Time: 02/15/2016 11:26

Field ID: G4CE0085

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1771406	EPA 180.1 Rev. 2.0	Turbidity	2.4		NTU	P298695	
	EPA 300.0 Rev. 2.1	Chloride	19	A	mg Cl/L	P298902	
		Sulfate	24	A	mg SO4/L	P298904	
	SM 2120 B	Color (true)	180		PCU	P298685	
	SM 2320 B-97	Total Alkalinity	23		mg CaCO3/L	P299344	
	SM 2540 C-97	TDS	122		mg/L	P299081	
	SM 2540 D-97	TSS	5	I	mg/L	P299019	
	SM 4500 F-C-97	Fluoride	0.077	I	mg F/L	P299044	
1771407	EPA 350.1 Rev. 2.0	Ammonia-N	0.047		mg N/L	P298874	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P299000	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.29		mg N/L	P299060	
	EPA 365.1 Rev. 2.0	Total-P	0.064		mg P/L	P298896	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P299137	
1771408	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P298676	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P298695

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P298902

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P298904

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P298874

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

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P299000

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299060

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P298896

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P298676

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

Reference Method: SM 2120 B
Batch ID: P298685

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P299344

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

Reference Method: SM 2540 C-97
Batch ID: P299081

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P299019

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P299044

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P299137

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298902

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298904

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P298874

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.9		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299000

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299060

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P298896

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: P298676

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

Reference Method: SM 2320 B-97
Batch ID: P299344

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	95 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P299044

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.0		P	94 - 108

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P299137

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298902

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1771406	Chloride	102		P	90 - 110
1771612	Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298904

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1771406	Sulfate	98.8		P	90 - 110
1771612	Sulfate	99.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P298874

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1771421	Ammonia-N	98.9	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299000

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1771398	Kjeldahl Nitrogen	99.7	93.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299060

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1771350	NO2NO3-N	96.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P298896

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1771398	Total-P	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P298676

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1771287	O-Phosphate-P	102	102	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P299044

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1771613	Fluoride	98.8	98.3	P/P	94 - 107

Reference Method: SM 5310 B-00
Batch ID: P299137

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1771316	Organic Carbon	92.6	95.2	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P298695

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771302	Turbidity	5.36	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298902

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771406	Chloride	0.0473	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298904

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771406	Sulfate	0.124	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P298874

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771421	Ammonia-N	0.728	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P299000

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771398	Kjeldahl Nitrogen	3.72	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
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Quality Assurance Report Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P299060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771350	NO2NO3-N	0.583	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P298896

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771398	Total-P	0.334	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P298676

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771287	O-Phosphate-P	0.295	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P298685

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771302	Color (true)	1.04	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P299344

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771613	Total Alkalinity	4.67	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P299081

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771349	TDS	1.97	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P299044

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771613	Fluoride	0.487	Spike	P	0 - 3.7

Reference Method: SM 5310 B-00
Batch ID: P299137

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1771316	Organic Carbon	1.89	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: EPA 365.1 Rev. 2.0 dissolved

Run ID: A67625

Included Lab Sample IDs: 1771408

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.0	97.2	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A67630

Included Lab Sample IDs: 1771406

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	103	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A67632

Included Lab Sample IDs: 1771406

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A67638

Included Lab Sample IDs: 1771406

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	101	P/P	90 - 110
Sulfate	97.6	99.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A67680

Included Lab Sample IDs: 1771407

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.9	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A67717

Included Lab Sample IDs: 1771407

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	99.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A67743

Included Lab Sample IDs: 1771406

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	99.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A67752

Included Lab Sample IDs: 1771407

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A67757

Included Lab Sample IDs: 1771407

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

Reference Method: SM 5310 B-00

Run ID: A67778

Included Lab Sample IDs: 1771407

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	93.7	94.9	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A67858

Included Lab Sample IDs: 1771406

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

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery	LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity				5.36	
EPA 300.0 Rev. 2.1	Chloride	104	102	102	0.0473	
	Sulfate	100	98.8	99.4	0.124	
EPA 350.1 Rev. 2.0	Ammonia-N	97.9	98.9	100		0.728
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.8	99.7	93.3		3.72
EPA 353.2 Rev. 2.0	NO2NO3-N	101	96.2			0.583
EPA 365.1 Rev. 2.0	Total-P	101	102	103		0.334
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	102	102		0.295
SM 2120 B	Color (true)				1.04	
SM 2320 B-97	Total Alkalinity	104			4.67	
SM 2540 C-97	TDS				1.97	
SM 4500 F-C-97	Fluoride	98.0	98.8	98.3		0.487
SM 5310 B-00	Organic Carbon	94.4	92.6	95.2		1.89

Reference Method Descriptions

Method / DoH Cert #

Description

Associated Samples

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1771406
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1771406
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1771406
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1771407
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1771407
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1771407
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1771407
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1771408
SM 2120 B / E31780	True Color measured at 450 nm	1771406
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1771406
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1771406
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1771406
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1771406
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1771407

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	02/16/2016			02/16/2016 15:33	Sima Feizi	1771406
EPA 300.0 Rev. 2.1	02/16/2016			02/18/2016	Ping Hua	1771406
EPA 350.1 Rev. 2.0	02/16/2016			02/18/2016	Diana M. Turner	1771407
EPA 351.2 Rev. 2.0	02/16/2016	02/22/2016	Christopher Armour	02/23/2016	Bryan A. Werth	1771407
EPA 353.2 Rev. 2.0	02/16/2016			02/22/2016	Diana M. Turner	1771407
EPA 365.1 Rev. 2.0	02/16/2016	02/19/2016	Christopher Armour	02/19/2016	Lipi Saha	1771407
EPA 365.1 Rev. 2.0 dissolved	02/16/2016			02/16/2016 14:29	Bryan A. Werth	1771408
SM 2120 B	02/16/2016			02/16/2016 15:19	Blanca Fach	1771406
SM 2320 B-97	02/16/2016			02/25/2016	Dale L. Simmons	1771406
SM 2540 C-97	02/16/2016			02/17/2016	Yijie Li	1771406
SM 2540 D-97	02/16/2016			02/17/2016	Yijie Li	1771406
SM 4500 F-C-97	02/16/2016			02/22/2016	Dale L. Simmons	1771406
SM 5310 B-00	02/16/2016			02/23/2016	Sofia Elnemr	1771407