

Chemical Analysis Report

WQAP-2019-07-12-01

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

Event Description: **Algal Bloom Response - SWD**
Request ID: **RQ-2019-07-08-79**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Date Certified: 30-JUL-2019 19:04



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: Nutrients and Pesticides.

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 by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

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

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

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

Precision is reported as relative percent difference unless otherwise noted.

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

QC Codes used in this report may include:

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

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

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

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

Sample Location: LAKE SEMINOLE NORTH

Collection Date/Time: 07/11/2019 10:50

Field ID: LAKE SEMINOLE NORTH

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2102649	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P367024	
		Cylindrospermopsin**	0.25	U	ug/L	P367024	
		Microcystin LA**	0.25	U	ug/L	P367024	
		Microcystin LF**	0.25	U	ug/L	P367024	
		Microcystin LR**	0.25	U	ug/L	P367024	
		Microcystin LY**	0.25	U	ug/L	P367024	
		Microcystin RR**	0.25	U	ug/L	P367024	
		Microcystin YR**	0.25	U	ug/L	P367024	

Sample Location: LAKE SEMINOLE NORTH

Collection Date/Time: 07/11/2019 10:50

Field ID: LAKE SEMINOLE NORTH

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2102660	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P367750	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.0		mg N/L	P367200	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P367262	
	EPA 365.1 Rev. 2.0	Total-P	0.059		mg P/L	P367216	
2102662	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P367173	

Sample Location: LAKE SEMINOLE SOUTH

Collection Date/Time: 07/11/2019 10:30

Field ID: LAKE SEMINOLE SOUTH

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2102650	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P367024	
		Cylindrospermopsin**	0.25	U	ug/L	P367024	
		Microcystin LA**	0.25	U	ug/L	P367024	
		Microcystin LF**	0.25	U	ug/L	P367024	
		Microcystin LR**	0.25	U	ug/L	P367024	
		Microcystin LY**	0.25	U	ug/L	P367024	
		Microcystin RR**	0.25	U	ug/L	P367024	
		Microcystin YR**	0.25	U	ug/L	P367024	

Sample Location: LAKE SEMINOLE SOUTH

Collection Date/Time: 07/11/2019 10:30

Field ID: LAKE SEMINOLE SOUTH

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2102661	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P367750	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.5		mg N/L	P367201	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P367262	
	EPA 365.1 Rev. 2.0	Total-P	0.053		mg P/L	P367217	
2102663	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P367174	

Ref. Method and Comment:

EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P367750

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P367200

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P367201

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P367262

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P367216

Component	Result	Code	Units
Total-P	0.005	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P367217

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P367173

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P367174

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

Reference Method: EPA 8321B
Batch ID: P367024

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.25	U	ug/L
Microcystin LA	0.25	U	ug/L
Microcystin LF	0.25	U	ug/L

Quality Assurance Report

Method Blank Results

Reference Method: EPA 8321B
Batch ID: P367024

Component	Result	Code	Units
Microcystin LR	0.25	U	ug/L
Microcystin LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin YR	0.25	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P367750

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P367200

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: P367201

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P367262

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	102		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P367216

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: P367217

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P367173

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.1		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P367174

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

Reference Method: EPA 8321B
Batch ID: P367024

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	101		P	40 - 140
Cylindrospermopsin	97.5		P	40 - 140
Microcystin LA	112		P	40 - 140
Microcystin LF	110		P	40 - 140

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 8321B
Batch ID: P367024

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Microcystin LR	101		P	40 - 140
Microcystin LY	112		P	40 - 140
Microcystin RR	105		P	40 - 140
Microcystin YR	108		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P367750

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2102616	Ammonia-N	107	107	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P367200

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2102561	Kjeldahl Nitrogen	101	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P367201

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2102702	Kjeldahl Nitrogen	109	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P367262

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2102653	NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P367216

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2102561	Total-P	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P367173

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2102620	O-Phosphate-P	93.4	94.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P367174

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2102725	O-Phosphate-P	95.9	96.5	P/P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P367024

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2101929	Anatoxin-a	113	101	P/P	40 - 140
2101929	Cylindrospermopsin	98.6	74.3	P/P	40 - 140
2101929	Microcystin LA	121	102	P/P	40 - 140
2101929	Microcystin LF	114	98.8	P/P	40 - 140
2101929	Microcystin LR	114	114	P/P	40 - 140
2101929	Microcystin LY	126	111	P/P	40 - 140
2101929	Microcystin RR	103	103	P/P	40 - 140
2101929	Microcystin YR	122	118	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P367750

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2102616	Ammonia-N	0.182	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P367200

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2102561	Kjeldahl Nitrogen	2.41	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P367201

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2102702	Kjeldahl Nitrogen	2.35	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P367262

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2102653	NO2NO3-N	0.460	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P367216

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2102561	Total-P	1.58	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P367217

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2102702	Total-P	0.176	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P367173

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2102620	O-Phosphate-P	0.804	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P367174

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2102725	O-Phosphate-P	0.624	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P367024

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2101929	Anatoxin-a	11.1	Spike	P	0 - 30
2101929	Cylindrospermopsin	28.1	Spike	P	0 - 30
2101929	Microcystin LA	17.1	Spike	P	0 - 30
2101929	Microcystin LF	14.4	Spike	P	0 - 30
2101929	Microcystin LR	0.195	Spike	P	0 - 30
2101929	Microcystin LY	13.4	Spike	P	0 - 30
2101929	Microcystin RR	0.572	Spike	P	0 - 30
2101929	Microcystin YR	3.18	Spike	P	0 - 30

* 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 Surrogates

Lab Sample ID: 2102649

Field Sample ID: LAKE SEMINOLE NORTH

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	83.1	P	30 - 165

Lab Sample ID: 2102650

Field Sample ID: LAKE SEMINOLE SOUTH

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	84.5	P	30 - 165

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B

Run ID: A92732

Included Lab Sample IDs: 2102649, 2102650

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	91.9	99.7	P/P	50 - 160
Cylindrospermopsin	84.7	97.5	P/P	60 - 160
Microcystin LA	96.3	101	P/P	50 - 160
Microcystin LF	91.8	88.3	P/P	60 - 160
Microcystin LR	86.4	84.5	P/P	60 - 160
Microcystin LY	98.3	98.3	P/P	60 - 160
Microcystin RR	94.1	94.1	P/P	60 - 160
Microcystin YR	90.3	91.9	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A92740

Included Lab Sample IDs: 2102662, 2102663

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.1	97.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A92780

Included Lab Sample IDs: 2102660, 2102661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A92781

Included Lab Sample IDs: 2102660, 2102661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.3	102	P/P	90 - 110
Kjeldahl Nitrogen	99.9	96.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A92785

Included Lab Sample IDs: 2102660, 2102661

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A92906

Included Lab Sample IDs: 2102660, 2102661

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

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

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	109	107	107			0.182
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	101	105			2.41
	Kjeldahl Nitrogen	101	109	106			2.35
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	101	100			0.460
EPA 365.1 Rev. 2.0	Total-P	105	102	104			1.58
	Total-P	102					0.176
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.1	93.4	94.3			0.804
	O-Phosphate-P	102	95.9	96.5			0.624
EPA 8321B	Anatoxin-a	101	113	101			11.1
	Cylindrospermopsin	97.5	98.6	74.3			28.1
	Microcystin LA	112	121	102			17.1
	Microcystin LF	110	114	98.8			14.4
	Microcystin LR	101	114	114			0.195
	Microcystin LY	112	126	111			13.4
	Microcystin RR	105	103	103			0.572
	Microcystin YR	108	122	118			3.18

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2102660, 2102661
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2102660, 2102661
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2102660, 2102661
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2102660, 2102661
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2102662, 2102663
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2102649, 2102650

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 350.1 Rev. 2.0	07/12/2019			07/19/2019 13:58	Virginia P. Brown	2102660
	07/12/2019			07/19/2019 14:00	Virginia P. Brown	2102661
EPA 351.2 Rev. 2.0	07/12/2019	07/15/2019 12:00	Sima Feizi	07/16/2019 09:32	Joseph Suarez	2102660
	07/12/2019	07/15/2019 12:00	Sima Feizi	07/16/2019 09:40	Joseph Suarez	2102661
EPA 353.2 Rev. 2.0	07/12/2019			07/16/2019 09:52	Beverly Y. Sanders	2102660
	07/12/2019			07/16/2019 09:53	Beverly Y. Sanders	2102661
EPA 365.1 Rev. 2.0	07/12/2019	07/15/2019 12:55	Sima Feizi	07/16/2019 09:26	Lipi Saha	2102660
	07/12/2019	07/15/2019 12:55	Sima Feizi	07/16/2019 09:32	Lipi Saha	2102661
EPA 365.1 Rev. 2.0 dissolved	07/12/2019			07/12/2019 16:29	Jhamieka S. Greenwood	2102662
	07/12/2019			07/12/2019 16:31	Jhamieka S. Greenwood	2102663
EPA 8321B	07/12/2019	07/12/2019 11:30	Mohammad Ghaffari	07/12/2019 12:30	Mohammad Ghaffari	2102649
	07/12/2019	07/12/2019 11:30	Mohammad Ghaffari	07/12/2019 12:47	Mohammad Ghaffari	2102650