Florida
Department of Environmental Protection

Bioassays of

St. Marks Wastewater Treatment Plant

St. Marks, Wakulla County, Florida

NPDES #FL0040835

Sampled 10/27/93

January, 1994

Biology Section
Division of Technical Services

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Biology Section
Bureau of Laboratories
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Introduction

St. Marks Wastewater Treatment Plant, St. Marks, Wakulla County, Florida, NPDES #FL0040835, tests performed on 27 to 29 October, 1993.

This facility is located on First Street in St. Marks and has a 50,000 GPD capacity. The plant provides secondary treatment with flow-equalization, clarification, aeration, chlorine disinfection, and dechlorination prior to discharging an average of 21,000 GPD. Treated effluent is discharged to the Class III waters of the St. Marks River (NPDES file and inspection information from Candice Burger, FDEP NWD Branch Office, Tallahassee).

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 FDEP Biology Section performed two 48-hour static acute screening toxicity bioassays with 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* (formerly *Notropis leedsi*). The test results indicated that the sample was not toxic to *Cyprinella leedsi*. The sample exhibited some toxicity to *Ceriodaphnia dubia*, producing 15% mortality in the 100% effluent test concentration.

Total residual chlorine and total ammonia were not detected in the sample. Further chemical analyses were performed on the sample and several metals were present (Table 2). Pesticides and organics were not detected.

Conclusion

The sample of effluent collected from this facility on 27 October, 1993, showed slight toxicity to *Ceriodaphnia dubia*. The cause of toxicity was not determined.

Table 1. Concentration series and volumes used for the 48-hour static acute screening toxicity bioassays of the St. Marks WWTP effluent performed on 27 to 29 October, 1993.

Ceriodaphnia dubia (water flea)

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

Cyprinella leedsi (bannerfin shiner, formerly *Notropis leedsi*)

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 St. Marks WWTP, sampled on 27 October, 1993.

Metals

Aluminum	122	µg/L [I]
Cadmium	0.12	µg/L [I]
Calcium	104	mg/L
Copper	15	µg/L
Iron	41	µg/L
Magnesium	5.6	mg/L
Sodium	29.8	mg/L
Zinc	45	µg/L

Pesticides & Herbicides

None Detected

Base-Neutral & Acid Extractables

None Detected

[I] Value reported is between the laboratory method detection limit and the laboratory practical quantitation limit.

Table 3. Data recorded during the 48-hour static acute screening bioassays of a sample of effluent from the St. Marks WWTP, St. Marks, Wakulla County, Florida, NPDES# FL0040835, performed on 27 to 29 October, 1993.

Facility:	St. Marks WWTP	NPDES #	FL0040835	Facility Type:	Wastewater Treatment Plant
Location:	St. Marks	Contact/District:	Frank Leteux/NW		
County:	Wakulla	Test type:	static acute screen		
Sample Collection Date:	10/27/93 Time: 1100	# tests:	2	Receiving Water:	St. Marks River
Test Beginning Date:	10/27/93 Time: 1430	Chlorination Type:	Sample collected after dechlorination.		
Test Ending Date:	10/29/93 Time: 1430			Page 1 of 1	

Total Residual Cl2	mg/L	Method
Field:	0	-
Lab:	< 0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	<0.017	0.00
20% Dilute Mineral Water (cladocerans):	<0.017	0.00
100% Sample:	<0.017	0.00

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	125	120
20% Dilute Mineral Water (cladocerans):	80	85
100% Sample:	180	250

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	7.8	-	7.9	23.4	-	23.7	9.0	-	8.3	155	180
Control	5	5	5	-	-	7.9	-	-	23.7	-	-	8.2	-	190
Control	5	5	5	-	-	8.0	-	-	23.8	-	-	8.1	-	200
Control	5	5	5	-	-	8.0	-	-	23.7	-	-	8.1	-	200
100%	5	5	3	7.3	-	8.4	24.6	-	24.4	8.8	-	8.0	620	600
100%	5	5	5	-	-	8.4	-	-	24.0	-	-	8.3	-	645
100%	5	5	5	-	-	8.4	-	-	23.9	-	-	8.4	-	700
100%	5	5	4	-	-	8.4	-	-	24.4	-	-	8.1	-	740

Organism: ***Cyprinella leedsi*** Age: 10 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	24 hour	48 hour
Control	5	5	5	7.4	7.9	8.0	23.4	23.6	23.7	8.9	9.1	8.5	240	265
Control	5	5	5	7.5	7.9	8.0	-	-	23.7	8.9	9.3	8.4	245	255
100%	5	5	5	7.3	7.9	8.1	26.1	23.6	23.6	9.0	9.0	8.3	695	665
100%	5	5	5	7.3	7.9	8.1	-	-	23.6	9.0	9.0	8.4	700	665

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: ST MARKS WWTP
Location: ST MARKS
County: WAKULLA
Contact/District: FRANK LETOUX (NWD-TML)
NPDES Permit #: FL0040335 Outfall #:

Sample Collection: Date 10-27-93 Time 11:00
Test Beginning: Date 10-27-93 Time 1430
Test Ending: Date 10-31-93 Time 1130
Organism Batch #: 116 Diluent Batch #: 25
Organism Age: <24 hours
Test Organism: Ceriodaphnia dubia

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

Test Number: 1 of 2

Remarks:

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.2 @ 23.3	8.5 @ 23.3	484 @ 1,000 9490 @ 10,000 @ 23.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.2 @ 23.3	8.4 @ 23.6	485 @ 1,000 9340 @ 10,000 @ 24.2 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.2 @ 23.3	8.4 @ 23.9	990 @ 1,000 9660 @ 10,000 @ 24.2 °C

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) Cond. (µmhos/cm) 0 hr	24 h	48 h
control	A	5	5	5	7.8		7.9	23.4		23.3	7.0		8.4	155		160
Control	B	5	5	5			7.9			23.3			8.4			170
Control	C	5	5	5			8.0			23.3			8.1			200
Control	D	5	5	5			8.0			23.3			8.1			200
100%	A	5	5	5	7.5		8.4	24.6		24.1	8.5		8.0	620		630
100%	B	5	5	5*			8.4			24.0			8.3			670
100%	C	5	5	5			8.4			23.7			8.4			700
100%	D	5	5	4			8.4			24.1			8.1			710
			Lost to accident													
			write over -TM													
Measured/Loaded by:		TM	TM	TM	TM		TM	TM		TM	TM		TM	TM		TM
Recorded by:		TM	TM	TM	KP		TM	KP		TM	KP		TM	KP		TM

Investigators' Signatures

Kim Pearce
Tina Mikulidis
Michael Sandlin
Tobin G. Kader
Reviewer

	Salt Water/ Well Water	Water Quality Parameters: 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.0	—	FL
Lab Total Residual Cl2:	—	—	<0.03	DR-100	KP
Alkalinity:	125	80	180	Hach	TM
Hardness:	120	85	250	Hach	TM
Total Ammonia:	NA	<0.017	0.07	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -56.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 7/8/93

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: ST MARKS WWTP
Location: ST MARKS
County: WAKULLA
Contact/District: FRANK LETEUX (NWD - TALL)
NPDES Permit #: FL00 40335 Outfall #:

Sample Collection: Date 10-27-93 Time 1100
Test Beginning: Date 10-27-93 Time 1430
Test Ending: Date 10-29-93 Time 1430
Organism Batch #: 45 Diluent Batch #: WELL
Organism Age: 11 DAYS
Test Organism: Cyprinodon variegatus

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

C-4331 93-OCT-27-12

Test Number: 2 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.2 @ 23.3	8.5 @ 23.3	184 @ 1,000 9490 @ 10,000 @ 23.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.3	7.4 @ 23.6	995 @ 1,000 9340 @ 10,000 @ 24.2 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.2 @ 23.3	8.4 @ 23.9	990 @ 1,000 9560 @ 10,000 @ 22.2 °C

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) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	05	5	5	5	7.4	7.9	8.0	23.4	23.6	23.7	8.7	8.1	8.5	240	245	245
Control	13	5	5	5	7.5	7.9	8.0			23.7	8.9	9.3	8.4	240	255	255
100% 2	11	5	5	5	7.3	7.9	8.1	23.1	23.6	23.6	9.0	9.0	8.5	695	695	695
100% 3	15	5	5	5	7.3	7.9	8.1			23.6	9.0	9.0	8.4	700	665	695
Measured/Loaded by:		TM	TM	TM	TM	TR	MF	TM	TR	MF	TM	TR	MF	TM	TR	MF
Recorded by:		TM	TM	TM	KP	TM	TM	KP	TM	TM	KP	TM	TM	KP	TM	TM

Investigators' Signatures

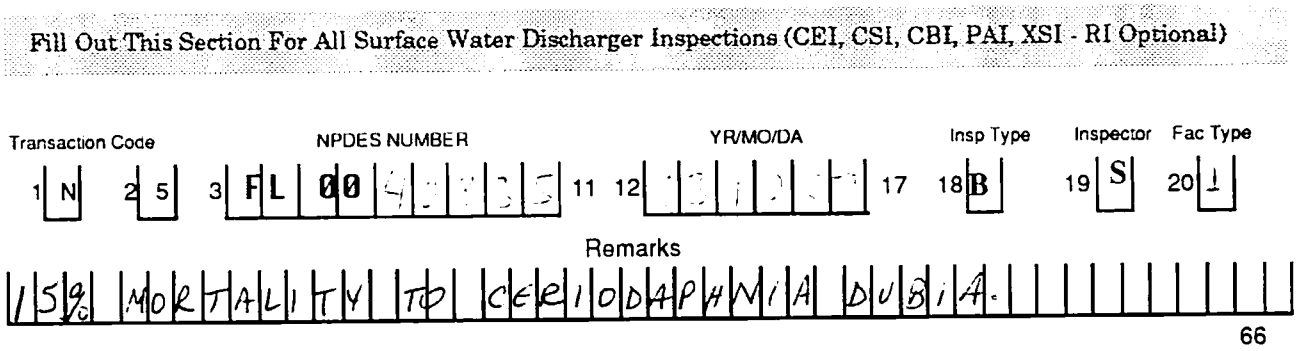
Kim Pearce
Tina Mikulski
Marshall Faircloth
Justin C. Fadler
Reviewer

	Salt Water/ Well Water	Water Quality Parameters 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.0	—	FL
Lab Total Residual Cl2:	—	—	<0.03	DR-100	KP
Alkalinity:	25	5C	80	Hach	TM
Hardness:	2C	85	25C	Hach	TM
Total Ammonia:	0.0	NA	0.0	Hach	MF

Ammonia Meter #98136 Ammonia Meter Slope: -56.9 Ammonia Blank: 0.17 Control Salinity: 0 ppt Sample Salinity: ppt

form updated 7/8/93

The Bioassay of the St Marks WWTP effluent sampled on October 27, 1993, NPDES# FL0040835.



The Priority Pollutants Analysis for the Bioassay of the St Marks WWTP effluent sampled on October 27, 1993, NPDES# FL0040835.

