

Bioassays of the City of

Marianna Wastewater Treatment Plant

Marianna, Jackson County, Florida

NPDES #FL0020117

Sampled 12/4/99

June 2001

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

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Bureau of Laboratories
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Introduction

City of Marianna Wastewater Treatment Plant, 101 East Franklin Street, Marianna, Jackson County, Florida, NPDES #FL0020117, tests performed on 5 to 7 December 2000.

This wastewater treatment plant has a design flow of 2.7 MGD and an average flow of 1.87 MGD. The flow during the survey was 1.84 MGD. This wastewater treatment plant consists of two oxidation ditches and one trickling filter. Alum is added to the wastewater to remove phosphorus. The effluent is chlorinated for disinfection and dechlorinated using sulfur dioxide. The final effluent is continuously discharged through Outfall 001 to the Class III fresh waters of the Chipola River (facility summary provided by Kenny Ferguson, Kim Allen, and Glenn Butts, FDEP, Pensacola).

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1993, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition, EPA/600/4-90/027F.

Results and Discussion

The FDEP Biology Section performed two 48-hour static acute screening toxicity bioassays on a sample of effluent from this facility. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The test results did not indicate toxicity to either test species by 48 hours (Table 1).

The total residual chlorine concentration of the sample was below the minimum detection limit in the laboratory of 0.03 mg/L. Total ammonia was not detected in the sample. Further chemical analyses were performed on the sample, and several metals were identified. The concentration of silver found in the sample (0.44 µg/L) exceeded the State of Florida Surface Water Quality Standard for silver (≤0.07 µg/L) in Class III fresh waters (Table 2).

Conclusion

The sample of effluent collected from this facility on December 4, 2000, did not indicate toxicity to the test species, *C. leedsi* or *C. dubia*, within 48 hours. The concentration of silver found in the sample exceeded the State of Florida Surface Water Quality Standard for silver in Class III fresh waters.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the City of Marianna WWTP, 101 East Franklin Street, Marianna Jackson County, Florida, NPDES# FL0020117 performed on 5 to 7 December 2000.

Facility:	**City of Marianna WWtP**			**NPDES #**	**FL0020117**	Facility Type:	**Wastewater**
Location:	101 East Franklin Street, Marianna			Contact/District:	Glenn Butts/ Northwest		**Treatment Plant**
County:	Jackson			Test type:	static acute screen		
Sample Collection Date:	12/4/00	Time:	1030	# tests:	2	Receiving Water:	Chipola River
Test Beginning Date:	12/5/00	Time:	1335	Chlorination Type:	chlorinated		
Test Ending Date:	12/7/00	Time:	1310		sample collected after dechlorination		**Page 1 of 1**

Total Residual Cl2	mg/L	Method
Field:	0.03	-
Lab:	<0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	< 0.017	<0.017
20% Dilute Mineral Water (cladocerans):	< 0.017	<0.017
100% Sample:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	129	127
20% Dilute Mineral Water (cladocerans):	75	82
100% Sample:	164	154

Salinity[C]	(ppt)
Control Water:	<1
100% Sample:	<1

[C] Salinity based on conductivity and temperature measurements.

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

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	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 A	0/20	5	5	5	7.2	-	8.2	25.1	-	24.1	8.0	-	8.7	172	200
Control B	0/20	5	5	5	-	-	8.2	-	-	24.0	-	-	8.8	-	200
Control C	0/20	5	5	5	-	-	8.2	-	-	24.8	-	-	8.8	-	195
Control D	0/20	5	5	5	-	-	8.2	-	-	24.3	-	-	8.7	-	195
100% A	20/0	5	5	5	7.3	-	8.5	24.9	-	23.9	8.0	-	8.9	575	690
100% B	20/0	5	5	5	-	-	8.5	-	-	23.8	-	-	8.9	-	680
100% C	20/0	5	5	5	-	-	8.5	-	-	23.9	-	-	9.0	-	680
100% D	20/0	5	5	5	-	-	8.5	-	-	24.2	-	-	8.8	-	680

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.5-25.5°C.
Incubator #2 temperature range for the test period was 24.5-26.0°C.

Organism: *Cyprinella leedsi* Life stage: 11 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	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 A	0/500	5	5	5	7.7	8.2	8.2	24.8	24.4	25.3	6.9	7.8	8.0	280	270
Control B	0/500	5	5	5	7.7	8.2	8.3	24.6	24.1	25.1	7.1	7.9	8.1	260	270
Control C	0/500	5	5	5	7.7	8.2	8.3	24.4	24.1	24.7	7.2	7.9	8.1	255	260
Control D	0/500	5	5	5	7.7	8.2	8.3	24.3	24.1	24.4	7.7	7.9	8.3	255	260
100% A	500/0	5	5	5	7.6	8.1	8.2	24.6	24.2	25.2	8.2	7.5	7.6	575	670
100% B	500/0	5	5	5	7.6	8.1	8.2	24.7	24.2	25.0	8.2	7.5	7.4	630	650
100% C	500/0	5	5	5	7.6	8.1	8.2	24.8	24.0	24.6	8.2	7.5	7.5	620	650
100% D	500/0	5	5	5	7.6	8.1	8.2	24.8	23.9	24.3	8.3	7.5	7.6	635	645

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.5-25.5°C.
Incubator #3 temperature range for the test period was 24.5-25.5°C.

Table 2. Results of chemical analyses on the effluent from City of Marianna WWTP sampled on December 4, 2000.

Metals

Aluminum	700	µg/L	A
Cadmium	0.048	µg/L	I
Calcium	52.6	mg/L	A
Chromium	0.93	µg/L	I
Copper	6	µg/L	
Iron	152	µg/L	A
Lead	0.67	µg/L	I
Magnesium	7.5	mg/L	A
Silver	0.44	µg/L	
Zinc	46.8	µg/L	AJ

Pesticides and Herbicides

None detected

Base, Neutral, & Acid Extractable Organics

None detected

A Value reported is the mean of two or more determinations.

I Value reported is less than the minimum quantitation limit and greater than or equal to the minimum detection limit.

J Estimated value.

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Marianna WWTP
County: JACKSON
Contact / District: Glenn Botts / Northwest
NPDES Permit #: FL0020117
LIMS Sample #: 498208 LIMS Job #: TLH-2000-12-05-16
sample log 12-18-00 MF
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 1 of 2

Remarks:

Sample Collection: Date 12/4/00 Time 1050
Test Beginning: Date 12/5/00 Time 13:45
Test Ending: Date 12/7/00 Time 13:10
Organism Batch #: 62 Diluent Batch #: DMW #57
Organism Age: <24 hrs SRT toxicant batch #: NA
Test organism: C. dubia

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
CTRL H	A	5	5	5	7.2	—	8.2	25.1	—	24.1	8.0	—	8.7	172	—	200
	B	5	5	5	—	—	8.2	—	—	24.0	—	—	8.8	—	—	200
	C	5	5	5	—	—	8.2	—	—	24.0	—	—	8.8	—	—	195
	D	5	5	5	—	—	8.2	—	—	24.3	—	—	8.7	—	—	195
100% A	A	5	5	5	7.3	—	8.5	24.9	—	23.9	8.0	—	8.9	575	—	690
	B	5	5	5	—	—	8.5	—	—	23.8	—	—	8.9	—	—	680
	C	5	5	5	—	—	8.5	—	—	23.9	—	—	9.0	—	—	680
	D	5	5	5	—	—	8.5	—	—	24.2	—	—	8.8	—	—	680
					—			—	—							
measured by:		YG	SG	SG	DPH	—	SG	DPH	—	SG	DPH	—	SG	DPH	—	SG
recorded by:		DPH	SG	SG	DPH	—	SG	DPH	—	SG	DPH	—	SG	DPH	—	SG

Investigators' Signatures
Shannon Gerardi
Julia Tarnoff
Marshall Faircloth
John Lyons
Tom Patton
Ann Wolfe
reviewer

form updated 3/3/99

Temperature Range °C
Incubator # 2 24.5 - 26.0 °C
Room B246 24.5 - 25.5 °C

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			0.03	—	G Botts	MF
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR100	DPH	SG
Alkalinity (mg/L as $CaCO_3$):		75	164	Hach	SG	SG
Hardness (mg/L as $CaCO_3$):		82	154	Hach	SG	SG
Total ammonia (mg/L as N):		<0.017	<0.017	Denver	DPH	SG
Salinity:		≈0	≈0	YSI	MF	SG

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Marianna WWTP
County: Jackson
Contact / District: Glenn Britts / Northwest
NPDES Permit #: FL0020117
LIMS Sample #: 493205 LIMS Job #: TLH-2000-12-05-16
sample log: 12-10-00 MF
Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 2 of 2

Remarks:

Sample Collection: Date 12/4/00 Time 1030
Test Beginning: Date 12/5/00 Time 1335
Test Ending: Date 12/7/00 Time 1315
Organism Batch #: 96 Diluent Batch #: UDRL
Organism Age: 11 days SRT toxicant batch #: NA
Test organism: C. reddi

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
CTRL A	F1	5	5	5	7.7	8.2	8.2	24.2	24.4	25.3	6.9	7.2	8.0	270	270	270
B	F2	5	5	5	7.7	8.2	8.3	24.6	24.1	25.1	7.1	7.9	8.1	260	260	270
C	F3	5	5	5	7.7	8.2	8.3	24.7	24.1	24.7	7.2	7.9	8.1	255	255	260
D	F4	5	5	5	7.7	8.2	8.3	24.3	24.1	24.4	7.2	7.9	8.3	255	255	260
A	F5	5	5	5	7.6	8.1	8.2	24.4	24.2	25.2	6.3	7.2	7.6	675	630	670
B	F6	5	5	5	7.6	8.1	8.2	24.7	24.2	25.0	7.2	7.2	7.9	630	640	650
C	F7	5	5	5	7.5	8.1	8.2	24.7	24.0	24.6	7.2	7.2	7.5	620	630	650
D	F8	5	5	5	7.6	8.1	8.2	24.2	23.9	24.3	6.3	7.2	7.6	635	635	645
measured by:		SG	SG	SG	DPH	SG	SG	TLH	SG	SG	DPH	SG	SG	DPH	SG	SG
recorded by:		DPH	SG	SG	TLH	SG	YMK	DPH	SG	YMK	DPH	SG	YMK	DPH	SG	YMK

Investigators' Signatures

Shannon Gerardi
L. Marie Hardin-Myers
Marshall Faircloth
Jodie Lyons
Yolanda Kelley
A. Hope
reviewer

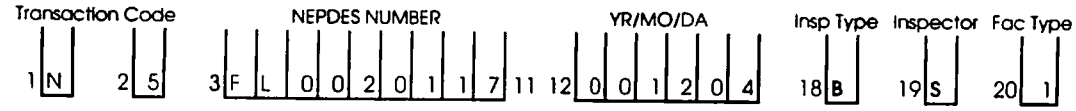
form updated 3/3/99

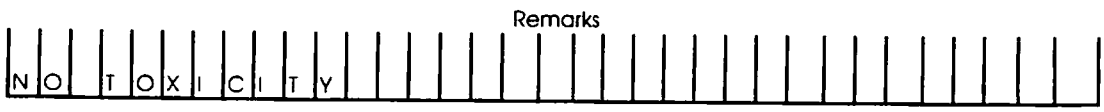
Temperature Range °C
Incubator # 3 24.5 - 25.5 °C
Room B246 24.5 - 25.5 °C

Water Quality Parameters	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			0.03	—	G. Britts	MF
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR100	DPH	SG
Alkalinity (mg/L as $CaCO_3$):	129		164	Hach	SG	SG
Hardness (mg/L as $CaCO_3$):	127		154	Hach	SG	SG
Total ammonia (mg/L as N):	<0.017		<0.017	Denver	DPH	SG
Salinity:	≈0		≈0	YSI	MF	SG

The Bioassay of the City of Marianna WWTP effluent sampled on December 4, 2000, NPDES #FL0020117.

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

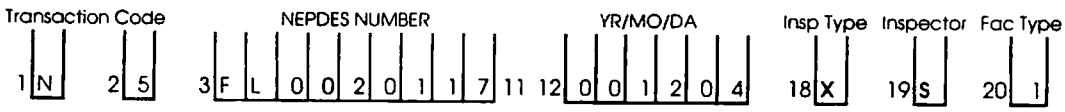


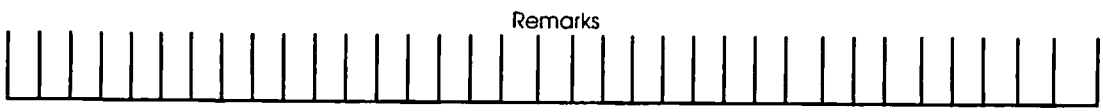


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The Priority Pollutants Analysis for Bioassay of the City of Marianna WWTP effluent sampled on December 4, 2000, NPDES #FL0020117.

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





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