

Chemical Analysis Report

SO-DIST-2023-12-19-01

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

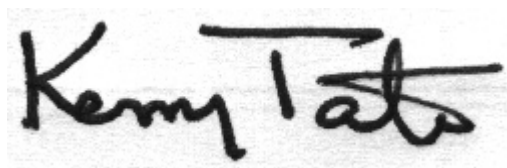
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2023-07-24-40**
Customer: **SO-DIST**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 314
Fort Myers, FL 33901-3381
Attn: John Barrington

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

Date Certified: 04-JAN-2024 12:26

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the "T" and a long, sweeping underline.

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 Glenada - Boat Ramp

Collection Date/Time: 12/18/2023 11:45

Field ID: HAB-HC-121823-1145

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2457805	DEP SOP: NU-094-1	Color (true)	33		PCU	P439199	
2457806	EPA 350.1 Rev. 2.0	Ammonia-N	0.035		mg N/L	P439344	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P439242	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.022		mg N/L	P439381	
	EPA 365.1 Rev. 2.0	Total-P	0.074		mg P/L	P439255	
2457807	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P439210	
2457808	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P439189	
		Cylindrospermopsin	0.10	U	ug/L	P439188	
		Desmethyl microcystin LR	0.25	U	ug/L	P439188	
		Microcystin HiLR	0.25	U	ug/L	P439188	
		Microcystin HtyR	0.25	U	ug/L	P439188	
		Microcystin LA	0.17	I	ug/L	P439188	
		Microcystin LF	0.11	I	ug/L	P439188	
		Microcystin LR	2.1		ug/L	P439188	
		Microcystin LW	0.25	U	ug/L	P439188	
		Microcystin LY	0.10	U	ug/L	P439188	
		Microcystin RR	0.19	I	ug/L	P439188	
		Microcystin WR	0.50	U	ug/L	P439188	
		Neosaxitoxin	0.50	U	ug/L	P439189	
		Microcystin YR	0.25	U	ug/L	P439188	
		Saxitoxin	0.50	U	ug/L	P439189	
		Nodularin-R	0.10	U	ug/L	P439188	

Quality Assurance Report Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P439199

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P439344

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P439242

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P439381

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P439255

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P439210

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

Reference Method: EPA 8321B
Batch ID: P439188

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: P439189

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: P439199

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P439344

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P439242

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P439381

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	94.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P439255

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P439210

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.4		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P439188

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	89.5		P	40 - 150
Desmethyl microcystin LR	115		P	40 - 150
Microcystin H1LR	115		P	40 - 150
Microcystin HtyR	127		P	40 - 150
Microcystin LA	111		P	40 - 150
Microcystin LF	116		P	40 - 150
Microcystin LR	125		P	40 - 150
Microcystin LW	117		P	40 - 150
Microcystin LY	119		P	40 - 150
Microcystin RR	85.0		P	40 - 150
Microcystin WR	112		P	40 - 150
Microcystin YR	132		P	40 - 150
Nodularin-R	93.6		P	40 - 150

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 8321B
Batch ID: P439189

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	71.5		P	40 - 150
Neosaxitoxin	71.8		P	40 - 150
Saxitoxin	75.3		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P439344

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2457755	Ammonia-N	95.4	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P439242

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2457704	Kjeldahl Nitrogen	101	98.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P439381

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2457806	NO2NO3-N	92.8	93.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P439255

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2457756	Total-P	108	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P439210

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2457785	O-Phosphate-P	100	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P439188

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2457779	Cylindrospermopsin	93.2	94.4	P/P	40 - 150
2457779	Desmethyl microcystin LR	113	118	P/P	40 - 150
2457779	Microcystin HiLR	128	126	P/P	40 - 150
2457779	Microcystin HtyR	124	119	P/P	40 - 150
2457779	Microcystin LA	105	107	P/P	40 - 150
2457779	Microcystin LF	132	133	P/P	40 - 150
2457779	Microcystin LR	123	116	P/P	40 - 150
2457779	Microcystin LW	126	125	P/P	40 - 150
2457779	Microcystin LY	118	118	P/P	40 - 150
2457779	Microcystin RR	89.4	89.4	P/P	40 - 150
2457779	Microcystin WR	129	131	P/P	40 - 150
2457779	Microcystin YR	121	129	P/P	40 - 150
2457779	Nodularin-R	94.9	98.4	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P439189

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2457779	Anatoxin-a	69.3	67.3	P/P	40 - 150
2457779	Neosaxitoxin	44.9	43.6	P/P	40 - 150
2457779	Saxitoxin	43.9	42.4	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P439199

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457749	Color (true)	6.48	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P439344

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457755	Ammonia-N	3.99	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P439242

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457704	Kjeldahl Nitrogen	1.81	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P439381

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457806	NO2NO3-N	0.957	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P439255

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457756	Total-P	0.279	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P439210

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457785	O-Phosphate-P	0.399	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P439188

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457779	Cylindrospermopsin	1.23	Spike	P	0 - 30
2457779	Desmethyl microcystin LR	4.33	Spike	P	0 - 30
2457779	Microcystin HtLR	1.46	Spike	P	0 - 30
2457779	Microcystin HtyR	4.48	Spike	P	0 - 30
2457779	Microcystin LA	2.23	Spike	P	0 - 30
2457779	Microcystin LF	0.830	Spike	P	0 - 30
2457779	Microcystin LR	6.05	Spike	P	0 - 30
2457779	Microcystin LW	0.486	Spike	P	0 - 30
2457779	Microcystin LY	0.595	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P439188

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457779	Microcystin RR	0.0111	Spike	P	0 - 30
2457779	Microcystin WR	1.68	Spike	P	0 - 30
2457779	Microcystin YR	6.00	Spike	P	0 - 30
2457779	Nodularin-R	3.55	Spike	P	0 - 30

Reference Method: EPA 8321B
Batch ID: P439189

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2457779	Anatoxin-a	2.90	Spike	P	0 - 30
2457779	Neosaxitoxin	2.96	Spike	P	0 - 30
2457779	Saxitoxin	3.42	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2457808

Field Sample ID: HAB-HC-121823-1145

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	76.3	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	122	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: DEP SOP: NU-094-1

Run ID: A123320

Included Lab Sample IDs: 2457805

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.7	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A123322

Included Lab Sample IDs: 2457807

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.3	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A123358

Included Lab Sample IDs: 2457806

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.7	99.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A123372

Included Lab Sample IDs: 2457806

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.4	98.6	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A123378

Included Lab Sample IDs: 2457808

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	96.0	96.0	P/P	50 - 160
Desmethyl microcystin LR	125	131	P/P	50 - 160
Microcystin HILR	128	133	P/P	50 - 160
Microcystin HtyR	131	133	P/P	50 - 160
Microcystin LA	120	121	P/P	50 - 160
Microcystin LF	126	123	P/P	50 - 160
Microcystin LR	129	132	P/P	50 - 160
Microcystin LW	109	117	P/P	50 - 160
Microcystin LY	133	129	P/P	50 - 160
Microcystin RR	93.6	90.4	P/P	50 - 160
Microcystin WR	136	130	P/P	50 - 160
Microcystin YR	130	135	P/P	50 - 160
Nodularin-R	102	107	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A123389

Included Lab Sample IDs: 2457808

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	73.6	69.5	P/P	50 - 160
Neosaxitoxin	79.0	67.7	P/P	50 - 160
Saxitoxin	79.2	75.9	P/P	50 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A123396

Included Lab Sample IDs: 2457806

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	94.5	94.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A123424

Included Lab Sample IDs: 2457806

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	97.2	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)	99.9				6.48	
EPA 350.1 Rev. 2.0	Ammonia-N	95.0	95.4	99.8			3.99
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	101	98.3			1.81
EPA 353.2 Rev. 2.0	NO2NO3-N	94.5	92.8	93.8			0.957
EPA 365.1 Rev. 2.0	Total-P	109	108	108			0.279
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.4	100	100			0.399
EPA 8321B	Anatoxin-a	71.5	69.3	67.3			2.90
	Cylindrospermopsin	89.5	93.2	94.4			1.23
	Desmethyl microcystin LR	115	113	118			4.33
	Microcystin H1LR	115	128	126			1.46
	Microcystin HtyR	127	124	119			4.48
	Microcystin LA	111	105	107			2.23
	Microcystin LF	116	132	133			0.830
	Microcystin LR	125	123	116			6.05
	Microcystin LW	117	126	125			0.486
	Microcystin LY	119	118	118			0.595
	Microcystin RR	85.0	89.4	89.4			0.0111
	Microcystin WR	112	129	131			1.68
	Microcystin YR	132	121	129			6.00
	Neosaxitoxin	71.8	44.9	43.6			2.96
	Nodularin-R	93.6	94.9	98.4			3.55
	Saxitoxin	75.3	43.9	42.4			3.42

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2457805
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2457806
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2457806
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2457806
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2457806
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2457807
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2457808
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2457808

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	12/19/2023			12/19/2023 14:18	Chandler E Cox	2457805
EPA 350.1 Rev. 2.0	12/19/2023			12/20/2023 13:05	Khloe J Berg	2457806
EPA 351.2 Rev. 2.0	12/19/2023	12/20/2023 13:42	Simonne.V. Calhoun	12/27/2023 11:29	Samantha L Bates	2457806
EPA 353.2 Rev. 2.0	12/19/2023			12/21/2023 14:54	Fadila Guebre	2457806
EPA 365.1 Rev. 2.0	12/19/2023	12/20/2023 12:07	Adam P Silver	12/20/2023 17:17	James L Waggerby	2457806
EPA 365.1 Rev. 2.0 dissolved	12/19/2023			12/19/2023 14:55	Elise M. Gillis	2457807
EPA 8321B	12/19/2023	12/21/2023 10:45	Hana Lee	12/21/2023 12:13	Hana Lee	2457808
	12/19/2023	12/21/2023 10:45	Hana Lee	12/21/2023 16:40	Hana Lee	2457808