

Chemical Analysis Report

SO-DIST-2023-08-18-01

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

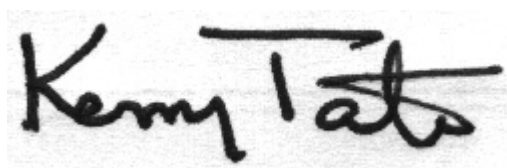
Event Description: **Algal Bloom Response -SOROC- Highlands**
Request ID: **RQ-2023-06-12-72**
Customer: **SO-DIST**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901-3381
Attn: John Barrington

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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 08-SEP-2023 14:39

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line extending from the end of the name.

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: 08/17/2023 08:56

Field ID: HAB-HC-081723-0856

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2432121	DEP SOP: NU-094-1	Color (true)	64		PCU	P434060	
2432122	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P434482	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.8		mg N/L	P434561	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P434570	
	EPA 365.1 Rev. 2.0	Total-P	0.048		mg P/L	P434113	
2432123	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P434057	
2432126	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P434002	
		Cylindrospermopsin	0.10	U	ug/L	P434001	
		Desmethyl microcystin LR	0.25	U	ug/L	P434001	
		Microcystin HiLR	0.25	U	ug/L	P434001	
		Microcystin HtyR	0.25	U	ug/L	P434001	
		Microcystin LA	0.10	U	ug/L	P434001	
		Microcystin LF	0.10	U	ug/L	P434001	
		Microcystin LR	0.25	U	ug/L	P434001	
		Microcystin LW	0.25	U	ug/L	P434001	
		Microcystin LY	0.10	U	ug/L	P434001	
		Microcystin RR	0.10	U	ug/L	P434001	
		Microcystin WR	0.50	U	ug/L	P434001	
		Neosaxitoxin	0.50	U	ug/L	P434002	
		Microcystin YR	0.25	U	ug/L	P434001	
		Saxitoxin	0.50	U	ug/L	P434002	
		Nodularin-R	0.10	U	ug/L	P434001	

Quality Assurance Report Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P434060

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434482

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434561

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434570

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434113

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P434057

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

Reference Method: EPA 8321B
Batch ID: P434001

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: P434002

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: P434060

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434482

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434561

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434570

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434113

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P434057

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

Reference Method: EPA 8321B
Batch ID: P434001

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	144		P	40 - 160
Desmethyl microcystin LR	92.7		P	40 - 160
Microcystin HILR	98.1		P	40 - 160
Microcystin HtyR	89.2		P	40 - 160
Microcystin LA	102		P	40 - 160
Microcystin LF	84.5		P	40 - 160
Microcystin LR	96.3		P	40 - 160
Microcystin LW	91.1		P	40 - 160
Microcystin LY	96.2		P	40 - 160
Microcystin RR	91.0		P	40 - 160
Microcystin WR	96.7		P	40 - 160
Microcystin YR	86.0		P	40 - 160
Nodularin-R	101		P	40 - 160

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 8321B
Batch ID: P434002

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	112		P	40 - 150
Neosaxitoxin	92.5		P	40 - 150
Saxitoxin	92.2		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434482

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432101	Ammonia-N	98.0	98.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434561

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432122	Kjeldahl Nitrogen	109	94.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434570

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432101	NO2NO3-N	105	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434113

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432099	Total-P	107	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P434057

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432094	O-Phosphate-P	101	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P434001

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432055	Cylindrospermopsin	133	126	P/P	40 - 160
2432055	Desmethyl microcystin LR	102	104	P/P	40 - 160
2432055	Microcystin HiLR	99.5	101	P/P	40 - 160
2432055	Microcystin HtyR	91.0	92.0	P/P	40 - 160
2432055	Microcystin LA	102	99.6	P/P	40 - 160
2432055	Microcystin LF	101	105	P/P	40 - 160
2432055	Microcystin LR	102	106	P/P	40 - 160
2432055	Microcystin LW	94.9	99.2	P/P	40 - 160
2432055	Microcystin LY	89.5	91.4	P/P	40 - 160
2432055	Microcystin RR	96.5	99.7	P/P	40 - 160
2432055	Microcystin WR	98.9	101	P/P	40 - 160
2432055	Microcystin YR	86.3	89.2	P/P	40 - 160
2432055	Nodularin-R	95.9	102	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P434002

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432055	Anatoxin-a	111	114	P/P	40 - 150
2432055	Neosaxitoxin	84.1	78.8	P/P	40 - 150
2432055	Saxitoxin	79.2	82.6	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P434060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432066	Color (true)	1.24	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434482

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432101	Ammonia-N	0.355	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434561

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432122	Kjeldahl Nitrogen	6.86	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434570

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432101	NO2NO3-N	0.948	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434113

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432099	Total-P	1.69	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P434057

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432094	O-Phosphate-P	0.498	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P434001

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432055	Cylindrospermopsin	5.58	Spike	P	0 - 30
2432055	Desmethyl microcystin LR	2.03	Spike	P	0 - 30
2432055	Microcystin HtIR	1.98	Spike	P	0 - 30
2432055	Microcystin HtyR	1.11	Spike	P	0 - 30
2432055	Microcystin LA	2.41	Spike	P	0 - 30
2432055	Microcystin LF	3.89	Spike	P	0 - 30
2432055	Microcystin LR	3.40	Spike	P	0 - 30
2432055	Microcystin LW	4.42	Spike	P	0 - 30
2432055	Microcystin LY	2.17	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P434001

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432055	Microcystin RR	3.25	Spike	P	0 - 30
2432055	Microcystin WR	2.53	Spike	P	0 - 30
2432055	Microcystin YR	3.33	Spike	P	0 - 30
2432055	Nodularin-R	6.60	Spike	P	0 - 30

Reference Method: EPA 8321B
Batch ID: P434002

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432055	Anatoxin-a	2.76	Spike	P	0 - 30
2432055	Neosaxitoxin	6.47	Spike	P	0 - 30
2432055	Saxitoxin	4.15	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2432126

Field Sample ID: HAB-HC-081723-0856

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	114	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	101	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A121127

Included Lab Sample IDs: 2432123

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	97.8	P/P	90 - 110

Reference Method: DEP SOP: NU-094-1

Run ID: A121128

Included Lab Sample IDs: 2432121

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	100	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A121132

Included Lab Sample IDs: 2432126

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	96.3	95.6	P/P	50 - 160
Neosaxitoxin	98.8	102	P/P	50 - 160
Saxitoxin	102	99.8	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A121133

Included Lab Sample IDs: 2432126

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	133	121	P/P	60 - 160
Desmethyl microcystin LR	98.1	88.1	P/P	50 - 160
Microcystin HILR	99.8	86.3	P/P	60 - 160
Microcystin HtyR	88.8	81.7	P/P	60 - 160
Microcystin LA	94.6	87.6	P/P	50 - 160
Microcystin LF	94.8	89.2	P/P	60 - 160
Microcystin LR	102	87.5	P/P	60 - 160
Microcystin LW	94.7	87.1	P/P	60 - 160
Microcystin LY	97.6	84.1	P/P	60 - 160
Microcystin RR	95.7	84.5	P/P	60 - 160
Microcystin WR	99.3	89.6	P/P	60 - 160
Microcystin YR	92.0	74.8	P/P	60 - 160
Nodularin-R	102	92.0	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A121176

Included Lab Sample IDs: 2432122

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A121307

Included Lab Sample IDs: 2432122

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

Quality Assurance Report

Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A121383

Included Lab Sample IDs: 2432122

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.5	101	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	MS
						SMP	
DEP SOP: NU-094-1	Color (true)	99.4				1.24	
EPA 350.1 Rev. 2.0	Ammonia-N	99.4	98.0	98.4			0.355
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	109	94.9			6.86
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	106	105	106			0.948
EPA 365.1 Rev. 2.0	Total-P	104	107	105			1.69
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	101	100			0.498
EPA 8321B	Anatoxin-a	112	111	114			2.76
	Cylindrospermopsin	144	133	126			5.58
	Desmethyl microcystin LR	92.7	102	104			2.03
	Microcystin HiLR	98.1	99.5	101			1.98
	Microcystin HtyR	89.2	91.0	92.0			1.11
	Microcystin LA	102	102	99.6			2.41
	Microcystin LF	84.5	101	105			3.89
	Microcystin LR	96.3	102	106			3.40
	Microcystin LW	91.1	94.9	99.2			4.42
	Microcystin LY	96.2	89.5	91.4			2.17
	Microcystin RR	91.0	96.5	99.7			3.25
	Microcystin WR	96.7	98.9	101			2.53
	Microcystin YR	86.0	86.3	89.2			3.33
	Neosaxitoxin	92.5	84.1	78.8			6.47
	Nodularin-R	101	95.9	102			6.60
	Saxitoxin	92.2	79.2	82.6			4.15

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2432121
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2432122
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2432122
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2432122
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2432122
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2432123
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2432126
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2432126

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	08/18/2023			08/18/2023 14:58	Anna M. Plaviak	2432121
EPA 350.1 Rev. 2.0	08/18/2023			08/29/2023 11:41	Ping Hua	2432122
EPA 351.2 Rev. 2.0	08/18/2023	09/05/2023 15:58	Simonne.V. Calhoun	09/06/2023 16:32	Samantha L Bates	2432122
EPA 353.2 Rev. 2.0	08/18/2023			09/01/2023 13:34	Anna M. Plaviak	2432122
EPA 365.1 Rev. 2.0	08/18/2023	08/21/2023 16:54	Adam P Silver	08/22/2023 13:54	James L Waggerby	2432122
EPA 365.1 Rev. 2.0 dissolved	08/18/2023			08/18/2023 15:10	Elise M. Gillis	2432123
EPA 8321B	08/18/2023	08/18/2023 12:00	Tae K Lee	08/18/2023 17:04	Hana Lee	2432126
	08/18/2023	08/18/2023 14:30	Tae K Lee	08/18/2023 16:49	Hana Lee	2432126