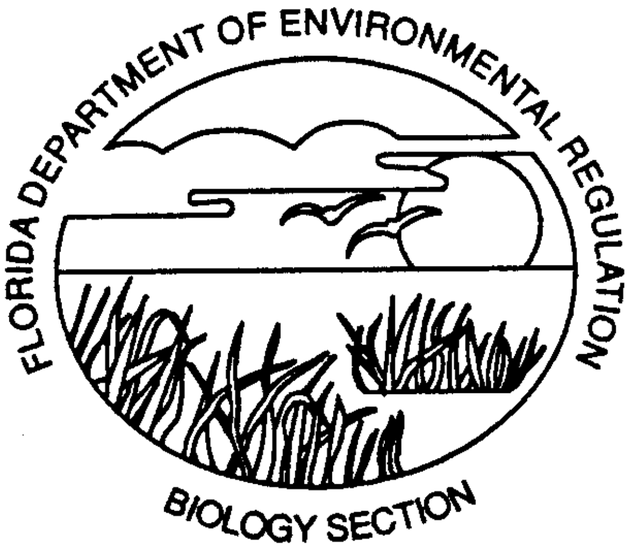


Bioassays of

Boca Raton Wastewater Treatment Plant

Boca Raton, Palm Beach County, Florida

NPDES #FL0026344

Sampled 4/16/90

June 18, 1990

Biology Section
Division of Administrative and Technical Services

Bioassays of

Boca Raton Wastewater Treatment Plant

Boca Raton, Palm Beach County, Florida

NPDES #FL0026344

Biology Section
Bureau of Laboratories
June 18, 1990

Introduction

Boca Raton Wastewater Treatment Plant, Boca Raton, Palm Beach County, Florida, NPDES #FL0026344, on 17 to 21 April, 1990.

This facility is located at 1501 West Glades Road and serves a population of approximately 150,000. The recovered water is chlorinated and piped several miles to the Atlantic Ocean, where it is discharged through a 30" pipe one mile from shore in approximately 100' of water. The facility uses an activated sludge process to treat domestic wastes and light industrial waste. The design flow is 10 MGD and the volume treated approaches this amount.

In response to a request from the FDER Southeast District, the Biology Section performed bioassays on a sample of discharge from this facility. The toxicity tests discussed in this report were performed in accordance with methods described by Peltier and Weber, 1985, *Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms*, 3rd Edition, and by the FDER Biology Section, 1985, *Quality Assurance Manual for Performing Acute Toxicity Tests*, 2nd Edition.

Results and Discussion

The results of the Biology Section's 96-hour static test indicated that the sample was toxic to the bioassay test organism, the waterflea, *Ceriodaphnia dubia*, producing a 72 hour LC_{50} of 62.2%. The sample was also toxic to the bioassay test organism, the shrimp, *Mysidopsis bahia*, producing an LC_{50} of 110.7%. The Microtox® assay indicated that the sample was stimulatory to the Microtox® test organism, *Photobacterium phosphoreum*.

The total and unionized ammonia concentrations were 1.41 mg/l and 0.01 mg/l, respectively. No total residual chlorine was detected in the sample. No further chemical analyses were performed on the sample. The cause of toxicity to the test organisms, *C. dubia* and *M. bahia*, was not determined.

Conclusion

The sample of discharge from this facility was toxic on 16 April, 1990. The cause of toxicity was not determined.

Table 2. Data recorded during the static definitive bioassay of a sample of discharge from the City of Boca Raton STP, Boca Raton, Palm Beach County, Florida, NPDES #FL0026344, on 17 to 21 April, 1990.

Facility: **City of Boca Raton STP** NPDES # **FL0026344** Facility Type: **sewage treatment**
Location: 1501 Glades Road, Boca Raton Contact/District: C. Ferrigan / City of Boca Raton
County: Palm Beach Test type: static definitive
Sample Collection Date: **4/16/90** Time: 0900 # tests: 2 Receiving Water: Atlantic Ocean
Test Beginning Date: 4/17/90 Time: 1100 Chlorination Type: **chlorinated**
Test Ending Date: 4/21/90 Time: 1230 Dechlor Method: no residual chlorine upon arrival **Page 1 of 4**

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
LC50: 62.20% Binomial: 62.2% Moving Average: - Probit: -

Concentrations	SURVIVAL # at 0 hr	Live at 24 hr	Live at 48 hr	Dissolved Oxygen 0 hour	24 hour	48 hour	pH 0 hour	24 hour	48 hour	Temperature 0 hour	24 hour	48 hour	Conductivity 0 hour	48 hour
Control	5	5	5	8.5	-	-	8.1	-	-	21.3	-	-	-	-
Control	5	5	5	8.5	-	-	8.1	-	-	-	-	-	-	-
Control	5	5	5	8.5	-	-	8.1	-	-	-	-	-	180	-
Control	5	5	5	8.5	-	-	8.1	-	-	-	-	-	-	-
10%	5	5	5	8.4	-	-	8.0	-	-	21.3	-	-	-	-
10%	5	5	4	8.4	-	-	8.0	-	-	-	-	-	-	-
10%	5	5	5	8.4	-	-	8.0	-	-	-	-	-	-	-
10%	5	5	5	8.4	-	-	8.0	-	-	-	-	-	215	-
30%	5	5	5	8.2	-	-	7.7	-	-	21.7	-	-	-	-
30%	5	5	5	8.2	-	-	7.7	-	-	-	-	-	-	-
30%	5	5	5	8.2	-	-	7.7	-	-	-	-	-	-	-
30%	5	5	5	8.2	-	-	7.7	-	-	-	-	-	290	-
50%	5	5	5	7.9	-	-	7.4	-	-	21.8	-	-	-	-
50%	5	5	5	8.0	-	-	7.4	-	-	-	-	-	-	-
50%	5	5	5	8.0	-	-	7.4	-	-	-	-	-	-	-
50%	5	5	5	8.0	-	-	7.4	-	-	-	-	-	380	-
70%	5	5	4	7.8	-	-	7.3	-	-	21.8	-	-	-	-
70%	5	5	0	7.8	-	-	7.3	-	-	-	-	-	-	-
70%	5	5	3	7.8	-	-	7.3	-	-	-	-	-	-	-
70%	5	5	3	7.8	-	-	7.3	-	-	-	-	-	445	-
85%	5	5	0	7.6	-	-	7.2	-	-	21.8	-	-	-	-
85%	5	5	0	7.6	-	-	7.2	-	-	-	-	-	-	-
85%	5	4	0	7.6	-	-	7.2	-	-	-	-	-	-	-
85%	5	5	1	7.6	-	-	7.2	-	-	-	-	-	500	-
100%	5	1	0	7.5	-	*	7.2	-	8.1	21.7	-	20.3	-	-
100%	5	5	0	7.5	-	*	7.2	-	8.1	-	-	-	-	-
100%	5	1	0	7.5	-	*	7.2	-	8.0	-	-	-	-	-
100%	5	1	0	7.5	-	*	7.2	-	8.0	-	-	-	550	555

*not recorded

Total Residual Cl2	mg/l	Method
Field:	0.3	Hach
Lab:	0.0	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (salt):	0.00	0.00
Cond. Control Water (daphnids):	0.66	0.04
100% Sample:	1.41	0.01

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (salt):	90	-
Cond. Control Water (daphnids):	65	75
100% Sample:	75	105

Salinity (ppt)	
Control Water:	20*
100% Sample:	20*

*adjusted with artificial sea salts

-continued-

Table 1. Concentration Series and Volumes Used for These Static Bioassays.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	15.0 ml	0.0 ml	15 ml
10.0%	13.5 ml	1.5 ml	15 ml
30.0%	10.5 ml	4.5 ml	15 ml
50.0%	7.5 ml	7.5 ml	15 ml
70.0%	4.5 ml	10.5 ml	15 ml
85.0%	2.25 ml	12.75 ml	15 ml
100.0%	0.0 ml	15.0 ml	15 ml

Mysidopsis bahia (mysid shrimp)

Concentration	Dilution Water	Sample	Total Volume
Control	500 ml	0 ml	500 ml
10.0%	450 ml	50 ml	500 ml
30.0%	350 ml	150 ml	500 ml
50.0%	250 ml	250 ml	500 ml
70.0%	150 ml	350 ml	500 ml
85.0%	75 ml	425 ml	500 ml
100.0%	0 ml	500 ml	500 ml

Table 2. Continued.

Facility: **City of Boca Raton STP** NPDES # **FL0026344** Facility Type: **sewage treatment**
Location: 1501 Glades Road, Boca Raton Contact/District: C. Ferrigan / City of Boca Raton
County: Palm Beach Test type: static definitive
Sample Collection Date: **4/16/90** Time: 0900 # tests: 2 Receiving Water: Atlantic Ocean
Test Beginning Date: 4/17/90 Time: 1100 Chlorination Type: **chlorinated**
Test Ending Date: 4/21/90 Time: 1230 Dechlor Method: no residual chlorine upon arrival **Page 2 of 4**

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
LC50: 62.20% Binomial: 62.2% Moving Average: - Probit: -

	SURVIVAL			Dissolved Oxygen			pH			Temperature			Conductivity	
Concentrations	# at 0 hr	Live at 72 hr	Live at 96 hr	0 hour	72 hour	96 hour	0 hour	72 hour	96 hour	0 hour	72 hour	96 hour	0 hour	96 hour
Control	5	5	5	8.5	-	8.3	8.1	-	8.2	21.3	-	21.0	-	-
Control	5	5	5	8.5	-	8.4	8.1	-	8.2	-	-	-	-	-
Control	5	5	5	8.5	-	8.4	8.1	-	8.2	-	-	-	-	-
Control	5	5	5	8.5	-	8.4	8.1	-	8.2	-	-	-	180	275
10%	5	5	5	8.4	-	8.3	8.0	-	8.2	21.3	-	20.8	-	-
10%	5	4	4	8.4	-	8.4	8.0	-	8.2	-	-	-	-	-
10%	5	5	5	8.4	-	8.4	8.0	-	8.2	-	-	-	-	-
10%	5	5	5	8.4	-	8.4	8.0	-	8.2	-	-	-	215	245
30%	5	5	5	8.2	-	8.3	7.7	-	8.0	21.7	-	20.9	-	-
30%	5	5	5	8.2	-	8.3	7.7	-	8.0	-	-	-	-	-
30%	5	5	5	8.2	-	8.3	7.7	-	8.1	-	-	-	-	-
30%	5	5	4	8.2	-	8.3	7.7	-	8.2	-	-	-	290	370
50%	5	5	5	7.9	-	8.2	7.4	-	8.0	21.8	-	203.9	-	-
50%	5	5	5	8.0	-	8.2	7.4	-	8.0	-	-	-	-	-
50%	5	5	5	8.0	-	8.2	7.4	-	8.0	-	-	-	-	-
50%	5	5	5	8.0	-	8.2	7.4	-	8.1	-	-	-	380	440
70%	5	1*	0	7.8	-	8.1	7.3	-	7.9	21.8	-	21.0	-	-
70%	5	0	0	7.8	-	8.2	7.3	-	7.9	-	-	-	-	-
70%	5	3	1	7.8	-	8.1	7.3	-	7.9	-	-	-	-	-
70%	5	2	2	7.8	-	8.1	7.3	-	8.1	-	-	-	445	515
85%	5	0	0	7.6	7.7	-	7.2	7.8	-	21.8	20.9	-	-	-
85%	5	0	0	7.6	7.7	-	7.2	7.8	-	-	-	-	-	-
85%	5	0	0	7.6	7.5	-	7.2	7.8	-	-	-	-	-	-
85%	5	0	1	7.6	7.6	-	7.2	7.8	-	-	-	-	500	525
100%	5	0	0	7.5	-	-	7.2	-	-	21.7	-	-	-	-
100%	5	0	0	7.5	-	-	7.2	-	-	-	-	-	-	-
100%	5	0	0	7.5	-	-	7.2	-	-	-	-	-	-	-
100%	5	0	0	7.5	-	-	7.2	-	-	-	-	-	550	-

* on bottom

Total Residual Cl2	mg/l	Method
Field:	0.3	Hach
Lab:	0.0	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (salt):	0.00	0.00
Cond. Control Water (daphnids):	0.66	0.04
100% Sample:	1.41	0.01

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (salt):	90	-
Cond. Control Water (daphnids):	65	75
100% Sample:	75	105

Salinity (ppt)	
Control Water:	20*
100% Sample:	20*

* adjusted with artificial sea salts

Table 3. Data recorded during the static definitive bioassay of a sample of discharge from the city of Boca Raton STP, Boca Raton, Palm Beach County, Florida, NPDES #FL0026344, on 17 to 21 April, 1990.

Facility: **City of Boca Raton STP** NPDES # **FL0026344** Facility Type: **sewage treatment**
Location: 1501 Glades Road, Boca Raton Contact/District: C. Ferrigan / City of Boca Raton
County: Palm Beach Test type: static definitive
Sample Collection Date: **4/16/90** Time: 0900 # tests: 2 Receiving Water: Atlantic Ocean
Test Beginning Date: 4/17/90 Time: 1100 Chlorination Type: **chlorinated**
Test Ending Date: 4/21/90 Time: 1230 Dechlor Method: no residual chlorine upon arrival **Page 3 of 4**

Total Residual Cl2	mg/l	Method
Field:	0.3	Hach
Lab:	0.0	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (salt):	0.00	0.00
Cond. Control Water (daphnids):	0.66	0.04
100% Sample:	1.41	0.01

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (salt):	90	-
Cond. Control Water (daphnids):	65	75
100% Sample:	75	105

Salinity (ppt)	
Control Water:	20*
100% Sample:	20*

* adjusted with artificial sea salts

Organism: ***Mysidopsis bahia*** Age: <7 days
LC50: 110.7% Binomial: - Moving Average: - Probit: 110.7%

	SURVIVAL			Dissolved Oxygen			pH			Temperature			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	7.1	6.4	6.4	8.3	7.9	7.6	21.7	18.9	19.0	-	-
Control	5	5	5	7.2	6.5	6.4	8.3	7.9	7.6	-	-	-	29000	29400
10%	5	5	5	7.0	6.5	6.0	8.3	8.0	7.6	22.0	18.7	18.8	-	-
10%	5	5	5	7.0	6.5	6.0	8.3	8.0	7.7	-	-	-	29200	28600
30%	5	4	3	6.9	6.6	6.3	8.2	8.0	7.7	22.3	18.4	18.8	-	-
30%	5	5	4	7.0	6.6	6.3	8.2	8.0	7.7	-	-	-	29100	28300
50%	5	5	5	6.5	6.7	6.1	8.1	8.0	7.7	22.8	18.3	18.8	-	-
50%	5	5	5	6.6	6.8	6.2	8.1	8.0	7.7	-	-	-	28300	27500
70%	5	4	4	6.4	6.8	6.1	8.1	7.9	7.7	23.2	18.3	18.9	-	-
70%	5	5	4	6.4	6.8	6.1	8.1	7.9	7.7	-	-	-	28500	27700
85%	5	5	5	6.3	6.6	5.9	8.0	7.8	7.7	23.4	18.3	19.0	-	-
85%	5	5	3	6.3	6.5	5.9	8.0	7.8	7.7	-	-	-	28500	27300
100%	5	5	5	6.1	6.5	5.5	8.0	7.8	7.7	23.5	18.7	19.3	-	-
100%	5	5	4	6.1	6.5	5.6	8.0	7.8	7.7	-	-	-	28200	27600

-continued-

Table 3. Continued.

Facility:	**City of Boca Raton STP**		NPDES #	FL0026344	Facility Type: **sewage treatment**
Location:	1501 Glades Road, Boca Raton		Contact/District:	C. Ferrigan / City of Boca Raton	
County:	Palm Beach		Test type:	static definitive	
Sample Collection Date:	**4/16/90**	Time: 0900	# tests:	2	Receiving Water: Atlantic Ocean
Test Beginning Date:	4/17/90	Time: 1100	Chlorination Type:	**chlorinated**	
Test Ending Date:	4/21/90	Time: 1230	Dechlor Method:	no residual chlorine upon arrival	**Page 4 of 4**

Total Residual Cl2	mg/l	Method
Field:	0.3	Hach
Lab:	0.0	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (salt):	0.00	0.00
Cond. Control Water (daphnids):	0.66	0.04
100% Sample:	1.41	0.01

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (salt):	90	-
Cond. Control Water (daphnids):	65	75
100% Sample:	75	105

Salinity (ppt)	
Control Water:	20*
100% Sample:	20*

* adjusted with artificial sea salts

Organism: ***Mysidopsis bahia*** Age: <7 days
LC50: 110.7% Binomial: - Moving Average: - Probit: 110.7%

	SURVIVAL			Dissolved Oxygen			pH			Temperature			Conductivity	
Concentrations	# at 0 hr	Live at 72 hr	Live at 96 hr	0 hour	72 hour	96 hour	0 hour	72 hour	96 hour	0 hour	72 hour	96 hour	0 hour	96 hour
Control	5	5	5	7.1	5.4	6.9	8.3	7.5	7.7	21.7	20.4	19.8	-	-
Control	5	5	5	7.2	5.6	6.9	8.3	7.5	77.0	-	-	-	29000	32100
10%	5	5	5	7.0	5.8	6.7	8.3	7.6	7.7	22.0	20.0	19.6	-	-
10%	5	5	5	7.0	6.1	6.8	8.3	7.6	7.7	-	-	-	29200	30600
30%	5	3	3	6.9	5.9	6.9	8.2	7.6	7.8	22.3	19.8	19.6	-	-
30%	5	4	4	7.0	6.0	6.9	8.2	7.6	7.8	-	-	-	29100	30500
50%	5	5	5	6.5	6.1	6.8	8.1	7.7	7.8	22.8	19.9	19.8	-	-
50%	5	5	3	6.6	6.1	6.9	8.1	7.7	7.8	-	-	-	28300	29800
70%	5	3	3*	6.4	5.9	6.6	8.1	7.7	7.8	23.2	20.0	19.9	-	-
70%	5	4	2**	6.4	5.9	6.8	8.1	7.7	7.8	-	-	-	28500	29900
85%	5	4	4**	6.3	5.8	6.7	8.0	7.7	7.8	23.4	20.1	19.9	-	-
85%	5	3	1**	6.3	5.9	6.7	8.0	7.7	7.8	-	-	-	28500	28900
100%	5	4	3**	6.1	5.7	6.5	8.0	7.7	7.8	23.5	20.5	20.2	-	-
100%	5	4	4**	6.1	5.9	6.6	8.0	7.7	7.8	-	-	-	28200	29200

* 1 barely alive ** difficulty swimming, spiraling

Table 4. Microtox test results, Boca Raton STP, Palm Beach County, NPDES #FL0026344, on 17 April, 1990.

% Sample	Chlorinated Final Reclaimed Water	
	5-min	15-min
0	75	52
0	53	36
0	71	50
12.38	67	49
12.38	73	52
12.38	70	50
24.75	70	49
24.75	76	55
24.75	75	55
49.5	74	53
49.5	70	49
49.5	78	54
99	71	50
99	63	43
99	80	56

EC_{50} Chlorinated sample* (15 minute, 15 °C) = stimulatory

*Total residual chlorine measured 0.0 mg/L (Hach) in the laboratory.

EC_{50} (15 minute, 15 °C) is calculated using the Data Reduction Computer Program developed by Microbics Corporation for the Sharp Model EL-5100 calculator (*Microbics Systems Operating Manual,* 1982, Microbics Corporation, Carlsbad, CA).

Table 5. LC_{50} Data for Bioassay of Boca Raton STP, NPDES # FL0026344, sampled on 16 April, 1990.

Organism	Method of Data Analysis	48 Hour LC_{50} (95% Confidence Intervals)
Chlorinated discharge		
Ceriodaphnia dubia	Binomial	62.20% (50.00%, 70.00%)
	Moving Average	a
	Probit	a
Mysidopsis bahia	Binomial	a
	Moving Average	a
	Probit	110.73% (65.90%, 2871.00%)

a Due to an insufficient number of dead organisms, or to the irregular distribution of mortality, an LC_{50} value cannot be calculated using this method of statistical analysis.

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: City of Boca Raton STP
Address/City: 1501 Glades Road
County: ~~Broward~~ Palm Beach County
Contact/District: C. Errigo / SE / City of Boca Raton
NPDES Permit #: FL0026344 Outfall #:

Sample Collection: Date 4/16/90 Time 0900
Test Beginning: Date 4/17/90 Time 1100
Test Ending: Date 4/21/90 Time 1230
Test Organism: Ceriodaphnia Dubia
Life Stage/Age: Neonate

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

Remarks: No residual chlorine detected
* 2 brown + Kidney enhancement
** 3 brown

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7.7; 7.4	8.2 @ 25°C	1358 @ 23, 1.0 1357	22.2 @ 22.7
24 hr	7.7; 7.9	8.7 @ 25°C		22.3 @ 22.8
48 hr	7.7; 7.9	8.7 @ 25°C	1357 @ 22.8, 1.0 1350	22.8 @ 22.3

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control		5	5	5	8.5			8.1			21.3					
Control		5	5	5	8.5			8.1								
Control		5	5	5	8.5			8.1								
Control		5	5	5	8.5			8.1						180		
10 %		5	5	5	8.4			8.0			21.3					
10 %		5	5	4	8.4			8.0								
10 %		5	5	5	8.4			8.0								
10 %		5	5	5	8.4			8.0						215		
30 %		5	5	5	8.2			7.7			21.7					
30 %		5	5	5	8.2			7.7								
30 %		5	5	5	8.2			7.7								
30 %		5	5	5	8.2			7.7						290		
50 %		5	5	5	7.9			7.4			21.8					
50 %		5	5	5	8.0			7.4								
50 %		5	5	5	8.0			7.4								
50 %		5	5	5	8.0			7.4						380		
70 %		5	5	4	7.8			7.3			21.8					
70 %		5	5	0	7.8			7.3								
70 %		5	5	3	7.8			7.3								
70 %		5	5	3	7.8			7.3						445		
85 %		5	5*	0	7.6			7.2			21.8					
85 %		5	5*	0	7.6			7.2								
85 %		5	4*	0	7.6			7.2								
85 %		5	5	1	7.6			7.2						500		
100 %		5	1	0	7.5			7.2		8.1	21.7		20.3			
100 %		5	5**	0	7.5			7.2		8.1						
100 %		5	1	0	7.5			7.2		8.0						
100 %		5	1	0	7.5			7.2		8.0				550		555
Measured by:		MF	MF	SW	MF			MF		MF	MF		W	MF		MF
Recorded by:		MF	MF	SW	MF			MF		MF	MF		MF	MF		MF

Investigators' Signatures

Marshall Faircloth

Steven H. Weiss

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	—	—	0.30		C. Errigo
Lab Tot. Resid. Cl2:	—	— 5.0	0.00	Hach	M. F
Alkalinity:	115	65 / 90	75	Hach	M. F
Hardness:	125	75 / —	105	Hach	M. F
Total Ammonia:	0.1	0.66 / 0.0	1.41	Orion	MF

New membrane slope = -60.0

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Boca Raton STP
Address/City:
County:
Contact/District:
NPDES Permit #: Outfall #:

Sample Collection: Date 4/16/90 Time 0900
Test Beginning: Date 4/17/90 Time 1100
Test Ending: Date 4/21/90 Time 1230
Test Organism: C. dubia
Life Stage/Age: Neonate

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

Remarks: Pg 2 of 3
72 hour = 96 hour Readings

Instrument Calibrations:

	pH	DO	Cond	Temp
72 hr	7@7.99	8.2@23°C	1359 @ 23.3 @ 1362	22.2 @ 22.7
96 hr	7@7.99	7@23°C	1360 @ 23.3	22.0 @ 22.6
48 hr				

* inbetween

Conc.	Chamber #	Number Live 0/72	24/96	48	DO (mg/l) 0/72	24/96	48	pH 0/72	24/96	48	Temp. (°C) 0/72	24/96	48	Cond. (µmhos/cm) 0/72	24/96	48
control		5	5			8.3			8.2		21	21.0				
control		5	5			8.4			8.2							
control		5	5			8.4			8.2							
control		5	5			8.4			8.2						275	
10 %		5	5			8.3			8.2			20.8				
10 %		4	4			8.4			8.2							
10 %		5	5			8.4			8.2							
10 %		5	5			8.4			8.2						245	
30 %		5	5			8.3			8.0			20.9				
30 %		5	5			8.3			8.0							
30 %		5	5			8.3			8.1							
30 %		5	4			8.3			8.2						370	
50 %		5	5			8.2			8.0			20.9				
50 %		5	5			8.2			8.0							
50 %		5	5			8.2			8.0							
50 %		5	5			8.2			8.1						440	
70 %		1*	0			8.1			7.9			21.0				
70 %		0	0			8.2			7.9							
70 %		3	1			8.1			7.9							
70 %		2	2			8.1			8.1						515	
85 %		0	0		7.7			7.8			20.9			525		
85 %		0	0		7.7			7.8								
85 %		0	0		7.5			7.8								
85 %		0	0		7.6			7.8						525		
100 %		0	0		—			—			—			—		
100 %		0	0		—			—			—			—		
100 %		0	0		—			—			—			—		
100 %		0	0		—			—			—			—		
Measured by:		MF	CW		SHW	SW		SHW			SHW	SW		SHW	SW	
Recorded by:		MF	SW		MF	SW		MF SHW			MF	SW		MF	SW	

Investigators' Signatures

Marshall Faircloth

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:					
Alkalinity:					
Hardness:					
Total Ammonia:					

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Boca Raton STP
Address/City: 1501 Glades Road, Palm Beach
County:
Contact/District: C. Corrigan / SE / City of Boca Raton
FDES Permit #: Outfall #:

Sample Collection: Date 4/16/90 Time 0900
Test Beginning: Date 4/17/90 Time 1100
Test Ending: Date 4/21/90 Time 1230
Test Organism: Mysidopsis Bahia
Life Stage/Age: < 1 day.

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

Remarks: Salinity = forty fathoms sea salts ≈ 20 ppt Sample + well H2O

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

* 1 barely alive
** difficulty swimming, spiraling

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control	7	5	5	5	7.1	6.4	6.4	8.3	7.9	7.6	21.7	18.9	19.0			
Control	94	5	5	5	7.2	6.5	6.4	8.3	7.9	7.6				29800		24400
10%	118	5	5	5	7.0	6.5	6.0	8.3	8.0	7.6	22.0	18.7	18.8			
10%	41	5	5	5	7.0	6.5	6.0	8.3	8.0	7.7				29200		25600
30%	174	5	4	3	6.9	6.6	6.3	8.2	8.0	7.7	22.3	18.4	18.8			
30%	142	5	5	4	7.0	6.6	6.3	8.2	8.0	7.7				29100		2830
50%	190	5	5	5	6.5	6.7	6.1	8.1	8.0	7.7	22.8	18.3	18.8			
50%	63	5	5	5	6.6	6.8	6.2	8.1	8.0	7.7				28300		27500
70%	19	5	4	4	6.4	6.8	6.1	8.1	7.9	7.7	23.2	18.3	18.9			
70%	43	5	5	4	6.4	6.8	6.1	8.1	7.9	7.7				28500		27700
85%	186	5	5	5	6.3	6.6	5.9	8.0	7.8	7.7	23.4	18.3	19.0			
85%	8	5	5	3	6.3	6.5	5.9	8.0	7.8	7.7				28500		27300
100%	39	5	5	5	6.1	6.5	5.5	8.0	7.8	7.7	23.5	18.7	19.3			
100%	14	5	5	4	6.1	6.5	5.6	8.0	7.8	7.7				28200		27600
Control	7	5	5		5.4	6.8		7.5	7.7		30.4	19.3		32,100		
Control	94	5	5		5.6	6.9		7.5	7.7						32,100	
10%	118	5	5		5.8	6.7		7.6	7.7		20.0	19.6				
10%	41	5	5		6.1	6.8		7.6	7.7						30,600	
30%	174	3	3		5.9	6.9		7.6	7.8		19.8	19.6				
30%	142	4	4		6.0	6.9		7.6	7.8						30,500	
50%	190	5	5		6.1	6.8		7.7	7.8		19.9	19.8				
50%	63	5	3		6.1	6.9		7.7	7.8						29,800	
70%	19	3	3*		5.9	6.6		7.7	7.8		20.0	19.9				
70%	43	4	2**		5.9	6.8		7.7	7.8						29,900	
85%	186	4	4**		5.8	6.7		7.7	7.8		20.1	19.9				
85%	8	3	1		5.9	6.7		7.7	7.8						29,900	
100%	39	4	3**		5.7	6.5		7.7	7.8		20.5	20.2				
100%	14	4	4**		5.9	6.6		7.7	7.8						29,200	
	Measured by:	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF		MF
	Recorded by:	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF		MF
		SW SW			SHW MF	SW SW		SHW MF	SW SW		SHW MF	SW SW				SW SW

Investigators' Signatures

Marshall Faircloth

Steven J Wolf

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:					
Alkalinity:					
Hardness:					
Total Ammonia:					

Requestor: Chris Ferrigan SE

County:

MICROTOX™ Data Reduction Sheet

SOURCE: City of Boca Raton

GRAPH CALC EC50 (15 MIN, 5 °C) = Stimulatory %SAMPLE mg/L

SAMPLE DATA:

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.):

DATE ASSAYED: 4/17/90 TIME: 10:00AM

VISUAL COLOR: CORRECTION REQUIRED: YES NO

VISUAL TURBIDITY: SEPARATION REQUIRED: YES NO

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH; MOAS (DRY NaCl) OTHER

PRIMARY DILUTION OF SAMPLE:

OPERATOR: MB Clanzy REAGENT VIAL LOT NO. M- NLN

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES	Io
A1	0	75	52				96
B1		53	36				71
C1		71	50				92
A2	12.38	67	49	-.05	-.09	-.02	86
B2		73	52				90
C2		70	50				89
A3	24.75	70	49	-.10	-.13	-.08	89
B3		76	55				96
C3		75	55				96
A4	49.5	74	53	-.10	-.12	-.08	94
B4		70	49				90
C4		78	54				98
A5	99	71	50	-.07	-.07	-.06	94
B5		63	43				78
C5		80	56				105
EC50 (MIN, °C)					Stimulatory		

REVIEWED BY:

DATE: 6/12/90