Chemical Analysis Report

SO-DIST-2023-08-16-01

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

Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2023-07-17-60**
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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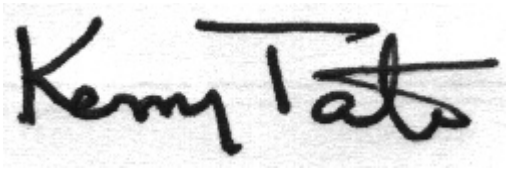
Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 08-SEP-2023 14:23



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 - Jaycee Park **Collection Date/Time: 08/15/2023 12:45**

Field ID: HAB-SD-081523-1245 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2431195	DEP SOP: NU-094-1	Color (true)	110		PCU	P433941	
2431196	EPA 350.1 Rev. 2.0	Ammonia-N	0.059		mg N/L	P434315	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P434559	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.22		mg N/L	P434440	
	EPA 365.1 Rev. 2.0	Total-P	0.15		mg P/L	P433967	
2431197	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.13		mg P/L	P433938	
2431198	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P433886	
		Cylindrospermopsin	0.10	U	ug/L	P433884	
		Desmethyl microcystin LR	0.25	U	ug/L	P433884	
		Microcystin HilR	0.25	U	ug/L	P433884	
		Microcystin HtyR	0.25	U	ug/L	P433884	
		Microcystin LA	0.10	U	ug/L	P433884	
		Microcystin LF	0.10	U	ug/L	P433884	
		Microcystin LR	2.2		ug/L	P433884	
		Microcystin LW	0.25	U	ug/L	P433884	
		Microcystin LY	0.10	U	ug/L	P433884	
		Microcystin RR	0.10	U	ug/L	P433884	
		Microcystin WR	0.50	U	ug/L	P433884	
		Neosaxitoxin	0.50	U	ug/L	P433886	
		Microcystin YR	0.25	U	ug/L	P433884	
		Saxitoxin	0.50	U	ug/L	P433886	
		Nodularin-R	0.10	U	ug/L	P433884	

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P433941

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434315

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434559

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434440

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433967

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433938

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

Reference Method: EPA 8321B
Batch ID: P433884

Component	Result	Code	Units
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HilR	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: P433886

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: P433941

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: P434315

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434559

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434440

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: P433967

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433938

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

Reference Method: EPA 8321B
Batch ID: P433884

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	103		P	40 - 160
Desmethyl microcystin LR	96.3		P	40 - 160
Microcystin HilR	93.5		P	40 - 160
Microcystin HtyR	90.5		P	40 - 160
Microcystin LA	92.3		P	40 - 160
Microcystin LF	106		P	40 - 160
Microcystin LR	95.3		P	40 - 160
Microcystin LW	98.7		P	40 - 160
Microcystin LY	86.3		P	40 - 160
Microcystin RR	97.2		P	40 - 160
Microcystin WR	76.2		P	40 - 160
Microcystin YR	86.7		P	40 - 160
Nodularin-R	104		P	40 - 160

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 8321B
Batch ID: P433886

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	102		P	40 - 150
Neosaxitoxin	89.1		P	40 - 150
Saxitoxin	83.3		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434315

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2430968	Ammonia-N	101	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434559

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432409	Kjeldahl Nitrogen	95.6	96.7	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434440

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2430970	NO2NO3-N	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433967

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431276	Total-P	97.3	95.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433938

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431467	O-Phosphate-P	96.3	98.0	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P433884

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2430755	Cylindrospermopsin	108	93.4	P/P	40 - 160
2430755	Desmethyl microcystin LR	106	83.6	P/P	40 - 160
2430755	Microcystin HilR	103	101	P/P	40 - 160
2430755	Microcystin HtyR	97.5	96.5	P/P	40 - 160
2430755	Microcystin LA	104	96.8	P/P	40 - 160
2430755	Microcystin LF	104	106	P/P	40 - 160
2430755	Microcystin LR	97.2	101	P/P	40 - 160
2430755	Microcystin LW	100	102	P/P	40 - 160
2430755	Microcystin LY	97.5	98.9	P/P	40 - 160
2430755	Microcystin RR	97.4	78.3	P/P	40 - 160
2430755	Microcystin WR	97.5	95.1	P/P	40 - 160
2430755	Microcystin YR	95.9	91.4	P/P	40 - 160
2430755	Nodularin-R	102	106	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P433886

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2430755	Anatoxin-a	107	109	P/P	40 - 150
2430755	Neosaxitoxin	105	108	P/P	40 - 150
2430755	Saxitoxin	90.9	96.6	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P433941

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431113	Color (true)	2.95	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434315

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2430968	Ammonia-N	0.884	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434559

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432409	Kjeldahl Nitrogen	0.988	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434440

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2430970	NO2NO3-N	0.922	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433967

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431276	Total-P	1.70	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433938

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431467	O-Phosphate-P	1.09	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P433884

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2430755	Cylindrospermopsin	14.5	Spike	P	0 - 30
2430755	Desmethyl microcystin LR	23.4	Spike	P	0 - 30
2430755	Microcystin HilR	1.39	Spike	P	0 - 30
2430755	Microcystin HtyR	1.03	Spike	P	0 - 30
2430755	Microcystin LA	7.54	Spike	P	0 - 30
2430755	Microcystin LF	1.57	Spike	P	0 - 30
2430755	Microcystin LR	3.35	Spike	P	0 - 30
2430755	Microcystin LW	1.52	Spike	P	0 - 30
2430755	Microcystin LY	1.40	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P433884

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2430755	Microcystin RR	21.3	Spike	P	0 - 30
2430755	Microcystin WR	2.44	Spike	P	0 - 30
2430755	Microcystin YR	4.87	Spike	P	0 - 30
2430755	Nodularin-R	3.86	Spike	P	0 - 30

Reference Method: EPA 8321B
Batch ID: P433886

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2430755	Anatoxin-a	2.14	Spike	P	0 - 30
2430755	Neosaxitoxin	2.73	Spike	P	0 - 30
2430755	Saxitoxin	6.07	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2431198
Field Sample ID: HAB-SD-081523-1245

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	84.0	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	84.9	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A121069
Included Lab Sample IDs: 2431197

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.1	96.7	P/P	90 - 110

Reference Method: DEP SOP: NU-094-1
Run ID: A121070
Included Lab Sample IDs: 2431195

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	101	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A121085
Included Lab Sample IDs: 2431198

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	91.6	85.1	P/P	50 - 160
Neosaxitoxin	84.1	81.7	P/P	50 - 160
Saxitoxin	78.7	79.4	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A121086
Included Lab Sample IDs: 2431198

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	98.2	88.9	P/P	60 - 160
Desmethyl microcystin LR	92.9	87.5	P/P	50 - 160
Microcystin HilR	87.9	95.8	P/P	60 - 160
Microcystin HtyR	82.8	89.0	P/P	60 - 160
Microcystin LA	92.0	99.0	P/P	50 - 160
Microcystin LF	93.0	93.5	P/P	60 - 160
Microcystin LR	85.3	80.8	P/P	60 - 160
Microcystin LW	89.3	92.3	P/P	60 - 160
Microcystin LY	85.7	88.1	P/P	60 - 160
Microcystin RR	77.7	83.6	P/P	60 - 160
Microcystin WR	87.6	79.8	P/P	60 - 160
Microcystin YR	81.7	82.9	P/P	60 - 160
Nodularin-R	89.4	77.9	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A121107
Included Lab Sample IDs: 2431196

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.5	99.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A121231
Included Lab Sample IDs: 2431196

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.9	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A121291
Included Lab Sample IDs: 2431196

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A121383
Included Lab Sample IDs: 2431196

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.9	91.7	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		
					LCS	SMP	MS
DEP SOP: NU-094-1	Color (true)	99.9				2.95	
EPA 350.1 Rev. 2.0	Ammonia-N	98.8	101	99.8			0.884
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	95.6	96.7			0.988
EPA 353.2 Rev. 2.0	NO2NO3-N	102	102	103			0.922
EPA 365.1 Rev. 2.0	Total-P	102	97.3	95.6			1.70
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.7	96.3	98.0			1.09
EPA 8321B	Anatoxin-a	102	107	109			2.14
	Cylindrospermopsin	103	108	93.4			14.5
	Desmethyl microcystin LR	96.3	106	83.6			23.4
	Microcystin HilR	93.5	103	101			1.39
	Microcystin HtyR	90.5	97.5	96.5			1.03
	Microcystin LA	92.3	104	96.8			7.54
	Microcystin LF	106	104	106			1.57
	Microcystin LR	95.3	97.2	101			3.35
	Microcystin LW	98.7	100	102			1.52
	Microcystin LY	86.3	97.5	98.9			1.40
	Microcystin RR	97.2	97.4	78.3			21.3
	Microcystin WR	76.2	97.5	95.1			2.44
	Microcystin YR	86.7	95.9	91.4			4.87
	Neosaxitoxin	89.1	105	108			2.73
	Nodularin-R	104	102	106			3.86
	Saxitoxin	83.3	90.9	96.6			6.07

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2431195
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2431196
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2431196
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2431196
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2431196
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2431197
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2431198
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2431198

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	08/16/2023			08/16/2023 14:36	Alexis Price	2431195
EPA 350.1 Rev. 2.0	08/16/2023			08/24/2023 12:43	Ping Hua	2431196
EPA 351.2 Rev. 2.0	08/16/2023	09/05/2023 15:58	Simonne.V. Calhoun	09/06/2023 15:42	Samantha L Bates	2431196
EPA 353.2 Rev. 2.0	08/16/2023			08/28/2023 14:32	Anna M. Plaviak	2431196
EPA 365.1 Rev. 2.0	08/16/2023	08/17/2023 14:21	Adam P Silver	08/17/2023 17:44	James L Waggerby	2431196
EPA 365.1 Rev. 2.0 dissolved	08/16/2023			08/16/2023 14:36	Elise M. Gillis	2431197
EPA 8321B	08/16/2023	08/16/2023 12:00	Tae K Lee	08/16/2023 23:52	Hana Lee	2431198
	08/16/2023	08/16/2023 12:00	Tae K Lee	08/17/2023 00:35	Hana Lee	2431198