

Bioassays of the City of

Mulberry Wastewater Treatment Plant

Mulberry, Polk County, Florida

NPDES #FL0020338

Sampled 11/2/92

December 1992

Biology Section
Division of Technical Services

Bioassays of the City of

Mulberry Wastewater Treatment Plant

Mulberry, Polk County, Florida

NPDES #FL0020338

Biology Section
Bureau of Laboratories
December 1992

Introduction

City of Mulberry WWTP, Mulberry, Polk County, Florida, NPDES #FL0020338, tests performed on 3 to 5 November, 1992.

This facility is located at Southwest Second Street in Mulberry. The facility is permitted to operate a 0.5 MGD capacity extended-aeration sewage treatment plant with chlorine disinfection. Discharge of chlorinated effluent is to a polishing pond with overflow to the North Prong of the Alafia River, and finally to Tampa Bay (NPDES files).

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1991, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition, EPA/600/4-90/027. .

Results and Discussion

The FDER Biology Section performed two 48-hour static acute screening toxicity bioassays with a sample of effluent from this facility. The bioassay organisms used for these tests were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Notropis leedsi*. The sample was toxic to *C. dubia*, producing a 48-hour $LC_{50} < 100\%$. No mortality occurred in the *N. leedsi* test.

Total residual chlorine of the sample was < 0.02 mg/L in the field and 0.04 mg/L in the laboratory. Total and unionized ammonia concentrations were 0.37 mg/L and < 0.01 mg/L, respectively. Further chemical analyses were performed on the sample and indicated the presence of the metals as shown in Table 2. The metals do not appear to be present in toxic concentrations. Organics were not detected. None of the 24 pesticides for which this sample was analyzed were detected. This does not rule out other pesticides as a possible cause of toxicity.

Conclusion

The sample of effluent collected from this facility on 2 November, 1992, was toxic to *C. dubia*. The cause of toxicity was not determined.

Table 1. Concentration series and volumes used for the 48-hour static acute screening bioassays of the City of Mulberry WWTP effluent performed on 3 to 5 November, 1992.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	20 mL	0 mL	20 mL
100 %	0 mL	20 mL	20 mL

Notropis leedsi (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
100 %	0 mL	500 mL	500 mL

Table 2. Results of chemical analyses on the effluent from City of Mulberry WWTP, sampled on 2 November, 1992.

Pesticides & Herbicides

none detected

Base-Neutral & Acid Extractables

none detected

Metals

Cadmium	0.08	µg/L	T
Calcium	43.7	µg/L	A
Iron	26	µg/L	A
Magnesium	12.4	µg/L	A
Zinc	58	µg/L	A

A Value reported is the mean of two or more determinations.
T Value reported is less than the practical quantitation limit.

Table 3. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the City of Mulberry WWTP, Mulberry, Polk County, Florida, NPDES# FL0020338, performed on 3 to 5 November, 1992.

Facility:	City of Mulberry WWTP		NPDES #	FL0020338	Facility Type:	wastewater treatment plant	
Location:	Mulberry		Contact/District:	James Snitgen / SW			
County:	Polk		Test type:	static acute screen			
Sample Collection Date:	11/2/92	Time: 1015	# tests:	2	Receiving Water:	North Prong of the Alafia River	
Test Beginning Date:	11/3/92	Time: 1345	Chlorination Type:	chlorinated			
Test Ending Date:	11/5/92	Time: 1400			Page 1 of 1		

Total Residual Cl2	mg/l	Method
Field:	< 0.02	DR-100
Lab:	0.04	DR-100

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.34	< 0.01
20% Dilute Mineral Water (cladocerans):	0.40	< 0.01
100% Sample:	0.37	< 0.01

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	119	118
20% Dilute Mineral Water (cladocerans):	70	88
100% Sample:	159	182

Salinity (ppt)	
Control Water:	0
100% Sample:	0

Organism: ***Ceriodaphnia dubia*** Life stage: < 24 hours old

	SURVIVAL			pH			Temperature			Dissolved Oxygen			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control	5	5	5	8.0	-	8.1	23.2	-	24.7	8.7	-	8.4	150	190
Control	5	5	5	-	-	8.1	-	-	-	-	-	8.4	-	-
Control	5	5	5	-	-	8.2	-	-	-	-	-	8.4	-	-
Control	5	5	5	-	-	8.3	-	-	-	-	-	8.4	-	-
100%	5	3	1	7.0	-	8.6	23.0	-	25.0	8.6	-	8.4	620	650
100%	5	4	0	-	-	8.6	-	-	-	-	-	8.4	-	-
100%	5	4	1	-	-	8.6	-	-	-	-	-	8.4	-	-
100%	5	4	0	-	-	8.6	-	-	-	-	-	8.4	-	-

Organism: ***Notropis leedsi*** Age: 11 days

	SURVIVAL			pH			Temperature			Dissolved Oxygen			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control	5	5	5	7.9	8.2	8.3	23.5	24.0	23.7	8.6	7.8	7.9	240	245
Control	5	5	5	7.9	8.2	8.3	-	-	-	8.7	7.9	8.0	240	245
100%	5	5	5	6.9	7.7	8.1	23.0	23.8	23.7	8.5	7.9	8.1	650	650
100%	5	5	5	6.9	7.6	8.1	-	-	-	8.5	7.9	8.1	650	655

Sample Source: Mulberry STP
Address/City:
County:
Contact/District:
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 11/2/92 Time 1015
Test Beginning: Date 11/3/92 Time 1345
Test Ending: Date 11-5-92 Time 1400
Test Organism: Ceriodaphnia dubia
Life Stage/Age: < 24 hours

Test Number: 1 of 2 Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

44246- 92-NOV-03-18
verified 11-5-92 KP

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7, 7.9, 9	8.5@23.7	23.3@23.8	960@24.2 9610
24 hr	7@7, 9@9	8.5@24.0	24.0@24.0	960 @24.0 9700
48 hr	7@7, 9@9	8.5@23.9	23.9@23.7	960 @24.0 9650

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO.(mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control	A	5	5	5	8.0		8.1	23.2		24.7	8.7		8.4	150		190
Control	B	5	5	5			8.1						8.4			
Control	C	5	5	5			8.2						8.4			
Control	D	5	5	5			8.3						8.4			
100%	A	5	3	1	7.0		8.6	23.0		25.0	8.6		8.4	620		605
100%	B	5	4	0			8.6						8.4			
100%	C	5	4	1			8.6						8.4			
100%	D	5	4	0			8.6						8.4			
Measured/Loaded by:		MF	MF	TM	TM		MF	TM		MF	TM		MF	TM		MF
Recorded by:		MF	MF	MF	KP		TM	KP		TM	KP		TM	KP		TM

Investigators' Signatures

Marshall Fanchick
Tina M. Kuldau
Kim Pearce
Robin Rader
Reviewer

Water-quality Parameters

	Well Water	20% Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			<0.02	DR100	
Lab Tot. Resid. Cl2:	0.02	0.01	0.04	DR100	TR
Alkalinity:	119	70	159	Hach	TR
Hardness:	118	88	182	Hach	TR
Total Ammonia:	.34	.40	.37	Orion	MF

Ammonia Meter Slope: -55
Ammonia Blank: 0.0
Salinity Sample:

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Mulberry STP
Address/City:
County:
Contact/District:
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 11/2/92 Time 1015
Test Beginning: Date 11/3/92 Time 1345
Test Ending: Date 11-5-92 Time 1400
Test Organism: Notropis leedsi
Life Stage/Age: 1 days

Test Number: 2 of 2 Test Type: (Screening) | Definitive
Static | (Static Renewal) | Flow-through

44246 92-NOV-03-18
verified 11-5-92 KP

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7&7.9&9	8.5@23.7	23.8&23.8	960 9600 @ 24.2
24 hr	7&7.9&9	8.5@24.0	24.0@24.0	960 @24.0
48 hr	7&7.9&9	8.5@23.9	23.9@23.7	960 9650 @24.0

		Number Live			pH			Temp. (°C)			DO (mg/L)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	47	5	5	5	7.9	8.2	8.3	23.5	24	23.7	~~7.8~~	7.8	7.9	240	245	245
Control	82	5	5	5	7.9	8.2	8.3				~~7.8~~	7.9	8.0	240	245	245
100%	63	5	5	5	6.9	7.7	8.1	23.0	23.8	23.7	~~7.5~~	7.9	8.1	650	655	650
100%	190	5	5	5	6.9	7.6	8.1				~~7.6~~	7.9	8.1	650	660	655
											KP					
											Had meter set on					
											21 ppt salin					
										#47	8.6					
										#82	8.7					
										# 63	8.5					
										# 190	8.5					
Measured/Loaded by:		MF	MF	MF	TM	TM	MF	TM	TM	MF	TM	TM	MF	TM	TM	MF
Recorded by:		MF	MF	MF	KP	TR	TM	KP	TR	TM	KP	TR	TM	KP	TR	TM

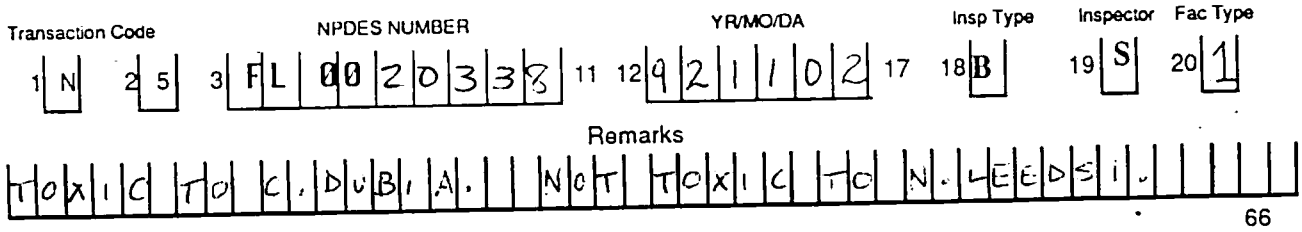
Investigators' Signatures
Marshall Faircloth
Tina Mikulski
Kim Pearce
Tobin Rader
Reviewer

Water-quality Parameters

	Well Water	Cond. Water (20‰)	Sample	Method	Measured by
Field Tot. Resid. Cl2:			0.00	DR100	
Lab Tot. Resid. Cl2:	0.02	0.01	0.04	DR100	TR
Alkalinity:	119	70	159	Hach	TR
Hardness:	118	88	182	Hach	TR
Total Ammonia:	.34	.40	.37	Orion	MF

Ammonia Meter Slope: -55
Ammonia Blank: 0.0
Salinity Sample: ____ ppt

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)



Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)

