Bioassays of

F file → **Florida Cities Water Company**
Waterway Estates Wastewater Treatment Plant
North Fort Myers, Lee County, Florida
NPDES #FL0030325
Sampled 1/19/93

March 1993

Biology Section
Division of Technical Services

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Florida Cities Water Company
Waterway Estates Wastewater Treatment Plant

North Fort Myers, Lee County, Florida

NPDES #FL0030325

Biology Section
Bureau of Laboratories
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Introduction

Florida Cities Water Company Waterway Estates WWTP, North Fort Myers, Lee County, Florida, NPDES #FL0030325, tests performed on 20 to 22 January, 1993.

This facility is located at 1667 Inlet Drive in North Fort Myers. The advanced wastewater treatment facility has a 1.0 MGD capacity. Construction to improve the treatment of wastewater includes a 17,000-gallon surge tank, three denitrification filters, ultraviolet disinfection, and relocation of the discharge pipe. Treated effluent is discharged to the Caloosahatchee River (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 test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Notropis leedsi*. The test results did not indicate toxicity to *N. leedsi*. However, the sample did cause 100% mortality in the *C. dubia* test in 48 hours, resulting in a 48-hour $LC_{50} < 100\%$.

Total residual chlorine of the sample was 0.04 mg/L in the laboratory. No total residual chlorine was detected in the field. Total and unionized ammonia concentrations were 0.40 mg/L and < 0.01 mg/L, respectively.

Further chemical analyses were performed on the sample and indicated the presence of the pesticide, diazinon (0.32 µg/L). Diazinon levels as low as 0.03 µg/L have been found to be acutely toxic to some freshwater invertebrates (EPA *AQUIRE* database). The LC_{50} of diazinon for *C. dubia* is 0.35 µg/L (EPA), which would account for part of the observed mortality. The total *C. dubia* mortality observed would indicate that other toxicants are also present. Metals do not appear to be present in toxic concentrations (Table 2). Organics were not detected.

Conclusion

The sample of effluent collected from this facility on show toxicity to *C. dubia*. The diazinon was a probabl toxicity.

SPW,
C. dubia LC50
for diazinon
= 0.50 ug/L
HP 3/24/93

Table 1. Concentration series and volumes used for the 48-hour static acute screening bioassays of the Waterway Estates WWTP effluent performed on 20 to 22 January, 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

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 the Waterway Estates WWTP, sampled on 19 January, 1993.**

Pesticides & Herbicides

diazinon	0.32	µg/L

Metals

Calcium	49	mg/L	A
Iron	284	µg/L	A
Magnesium	12	mg/L	A
Zinc	7	µg/L	T

Base-Neutral & Acid Extractables

none detected

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 acute screening bioassays of a sample of effluent from the Waterway Estates WWTP, North Fort Myers, Lee County, Florida, NPDES# FL0030325, performed on 20 to 22 January, 1993.

Facility:	**Florida Cities Water Company Waterway WWTP**		**NPDES #**	**FL0030325**	Facility Type: **WWTP**
Location:	North Fort Myers		Contact / District:	Ron McGregor/S	
County:	Lee		Test type:	static acute screen	
Sample Collection Date:	**1/19/93**	Time: 1030	# tests:	2	Receiving Water: Caloosahatchee River
Test Beginning Date:	1/20/93	Time: 1230	Chlorination Type:	**sample collected**	
Test Ending Date:	1/22/93	Time: 1230		**after dechlorination**	**Page 1 of 1**

Total Residual Cl2	mg/l	Method
Field:	0.00	Hach
Lab:	0.04	DR-100

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
20% Dilute Mineral Water (cladocerans):	0.00	0.00
100% Sample:	0.40	< 0.01

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	120	120
20% Dilute Mineral Water (cladocerans):	65	80
100% Sample:	100	175

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

Organism: ***Ceriodaphnia dubia*** Life stage: < 24 hrs
LC50 < 100%

	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	8.3	-	8.3	22.1	-	23.2	8.2	-	7.7	150	190
Control	5	5	5	-	-	8.3	-	-	-	-	-	7.8	-	185
Control	5	5	5	-	-	8.3	-	-	-	-	-	7.8	-	180
Control	5	5	5	-	-	8.3	-	-	-	-	-	7.9	-	185
100%	5	5	0	7.8	-	8.5	22.5	-	23.6	8.5	-	7.8	890	910
100%	5	5	0	-	-	8.5	-	-	-	-	-	7.8	-	925
100%	5	5	0	-	-	8.4	-	-	-	-	-	7.8	-	960
100%	5	5	0	-	-	8.4	-	-	-	-	-	7.8	-	960

Organism: ***Notropis leedsi*** Age: 12 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	7.5	8.2	8.3	21.8	22.7	22.7	8.1	8.1	8.0	235	255
Control	5	5	5	7.6	8.2	8.3	-	-	-	8.2	8.1	8.0	235	255
100%	5	5	*	7.7	8.0	-	23.5	22.7	-	8.6	7.9	-	970	-
100%	5	5	5	7.7	8.1	8.2	-	-	20.8	8.7	8.0	7.8	975	970

*100% Replicate-A knocked off counter at 1:45 on 1/21/93.

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Waterway Estates WWTP
Location:
County: Lee
Contact/District: Ron McGregor / South
NPDES Permit #: FL00 48172 KP (LIMS #, NOT NPDES 1-25-93) Outfall #:

Sample Collection: Date 1-19-93 Time 10:30
Test Beginning: Date 1-20-93 Time 12:30
Test Ending: Date 1-22-93 Time 12:30
Organism Batch #: 3 Diluent Batch #: 2
Organism Age: < 24 hrs.
Test Organism: Ceriodaphnia Dubia

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

Test Number: 1 of 2

Remarks: 48172 93-JAN-20-05-01
entered in Lims by remote entry
verified 1-22-93 KP 1/22/93 1530

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
0 hr	7.0 @ 7.0	21.8 @ 21.9	8.6 @ 22.5	970 @ 1,000 @23.3
	10.0 @ 10.0			9650 @ 10,000
24 hr	7.0 @ 7.0	23.0 @ 23.1	8.5 @ 23.5	975 @ 1,000 @23.6
	10.0 @ 10.0			9700 @ 10,000
48 hr	7.0 @ 7.0	22.8 @ 22.9	8.0 @ 26.4	970 @ 1,000 @23.5°C
	10.0 @ 10.0			9750 @ 10,000

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			Cond. (mmhos/cm) Cond (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	A	5	5	5	8.3		8.3	22.1		23.2	8.2		7.7	150		190
Control	B	5	5	5			8.3						7.8			185
Control	C	5	5	5			8.3						7.8			180
Control	D	5	5	5			8.3						7.9			185
100%	A	5	5	0	7.8		8.5	22.5		23.6	8.5		7.8	890		910
100%	B	5	5	0			8.5						7.8			925
100%	C	5	5	0			8.4						7.8			960
100%	D	5	5	0			8.4						7.8			960
Measured/Loaded by:		MF	TM	TM	TR		TR	TR		TR	TR		TR	TR		TR
Recorded by:		TR	TR	TR	TM		TM	TM		TM	TM		TM	TM		TM

Investigators' Signatures
Robin Rader
Tina Mikulski
Mark Fawlett
Kim Pearce

Reviewer

form updated 10/20/92

	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
			Water Quality Parameters		
Field Total Residual Cl2:			0		RM
Lab Total Residual Cl2:	.02	.02	.04	DR-100	TM
Alkalinity:	120	65	100	Hach	TM
Hardness:	120	80	175	Hach	TM
Total Ammonia:	0.0	0.0	0.40	Orion Hach	TM

Cl_2 Blank: 0.0 Ammonia Meter Slope: -57.2 Ammonia Blank: 0.0 Sample Salinity: ____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Waterway Estates WWTP
Location:
County: Lee
Contact/District: Ron McGregor / South
NPDES Permit #: FL00 ~~48172 KP~~ Outfall #:
LIMS #, NOT NPDES # 1-25-93

Sample Collection: Date 1-19-93 Time 10:30
Test Beginning: Date 1-20-93 Time 12:30
Test Ending: Date 1-22-93 Time 12:30
Organism Batch #: 54 Diluent Batch #: NA
Organism Age: 12 days
Test Organism: Notropis leedsi

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

Test Number: 2 of 2

Remarks:
48172 93JAN2005 01

*- 100% - Jar A - knocked off counter at 1:45 on 1-21-93. TM
Spilled @ 1530 1/22/93 by mistake entry

Instrument Calibrations: pH Temperature °C D.O. mg/L Conductivity µmhos/cm

0 hr 7.0 @ 7.0 21.8 @ 21.9 8.6 @ 22.5 970 @ 1,000 @ 23.3°C
10.0 @ 10.0 9650 @ 10,000

24 hr 7.0 @ 7.0 23.0 @ 23.1 8.5 @ 235 975 @ 1,000 @ 23.6°C
10.0 @ 10.0 9700 @ 10,000

48 hr 7.0 @ 7.0 22.8 @ 22.9 8.0 @ 26.4 970 @ 1,000 @ 23.5°C
10.0 @ 10.0 9750 @ 10,000

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temperature (°C) 0	24	48	D.O. (mg/L) 0	24	48	Cond. (mmhos/cm) Cond. (µmhos/cm) 0	24	48
Control	28	5	5	5	7.5	8.2	8.3	21.8	22.7	22.7	8.1	8.1	8.0	235	250	255
Control	190	5	5	5	7.6	8.2	8.3				8.2	8.1	8.0	235	255	255
100%	366	5	5	*	7.7	8.0	—	23.5	22.7	—	8.6	7.9	—	970	950	—
100%	8	5	5	5	7.7	8.1	8.2			20.8	8.7	8.0	7.8	975	960	770
Measured/Loaded by:		TM	TR	TM	TR	TM	TR	TR	TM	TR	TR	TM	TR	TR	TM	TR
Recorded by:		TR	TR	TM	TM	TR	TM	TM	TR	TM	TM	TR	TM	TM	TR	TM

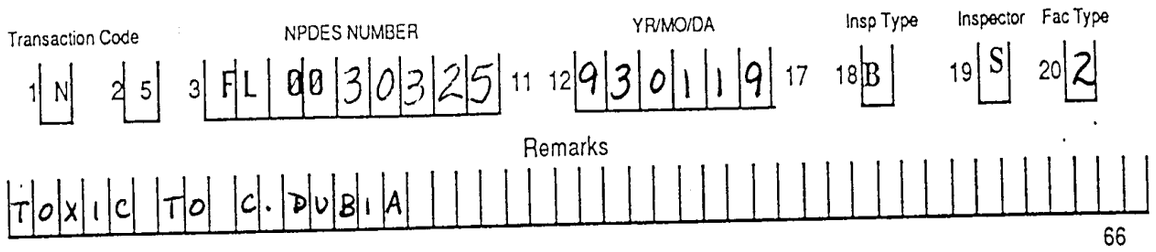
Investigators' Signatures
Tobin Rader
Tina Mikulski
Marshall Faircloth
Kim Pearce

Reviewer

Water Quality Parameters	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0		RM
Lab Total Residual Cl2:	.02	.02	.04	DR-100	TM
Alkalinity:	120	65	100	Hach	TM
Hardness:	120	80	175	Hach	TM
Total Ammonia:	0.0	0.0	0.40	Orion	MF

Cl_2 Blank: 0.0 Ammonia Meter Slope: -57.2 Ammonia Blank: 0.0 Sample Salinity: 0 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)

