

Chemical Analysis Report

SO-DIST-2024-03-27-01

Florida DEP Laboratory
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Tallahassee, FL 32399-2400
DOH Accreditation E31780

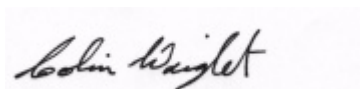
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2023-07-24-16**
Customer: **SO-DIST**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901-3381
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Certified by: Colin Wright, Program Administrator

Date Certified: 09-APR-2024 09:08



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: Orange River - RV boat ramp

Collection Date/Time: 03/26/2024 08:35

Field ID: HAB-SD-032624-0835

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2477808	DEP SOP: NU-094-1	Color (true)	47		PCU	P443405	
2477809	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P443574	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.90		mg N/L	P443425	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P443465	
	EPA 365.1 Rev. 2.0	Total-P	0.054		mg P/L	P443443	
2477810	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.009	I	mg P/L	P443383	
2477811	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P443332	
		Cylindrospermopsin	0.10	U	ug/L	P443331	
		Desmethyl microcystin LR	0.25	U	ug/L	P443331	
		Microcystin HiLR	0.25	U	ug/L	P443331	
		Microcystin HtyR	0.25	U	ug/L	P443331	
		Microcystin LA	0.10	U	ug/L	P443331	
		Microcystin LF	0.10	U	ug/L	P443331	
		Microcystin LR	0.25	U	ug/L	P443331	
		Microcystin LW	0.25	U	ug/L	P443331	
		Microcystin LY	0.10	U	ug/L	P443331	
		Microcystin RR	0.10	U	ug/L	P443331	
		Microcystin WR	0.50	U	ug/L	P443331	
		Neosaxitoxin	0.50	U	ug/L	P443332	
		Microcystin YR	0.25	U	ug/L	P443331	
		Saxitoxin	0.50	U	ug/L	P443332	
		Nodularin-R	0.10	U	ug/L	P443331	

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P443405

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P443574

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P443425

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P443465

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P443443

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P443383

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

Reference Method: EPA 8321B
Batch ID: P443331

Component	Result	Code	Units
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin H1LR	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.10	U	ug/L
Microcystin LF	0.10	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.10	U	ug/L
Microcystin RR	0.10	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.10	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 8321B
Batch ID: P443332

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Neosaxitoxin	0.50	U	ug/L
Saxitoxin	0.50	U	ug/L

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: DEP SOP: NU-094-1
Batch ID: P443405

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P443574

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P443425

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P443465

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P443443

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P443383

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

Reference Method: EPA 8321B
Batch ID: P443331

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	94.2		P	40 - 150
Desmethyl microcystin LR	89.4		P	40 - 150
Microcystin H1LR	92.0		P	40 - 150
Microcystin HtyR	96.8		P	40 - 150
Microcystin LA	91.5		P	40 - 150
Microcystin LF	94.9		P	40 - 150
Microcystin LR	102		P	40 - 150
Microcystin LW	100		P	40 - 150
Microcystin LY	97.0		P	40 - 150
Microcystin RR	95.9		P	40 - 150
Microcystin WR	95.3		P	40 - 150
Microcystin YR	91.5		P	40 - 150
Nodularin-R	91.3		P	40 - 150

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 8321B
Batch ID: P443332

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	109		P	40 - 150
Neosaxitoxin	106		P	40 - 150
Saxitoxin	110		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P443574

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2477809	Ammonia-N	99.2	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P443425

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2477777	Kjeldahl Nitrogen	93.3	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P443465

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2477765	NO2NO3-N	102		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P443443

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2477857	Total-P	105	110	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P443383

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2477625	O-Phosphate-P	97.1	97.4	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P443331

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2477550	Cylindrospermopsin	103	99.9	P/P	40 - 150
2477550	Desmethyl microcystin LR	92.8	96.5	P/P	40 - 150
2477550	Microcystin HiLR	96.0	101	P/P	40 - 150
2477550	Microcystin HtyR	98.4	93.5	P/P	40 - 150
2477550	Microcystin LA	96.9	94.6	P/P	40 - 150
2477550	Microcystin LF	104	104	P/P	40 - 150
2477550	Microcystin LR	82.2	83.8	P/P	40 - 150
2477550	Microcystin LW	108	108	P/P	40 - 150
2477550	Microcystin LY	99.6	98.1	P/P	40 - 150
2477550	Microcystin RR	100	98.8	P/P	40 - 150
2477550	Microcystin WR	103	112	P/P	40 - 150
2477550	Microcystin YR	97.2	99.4	P/P	40 - 150
2477550	Nodularin-R	98.4	96.6	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P443332

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2477550	Anatoxin-a	101	95.3	P/P	40 - 150
2477550	Neosaxitoxin	61.4	57.0	P/P	40 - 150
2477550	Saxitoxin	73.5	69.1	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P443405

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2477794	Color (true)	11.2	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P443574

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2477809	Ammonia-N	0.551	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P443425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2477777	Kjeldahl Nitrogen	8.11	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P443465

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2477765	NO2NO3-N	1.36	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P443443

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2477857	Total-P	3.42	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P443383

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2477625	O-Phosphate-P	0.242	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P443331

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2477550	Cylindrospermopsin	2.81	Spike	P	0 - 30
2477550	Desmethyl microcystin LR	3.63	Spike	P	0 - 30
2477550	Microcystin HtIR	5.00	Spike	P	0 - 30
2477550	Microcystin HtyR	5.07	Spike	P	0 - 30
2477550	Microcystin LA	1.94	Spike	P	0 - 30
2477550	Microcystin LF	0.449	Spike	P	0 - 30
2477550	Microcystin LR	0.700	Spike	P	0 - 30
2477550	Microcystin LW	0.293	Spike	P	0 - 30
2477550	Microcystin LY	1.46	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P443331

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2477550	Microcystin RR	1.46	Spike	P	0 - 30
2477550	Microcystin WR	8.79	Spike	P	0 - 30
2477550	Microcystin YR	2.26	Spike	P	0 - 30
2477550	Nodularin-R	1.86	Spike	P	0 - 30

Reference Method: EPA 8321B
Batch ID: P443332

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2477550	Anatoxin-a	5.72	Spike	P	0 - 30
2477550	Neosaxitoxin	7.40	Spike	P	0 - 30
2477550	Saxitoxin	6.23	Spike	P	0 - 30

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Surrogates

Lab Sample ID: 2477811
Field Sample ID: HAB-SD-032624-0835

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	106	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	92.4	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A125019

Included Lab Sample IDs: 2477810

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.7	98.5	P/P	90 - 110

Reference Method: DEP SOP: NU-094-1

Run ID: A125030

Included Lab Sample IDs: 2477808

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.4	97.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A125052

Included Lab Sample IDs: 2477809

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	98.5	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A125053

Included Lab Sample IDs: 2477811

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	103	97.4	P/P	50 - 160
Desmethyl microcystin LR	104	104	P/P	50 - 160
Microcystin HILR	93.4	103	P/P	50 - 160
Microcystin HtyR	104	103	P/P	50 - 160
Microcystin LA	106	105	P/P	50 - 160
Microcystin LF	106	105	P/P	50 - 160
Microcystin LR	107	106	P/P	50 - 160
Microcystin LW	105	104	P/P	50 - 160
Microcystin LY	105	110	P/P	50 - 160
Microcystin RR	103	103	P/P	50 - 160
Microcystin WR	98.4	105	P/P	50 - 160
Microcystin YR	100	107	P/P	50 - 160
Nodularin-R	101	99.6	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A125054

Included Lab Sample IDs: 2477811

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	110	105	P/P	50 - 160
Neosaxitoxin	117	117	P/P	50 - 160
Saxitoxin	121	122	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A125059

Included Lab Sample IDs: 2477809

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A125089
Included Lab Sample IDs: 2477809

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	98.1	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A125090
Included Lab Sample IDs: 2477809

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.4	98.4	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	MS
					SMP	
DEP SOP: NU-094-1	Color (true)	97.4			11.2	
EPA 350.1 Rev. 2.0	Ammonia-N	97.0	99.2	99.8		0.551
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.2	93.3	104		8.11
EPA 353.2 Rev. 2.0	NO2NO3-N	102	102			1.36
EPA 365.1 Rev. 2.0	Total-P	105	105	110		3.42
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	97.1	97.4		0.242
EPA 8321B	Anatoxin-a	109	101	95.3		5.72
	Cylindrospermopsin	94.2	103	99.9		2.81
	Desmethyl microcystin LR	89.4	92.8	96.5		3.63
	Microcystin HiLR	92.0	96.0	101		5.00
	Microcystin HtyR	96.8	98.4	93.5		5.07
	Microcystin LA	91.5	96.9	94.6		1.94
	Microcystin LF	94.9	104	104		0.449
	Microcystin LR	102	82.2	83.8		0.700
	Microcystin LW	100	108	108		0.293
	Microcystin LY	97.0	99.6	98.1		1.46
	Microcystin RR	95.9	100	98.8		1.46
	Microcystin WR	95.3	103	112		8.79
	Microcystin YR	91.5	97.2	99.4		2.26
	Neosaxitoxin	106	61.4	57.0		7.40
	Nodularin-R	91.3	98.4	96.6		1.86
	Saxitoxin	110	73.5	69.1		6.23

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2477808
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2477809
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2477809
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2477809
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2477809
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2477810
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2477811
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2477811

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP: NU-094-1	03/27/2024			03/27/2024 14:43	Jessica K Wilks	2477808
EPA 350.1 Rev. 2.0	03/27/2024			04/01/2024 11:51	Khloe J Berg	2477809
EPA 351.2 Rev. 2.0	03/27/2024	03/29/2024 12:42	Simonne.V. Calhoun	04/01/2024 11:48	Robyn Blevins	2477809
EPA 353.2 Rev. 2.0	03/27/2024			03/28/2024 12:47	Fadila Guebre	2477809
EPA 365.1 Rev. 2.0	03/27/2024	03/28/2024 13:40	Josephine W Gitau	03/29/2024 09:19	Elise M. Gillis	2477809
EPA 365.1 Rev. 2.0 dissolved	03/27/2024			03/27/2024 12:45	Elise M. Gillis	2477810
EPA 8321B	03/27/2024	03/28/2024 11:30	Samatha Luckman	03/28/2024 14:22	Samatha Luckman	2477811
	03/27/2024	03/28/2024 11:30	Samatha Luckman	03/28/2024 22:22	Samatha Luckman	2477811