

Chemical Analysis Report

SO-DIST-2023-08-04-02

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

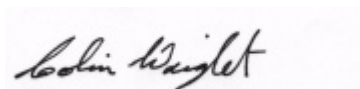
Event Description: **Algal Bloom Response -SOROC- Highlands**
Request ID: **RQ-2023-06-12-72**
Customer: **SO-DIST**
Project ID: **BLOOM-RESP**

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: 24-AUG-2023 09:37



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 Istokpoga

Collection Date/Time: 08/03/2023 07:58

Field ID: HAB-HC-080323-0758

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2428832	DEP SOP: NU-094-1	Color (true)	36		PCU	P433475	
2428833	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P433837	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.8	J	mg N/L	P433540	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.006	I	mg N/L	P433506	
	EPA 365.1 Rev. 2.0	Total-P	0.062		mg P/L	P433499	
2428834	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P433458	
2428835	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P433422	
		Cylindrospermopsin	0.10	U	ug/L	P433421	
		Desmethyl microcystin LR	0.25	U	ug/L	P433421	
		Microcystin HiLR	0.25	U	ug/L	P433421	
		Microcystin HtyR	0.25	U	ug/L	P433421	
		Microcystin LA	0.16	I	ug/L	P433421	
		Microcystin LF	0.10	U	ug/L	P433421	
		Microcystin LR	0.61	I	ug/L	P433421	
		Microcystin LW	0.25	U	ug/L	P433421	
		Microcystin LY	0.10	U	ug/L	P433421	
		Microcystin RR	0.10	U	ug/L	P433421	
		Microcystin WR	0.50	U	ug/L	P433421	
		Neosaxitoxin	0.50	U	ug/L	P433422	
		Microcystin YR	0.25	U	ug/L	P433421	
		Saxitoxin	0.50	U	ug/L	P433422	
		Nodularin-R	0.10	U	ug/L	P433421	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: Refer to the Lab Analysis Report for an explanation of QC Codes.

Quality Assurance Report Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P433475

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P433837

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433540

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P433506

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433499

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433458

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

Reference Method: EPA 8321B
Batch ID: P433421

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: P433422

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: P433475

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P433837

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433540

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P433506

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: P433499

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433458

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

Reference Method: EPA 8321B
Batch ID: P433421

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	103		P	40 - 160
Desmethyl microcystin LR	108		P	40 - 160
Microcystin H11R	109		P	40 - 160
Microcystin HtyR	100		P	40 - 160
Microcystin LA	111		P	40 - 160
Microcystin LF	89.8		P	40 - 160
Microcystin LR	108		P	40 - 160
Microcystin LW	105		P	40 - 160
Microcystin LY	112		P	40 - 160
Microcystin RR	103		P	40 - 160
Microcystin WR	115		P	40 - 160
Microcystin YR	97.4		P	40 - 160
Nodularin-R	106		P	40 - 160

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 8321B
Batch ID: P433422

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	81.5		P	40 - 150
Neosaxitoxin	80.9		P	40 - 150
Saxitoxin	81.3		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P433837

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428800	Ammonia-N	95.0	96.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433540

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428833	Kjeldahl Nitrogen	113	87.9	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P433506

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428823	NO2NO3-N	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433499

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428823	Total-P	99.6	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433458

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428840	O-Phosphate-P	99.6	101	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P433421

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428771	Cylindrospermopsin	112	107	P/P	40 - 160
2428771	Desmethyl microcystin LR	117	113	P/P	40 - 160
2428771	Microcystin HiLR	125	116	P/P	40 - 160
2428771	Microcystin HtyR	112	109	P/P	40 - 160
2428771	Microcystin LA	123	115	P/P	40 - 160
2428771	Microcystin LF	116	110	P/P	40 - 160
2428771	Microcystin LR	108	93.6	P/P	40 - 160
2428771	Microcystin LW	122	121	P/P	40 - 160
2428771	Microcystin LY	118	114	P/P	40 - 160
2428771	Microcystin RR	114	111	P/P	40 - 160
2428771	Microcystin WR	128	121	P/P	40 - 160
2428771	Microcystin YR	108	104	P/P	40 - 160
2428771	Nodularin-R	118	114	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P433422

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428771	Anatoxin-a	76.1	73.8	P/P	40 - 150
2428771	Neosaxitoxin	60.0	57.4	P/P	40 - 150
2428771	Saxitoxin	65.2	68.0	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P433475

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428838	Color (true)	0.217	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P433837

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428800	Ammonia-N	0.857	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433540

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428833	Kjeldahl Nitrogen	12.5	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P433506

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428823	NO2NO3-N	0.847	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433499

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428823	Total-P	1.86	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433458

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428840	O-Phosphate-P	0.999	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P433421

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428771	Cylindrospermopsin	4.11	Spike	P	0 - 30
2428771	Desmethyl microcystin LR	3.14	Spike	P	0 - 30
2428771	Microcystin HtIR	7.36	Spike	P	0 - 30
2428771	Microcystin HtyR	2.71	Spike	P	0 - 30
2428771	Microcystin LA	6.60	Spike	P	0 - 30
2428771	Microcystin LF	5.38	Spike	P	0 - 30
2428771	Microcystin LR	7.12	Spike	P	0 - 30
2428771	Microcystin LW	0.597	Spike	P	0 - 30
2428771	Microcystin LY	3.42	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P433421

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428771	Microcystin RR	3.29	Spike	P	0 - 30
2428771	Microcystin WR	5.69	Spike	P	0 - 30
2428771	Microcystin YR	3.60	Spike	P	0 - 30
2428771	Nodularin-R	3.98	Spike	P	0 - 30

Reference Method: EPA 8321B
Batch ID: P433422

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428771	Anatoxin-a	3.07	Spike	P	0 - 30
2428771	Neosaxitoxin	4.49	Spike	P	0 - 30
2428771	Saxitoxin	4.11	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2428835

Field Sample ID: HAB-HC-080323-0758

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	73.9	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	113	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B
Run ID: A120804
Included Lab Sample IDs: 2428835

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	105	108	P/P	60 - 160
Desmethyl microcystin LR	104	99.7	P/P	50 - 160
Microcystin HiLR	103	103	P/P	60 - 160
Microcystin HtyR	98.6	95.3	P/P	60 - 160
Microcystin LA	108	109	P/P	50 - 160
Microcystin LF	91.8	86.3	P/P	60 - 160
Microcystin LR	95.7	96.6	P/P	60 - 160
Microcystin LW	89.7	91.3	P/P	60 - 160
Microcystin LY	98.8	103	P/P	60 - 160
Microcystin RR	102	100	P/P	60 - 160
Microcystin WR	107	108	P/P	60 - 160
Microcystin YR	86.6	83.5	P/P	60 - 160
Nodularin-R	98.6	94.7	P/P	60 - 160

Reference Method: EPA 8321B
Run ID: A120830
Included Lab Sample IDs: 2428835

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	75.1	75.7	P/P	50 - 160
Neosaxitoxin	80.0	78.7	P/P	50 - 160
Saxitoxin	73.1	77.3	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A120850
Included Lab Sample IDs: 2428834

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

Reference Method: DEP SOP: NU-094-1
Run ID: A120859
Included Lab Sample IDs: 2428832

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.9	99.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A120875
Included Lab Sample IDs: 2428833

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A120894
Included Lab Sample IDs: 2428833

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	104	98.4	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A120935

Included Lab Sample IDs: 2428833

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A121029

Included Lab Sample IDs: 2428833

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.4	99.0	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 SMP	MS
					LCS	
DEP SOP: NU-094-1	Color (true)	97.8			0.217	
EPA 350.1 Rev. 2.0	Ammonia-N	94.6	95.0	96.0		0.857
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	110	113	87.9		12.5
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	104	102	103		0.847
EPA 365.1 Rev. 2.0	Total-P	103	99.6	101		1.86
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	99.6	101		0.999
EPA 8321B	Anatoxin-a	81.5	76.1	73.8		3.07
	Cylindrospermopsin	103	112	107		4.11
	Desmethyl microcystin LR	108	117	113		3.14
	Microcystin H ₁ LR	109	125	116		7.36
	Microcystin H ₂ LR	100	112	109		2.71
	Microcystin LA	111	123	115		6.60
	Microcystin LF	89.8	116	110		5.38
	Microcystin LR	108	108	93.6		7.12
	Microcystin LW	105	122	121		0.597
	Microcystin LY	112	118	114		3.42
	Microcystin RR	103	114	111		3.29
	Microcystin WR	115	128	121		5.69
	Microcystin YR	97.4	108	104		3.60
	Neosaxitoxin	80.9	60.0	57.4		4.49
	Nodularin-R	106	118	114		3.98
	Saxitoxin	81.3	65.2	68.0		4.11

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2428832
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2428833
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2428833
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2428833
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2428833
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2428834
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2428835
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2428835

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	08/04/2023			08/04/2023 15:21	Alexis Price	2428832
EPA 350.1 Rev. 2.0	08/04/2023			08/14/2023 13:33	Khloe J Berg	2428833
EPA 351.2 Rev. 2.0	08/04/2023	08/08/2023 12:58	Simonne.V. Calhoun	08/09/2023 16:05	Ping Hua	2428833
EPA 353.2 Rev. 2.0	08/04/2023			08/07/2023 10:49	Beverly Y. Sanders	2428833
EPA 365.1 Rev. 2.0	08/04/2023	08/07/2023 16:18	Adam P Silver	08/08/2023 12:20	Chandler E Cox	2428833
EPA 365.1 Rev. 2.0 dissolved	08/04/2023			08/04/2023 12:49	Elise M. Gillis	2428834
EPA 8321B	08/04/2023	08/04/2023 11:00	Tae K Lee	08/04/2023 15:58	Hana Lee	2428835
	08/04/2023	08/04/2023 12:00	Tae K Lee	08/04/2023 16:59	Hana Lee	2428835