Bioassays of

Beverly Beach Surfside Estates Wastewater Treatment Plant #2

Beverly Beach, Flagler County, Florida

NPDES #FL0039756

Sampled 9/14/92

November 1992

Biology Section
Division of Technical Services

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Introduction

Beverly Beach Surfside Estates WWTP #2, Beverly Beach, Flagler County, Florida, NPDES #FL0039756, tests performed on 15 to 17 September, 1992.

This facility is located on Highway A1A in Beverly Beach. The wastewater treatment facility from Beverly Beach Camptown WWTP #1 treats 25,000 gpd via extended aeration and chlorination. Beverly Beach Surfside WWTP #2 treats 35,000 gpd using the same method. Chlorinated effluent from WWTP #1 is discharged to WWTP #2. The combined effluent (60,000 gpd capacity) is passed through a tertiary filter and dechlorinated. Dechlorinated effluent is discharged through a 20' diffuser to the Atlantic Intracoastal Waterway between markers 4 and 5 (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 test results indicated that the sample was highly toxic to *C. dubia*, producing a 24-hour $LC_{50} < 100\%$. The test was terminated at 24 hours due to complete mortality in the effluent replicates. The sample was not toxic to *N. leedsi* (48-hour test).

Total residual chlorine was not detected in the sample. Total and unionized ammonia concentrations were 14.20 mg/L and 0.51 mg/L, respectively. Further chemical analyses were performed on the sample and indicated the presence of the metals as shown in Table 2. The sample was not analyzed for organics due to a chemistry laboratory error.

The pesticides, atrazine and chlorpyrifos, were present in concentrations of 0.23 µg/L and 0.19 µg/L, respectively. These pesticides do not appear to be present in toxic amounts. Two 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 on 14 September, 1992, was highly toxic to the *Ceriodaphnia*. Although the unionized ammonia levels were high enough to be of concern, in our experience, fish are more sensitive to ammonia than are *Ceriodaphnia*, making it unlikely to be the cause of the observed toxicity. The cause of toxicity was not determined.

Table 1. Concentration series and volumes used for the 48-hour static acute screening bioassays of the Beverly Beach WWTP #2 effluent performed on 15 to 17 September, 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 the Beverly Beach WWTP #2, sampled on 14 September, 1992.

Pesticides & Herbicides

Atrazine	0.23	µg/L	A
Chlorpyrifos	0.19	µg/L	A

Metals

Cadmium	0.18	µg/L	T
Calcium	40.6	µg/L	— mg/L?
Copper	8	µg/L	T
Iron	27	µg/L	
Magnesium	28.1	µg/L	— mg/L?
Zinc	30	µg/L	

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

T Value reported is less than the practical quantitation limit.

Base-Neutral & Acid Extractables

Sample was not analyzed for base-neutral and acid extractables due to a Chemistry laboratory operation error resulting in no additional sample available for re-extraction.

Table 3. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Beverly Beach WWTP #2, Beverly Beach, Flagler County, Florida, NPDES# FL0039756, performed on 15 to 17 September, 1992.

Facility:	**Beverly Beach WWTP #2**		**NPDES #**	**FL0039756**	Facility Type: **WWTP**
Location:	Highway A1A, Beverly Beach		Contact/District:	Ken Kohn / NE	
County:	Flagler		Test type:	static acute screen	
Sample Collection Date:	**9/14/92**	Time: 1255	# tests:	2	Receiving Water: Intracoastal Waterway
Test Beginning Date:	9/15/92	Time: 1300	Chlorination Type:	**Dechlorinated at Plant**	
Test Ending Date:	9/17/92	Time: 1330			**Page 1 of 1**

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

LC50: < 100% * test terminated at 24 hours due to complete mortality in effluent replicates

	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	24 hour
Control	5	5	*	8.3	8.3	-	23.0	23.9	-	8.7	9.0	-	165	170
Control	5	5	*	-	8.3	-	-	-	-	-	9.0	-	-	-
Control	5	5	*	-	8.3	-	-	-	-	-	9.0	-	-	-
Control	5	5	*	-	8.3	-	-	-	-	-	9.0	-	-	-
100%	5	0	*	7.8	8.2	-	22.8	23.9	-	8.2	8.9	-	2530	2610
100%	5	0	*	-	8.2	-	-	-	-	-	8.9	-	-	-
100%	5	0	*	-	8.2	-	-	-	-	-	8.9	-	-	-
100%	5	0	*	-	8.2	-	-	-	-	-	8.9	-	-	-

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	8.3	8.4	23.3	23.3	23.0	8.6	8.9	8.2	-	-
Control	5	5	5	7.9	8.3	8.4	-	-	-	8.6	8.9	8.2	244	244
100%	5	5	5	7.7	7.7	7.8	23.0	23.3	23.0	8.1	7.6	7.1	-	-
100%	5	5	5	7.7	7.7	7.8	-	-	-	8.1	7.6	7.1	2660	2640

Total Residual Cl2	mg/l	Method
Field:	< 0.05	Hach DPD
Lab:	0.0	Hach 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:	14.20	0.51

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	121	123
20% Dilute Mineral Water (cladocerans):	73	82
100% Sample:	129	217

Salinity (ppt)	
Control Water:	0
100% Sample:	1

Table 4. **24-hour LC_{50} Data for Bioassay of Beverly Beach WWTP #2 effluent performed on 15 to 16 September, 1992.**

Organism	Method of Data Analysis	24-Hour LC_{50} (95% Confidence Intervals)
Dechlorinated effluent		
Ceriodaphnia dubia	not calculated	< 100% [a]

[a] The LC_{50} is < 100% since all the organisms died in the lowest test concentration (100%). Test ran for 24 hours.

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: BEVERLY BEACH WWTP #2
Address/City: _____
County: _____
Contact/Distric: KEN KOHN NE
NPDES Permit #: FL00 Outfall #: _____

Sample Collection: Date 9-14-92 Time 1255
Test Beginning: Date 9-15-92 Time 1300
Test Ending: Date 9-16-92 Time 1330
Test Organism: C. DUBIA
Life Stage/Age: < 24 HRS

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

*40982 92-SEP-15-04
entered 9/18

Remarks:
test terminated at 24 hours

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	10@10, 7.7	8.6@23.5	23.5@23.7°C	961 9650 @23.1°C
24 hr	7.7; 10.10	8.5@24.0	24.0@24.1°C	979 9280 @24.0°C
48 hr				

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		8.3	8.3		23.0	23.9		8.7	9.0		165	170	
control	B	5	5			8.3						9.0				
control	C	5	5			8.3						9.0				
control	D	5	5			8.3						9.0				
100%	A	5	0	—	7.8	8.2		22.8	23.9		8.2	8.9		2530	2610	
100%	B	5	0	—		8.2						8.9				
100%	C	5	0	—		8.2						8.9				
100%	D	5	0	—		8.2						8.9				
Measured/Loaded by:		MF	MF		MF	MF		MF	MF		MF	MF		MF	MF	
Recorded by:		MF	MF		KP	KP		KP	KP		KP	KP		KP	KP	

Investigators' Signatures
Kim Pearce
Marshall Faircloth

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			<0.05		K. Kohn
Lab Tot. Resid. Cl2:	0.0	0.0	0.0	Hach	MF
Alkalinity:	121	73	129	Hach	LM
Hardness:	123	82	217	Hach	LM
Total Ammonia:	0.0	0.0	14.2	Hach	MF

Ammonia Meter Slope: _____
Ammonia Blank: 0.0
Salinity Sample: _____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: BEVERLY BEACH WWTP #2
Address/City:
County:
Contact/District: KEN KOHN NE
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 9-14-92 Time 1255
Test Beginning: Date 9-15-92 Time 1300
Test Ending: Date 9-17-92 Time 1330
Test Organism: N. LEEDSI
Life Stage/Age: 11 days

40982 92-SEP-15-04
entered 9/18

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

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.0 7.1@10 10	8.6@23.5	23.5@23.7°C	911 9650@23.1°C
24 hr	7.0 7.1@10 10	8.5@24.0	24.0@24.1°C	879 9680@24.0°C
48 hr	7.0 7.1@10 10	8.5@24.0	23.1@23.1	985 9710@23.7

		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	75	5	5	5	7.9	8.3	8.4	23.3	23.3	23.0	8.6	8.9	8.2			
control	68	5	5	5	7.9	8.3	8.4				8.6	8.9	8.2	244	243	244
100%	149	5	5	5	7.7	7.7	MF	23.0	23.3	23.0	8.1	7.6	7.1			
100%	326	5	5	5	7.7	7.7	MF 7.8				8.1	7.6	7.1	2660	2660	2640
					wrong wt. 9/17/10		7.8 MF									
Measured/Loaded by:		MF	KP	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		MF	KP	MF	KP	KP	MF	KP	KP	MF	KP	KP	MF	KP	KP	MF

Investigators' Signatures

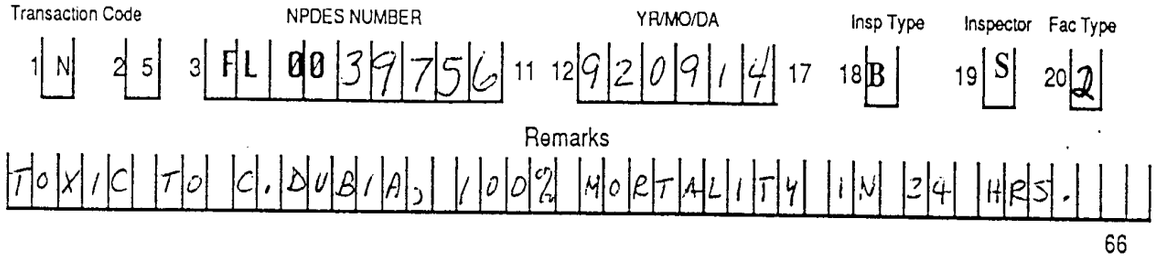
Kim Pearce
Randall Tunbull

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			<0.05		K. Kohn
Lab Tot. Resid. Cl2:	0.0	0.0	0.0	Hach	MF
Alkalinity:	121	73	129	Hach	KP/MF
Hardness:	123	82	207	Hach	KP/MF
Total Ammonia:	0.0	0.0	14.2	Hach	MF
	Ammonia	Ammonia	Salinity		

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)

