

Chemical Analysis Report

SO-DIST-2024-04-09-01

Florida DEP Laboratory
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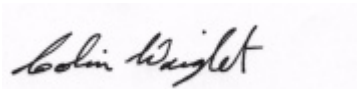
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2023-07-24-40**
Customer: **SO-DIST**
Project ID: **BLOOM-RESP**

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

Date Certified: 18-APR-2024 08:30



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: Caloosahatchee River - Alva Boat Ramp

Collection Date/Time: 04/08/2024 09:30

Field ID: HAB-SD-040824-0930

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2480771	DEP SOP: NU-094-1	Color (true)	58		PCU	P444011	
2480772	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P444196	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P443994	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P444215	
	EPA 365.1 Rev. 2.0	Total-P	0.068		mg P/L	P444241	
2480773	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P444005	
2480774	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P443958	
		Cylindrospermopsin	0.10	U	ug/L	P443957	
		Desmethyl microcystin LR	0.25	U	ug/L	P443957	
		Microcystin HilR	0.25	U	ug/L	P443957	
		Microcystin HtyR	0.25	U	ug/L	P443957	
		Microcystin LA	0.10	U	ug/L	P443957	
		Microcystin LF	0.10	U	ug/L	P443957	
		Microcystin LR	0.29	I	ug/L	P443957	
		Microcystin LW	0.25	U	ug/L	P443957	
		Microcystin LY	0.10	U	ug/L	P443957	
		Microcystin RR	0.10	U	ug/L	P443957	
		Microcystin WR	0.50	U	ug/L	P443957	
		Neosaxitoxin	0.50	U	ug/L	P443958	
		Microcystin YR	0.25	U	ug/L	P443957	
		Saxitoxin	0.50	U	ug/L	P443958	
		Nodularin-R	0.10	U	ug/L	P443957	

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P444011

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P444196

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P443994

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P444215

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P444241

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P444005

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

Reference Method: EPA 8321B
Batch ID: P443957

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: P443958

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: P444011

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	96.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P444196

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: P443994

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P444215

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P444241

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: P444005

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

Reference Method: EPA 8321B
Batch ID: P443957

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	95.7		P	40 - 150
Desmethyl microcystin LR	99.2		P	40 - 150
Microcystin H1LR	113		P	40 - 150
Microcystin HtyR	104		P	40 - 150
Microcystin LA	100		P	40 - 150
Microcystin LF	107		P	40 - 150
Microcystin LR	101		P	40 - 150
Microcystin LW	103		P	40 - 150
Microcystin LY	104		P	40 - 150
Microcystin RR	92.8		P	40 - 150
Microcystin WR	103		P	40 - 150
Microcystin YR	112		P	40 - 150
Nodularin-R	101		P	40 - 150

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 8321B
Batch ID: P443958

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	101		P	40 - 150
Neosaxitoxin	92.1		P	40 - 150
Saxitoxin	110		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P444196

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2480675	Ammonia-N	97.6	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P443994

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2480677	Kjeldahl Nitrogen	105	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P444215

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2480667	NO2NO3-N	96.5	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P444241

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2480820	Total-P	101	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P444005

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2480643	O-Phosphate-P	96.5	97.1	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P443957

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2480594	Cylindrospermopsin	93.6	99.3	P/P	40 - 150
2480594	Desmethyl microcystin LR	104	112	P/P	40 - 150
2480594	Microcystin HiLR	111	114	P/P	40 - 150
2480594	Microcystin HtyR	103	100	P/P	40 - 150
2480594	Microcystin LA	97.2	105	P/P	40 - 150
2480594	Microcystin LF	106	110	P/P	40 - 150
2480594	Microcystin LR	105	110	P/P	40 - 150
2480594	Microcystin LW	81.1	90.2	P/P	40 - 150
2480594	Microcystin LY	98.4	107	P/P	40 - 150
2480594	Microcystin RR	89.7	99.4	P/P	40 - 150
2480594	Microcystin WR	85.7	86.9	P/P	40 - 150
2480594	Microcystin YR	101	99.7	P/P	40 - 150
2480594	Nodularin-R	96.2	104	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P443958

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2480594	Anatoxin-a	91.1	89.8	P/P	40 - 150
2480594	Neosaxitoxin	50.6	48.3	P/P	40 - 150
2480594	Saxitoxin	67.9	63.4	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P444011

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2480672	Color (true)	0.788	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P444196

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2480675	Ammonia-N	1.14	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P443994

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2480677	Kjeldahl Nitrogen	2.57	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P444215

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2480667	NO2NO3-N	1.08	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P444241

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2480820	Total-P	1.96	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P444005

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2480643	O-Phosphate-P	0.620	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P443957

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2480594	Cylindrospermopsin	5.86	Spike	P	0 - 30
2480594	Desmethyl microcystin LR	7.20	Spike	P	0 - 30
2480594	Microcystin HtIR	2.34	Spike	P	0 - 30
2480594	Microcystin HtyR	2.57	Spike	P	0 - 30
2480594	Microcystin LA	7.37	Spike	P	0 - 30
2480594	Microcystin LF	3.65	Spike	P	0 - 30
2480594	Microcystin LR	5.40	Spike	P	0 - 30
2480594	Microcystin LW	10.7	Spike	P	0 - 30
2480594	Microcystin LY	8.62	Spike	P	0 - 30

Quality Assurance Report

Precision

Reference Method: EPA 8321B
Batch ID: P443957

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2480594	Microcystin RR	10.3	Spike	P	0 - 30
2480594	Microcystin WR	1.43	Spike	P	0 - 30
2480594	Microcystin YR	1.74	Spike	P	0 - 30
2480594	Nodularin-R	7.85	Spike	P	0 - 30

Reference Method: EPA 8321B
Batch ID: P443958

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2480594	Anatoxin-a	1.47	Spike	P	0 - 30
2480594	Neosaxitoxin	4.71	Spike	P	0 - 30
2480594	Saxitoxin	6.96	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2480774
Field Sample ID: HAB-SD-040824-0930

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	105	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	104	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A125238

Included Lab Sample IDs: 2480773

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.3	98.3	P/P	90 - 110

Reference Method: DEP SOP: NU-094-1

Run ID: A125240

Included Lab Sample IDs: 2480771

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.6	99.5	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A125265

Included Lab Sample IDs: 2480774

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	100	97.7	P/P	50 - 160
Desmethyl microcystin LR	109	107	P/P	50 - 160
Microcystin H1IR	119	125	P/P	50 - 160
Microcystin HtyR	117	117	P/P	50 - 160
Microcystin LA	110	108	P/P	50 - 160
Microcystin LF	109	110	P/P	50 - 160
Microcystin LR	116	115	P/P	50 - 160
Microcystin LW	113	117	P/P	50 - 160
Microcystin LY	117	115	P/P	50 - 160
Microcystin RR	95.5	95.7	P/P	50 - 160
Microcystin WR	122	122	P/P	50 - 160
Microcystin YR	118	115	P/P	50 - 160
Nodularin-R	99.8	102	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A125271

Included Lab Sample IDs: 2480774

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	97.7	88.5	P/P	50 - 160
Neosaxitoxin	96.7	81.0	P/P	50 - 160
Saxitoxin	117	99.2	P/P	50 - 160

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A125286

Included Lab Sample IDs: 2480772

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A125310

Included Lab Sample IDs: 2480772

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A125318
Included Lab Sample IDs: 2480772

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A125334
Included Lab Sample IDs: 2480772

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	102	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)	96.5				0.788	
EPA 350.1 Rev. 2.0	Ammonia-N	97.0	97.6	99.2			1.14
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.5	105	101			2.57
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	96.5	98.5			1.08
EPA 365.1 Rev. 2.0	Total-P	101	101	99.0			1.96
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	96.5	97.1			0.620
EPA 8321B	Anatoxin-a	101	91.1	89.8			1.47
	Cylindrospermopsin	95.7	93.6	99.3			5.86
	Desmethyl microcystin LR	99.2	104	112			7.20
	Microcystin HILR	113	111	114			2.34
	Microcystin HtyR	104	103	100			2.57
	Microcystin LA	100	97.2	105			7.37
	Microcystin LF	107	106	110			3.65
	Microcystin LR	101	105	110			5.40
	Microcystin LW	103	81.1	90.2			10.7
	Microcystin LY	104	98.4	107			8.62
	Microcystin RR	92.8	89.7	99.4			10.3
	Microcystin WR	103	85.7	86.9			1.43
	Microcystin YR	112	101	99.7			1.74
	Neosaxitoxin	92.1	50.6	48.3			4.71
	Nodularin-R	101	96.2	104			7.85
	Saxitoxin	110	67.9	63.4			6.96

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2480771
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2480772
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2480772
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2480772
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2480772
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2480773
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2480774
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2480774

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	04/09/2024			04/09/2024 14:38	Samantha L Bates	2480771
EPA 350.1 Rev. 2.0	04/09/2024			04/12/2024 13:32	Kenneth H Lee	2480772
EPA 351.2 Rev. 2.0	04/09/2024	04/10/2024 11:08	Robyn Blevins	04/11/2024 14:16	Robyn Blevins	2480772
EPA 353.2 Rev. 2.0	04/09/2024			04/12/2024 14:00	Fadila Guebre	2480772
EPA 365.1 Rev. 2.0	04/09/2024	04/15/2024 12:54	Adam P Silver	04/16/2024 11:07	Chandler E Cox	2480772
EPA 365.1 Rev. 2.0 dissolved	04/09/2024			04/09/2024 14:44	Elise M. Gillis	2480773
EPA 8321B	04/09/2024	04/10/2024 06:00	Tae K Lee	04/10/2024 11:00	Tae K Lee	2480774
	04/09/2024	04/10/2024 12:00	Tae K Lee	04/11/2024 02:16	Tae K Lee	2480774