Bioassays of

University Shores Sewage Treatment Plant #1

Orlando, Orange County, Florida

NPDES #FL0024856

Sampled 2/18/92

March 1992

Biology Section
Division of Technical Services

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Introduction

University Shores Sewage Treatment Plant #1, Orlando, Orange County, Florida, NPDES #FL0024856 on 19 to 21 February, 1992.

This facility is located at 2600 Harrel Road in Orlando. It is an extended aeration wastewater treatment facility with a 0.275 MGD design capacity. The facility has a surge tank, aerator, clarifier, dual sand filters, and chlorine contact chamber. Alum is used for phosphorus removal. Liquid sludge is hauled and applied to land. The effluent is dechlorinated prior to discharge into a drainage canal which joins the Little Econlockhatchee River.

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 Biology Section performed a static acute definitive toxicity bioassay on a sample of effluent from this facility. The bioassay test species used for this bioassay was the water flea, *Ceriodaphnia dubia*. The test results indicated that the sample was toxic to *C. dubia*, producing an LC_{50} of 59.63%. Total residual chlorine was not detected in the sample. The total ammonia and the unionized ammonia concentrations were 3.6 mg/L and 0.05 mg/L (Hach), respectively.

Further chemical analyses were not performed. No determination was made as to the cause of the toxicity noted in this sample.

Conclusion

The sample of effluent from this facility was toxic on 18 February, 1992. The cause of toxicity was not determined.

Table 1. Concentration Series and Volumes Used for the Static Acute Definitive Bioassays of University Shores STP #1 on 19 to 21 February, 1992.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	20 mL	0 mL	20 mL
25%	15 mL	5 mL	20 mL
50%	10 mL	10 mL	20 mL
75%	5 mL	15 mL	20 mL
100%	0 mL	20 mL	20 mL

Table 2. LC_{50} Data for Bioassay of the University Shores STP #1, Orange County, Florida, on 21 February, 1992.

Organism	Method of Data Analysis	48 Hour LC_{50} (95% Confidence Intervals)
Dechlorinated discharge		
Ceriodaphnia dubia	Binomial	59.63%(50.00%, 75.00%) [a]
	Moving Average	[b]
	Probit	[b]

a This LC_{50} is reported in the text since it is the most statistically conservative value of the data set.

b 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.

Table 3. Data recorded during the static acute definitive bioassay of a sample of effluent from the University Shores STP #1, Orlando, Orange County, Florida, NPDES# FL0024856, on 19 to 21 February, 1992.

Facility:	**University Shores STP #1**		NPDES #	**FL0024856**	Facility Type: **Sewage Treatment**
Location:	2600 Harrel Road, Orlando		Contact/District:	Phil Kane / Central	
County:	Orange		Test type:	static acute definitive	
Sample Collection Date:	**2/18/92**	Time: 0930	# tests:	1	Receiving Water: drainage canal to
Test Beginning Date:	2/19/92	Time: 1130	Chlorination Type:	**chlorinated**	Little Econlockhatchee River
Test Ending Date:	2/21/92	Time: 1130	Dechlor Method:	plant dechlorination	**Page 1 of 1**

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

Ammonia	Total (mg/l)	Unionized (mg/l)
Cond. Control		
Water (daphnids):	0.00	0.00
100% Sample:	3.60	0.05

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Cond. Control		
Water (daphnids):	70	90
100% Sample:	130	150

Organism: ***Ceriodaphnia dubia*** Life stage: < 24 hours
LC50: 59.63%

	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	8.2	-	8.1	25.5	-	23.0	9.1	-	9.1	168	193
Control	5	5	5	-	-	8.1	-	-	-	-	-	9.1	-	-
Control	5	5	5	-	-	8.1	-	-	-	-	-	9.1	-	-
Control	5	5	5	-	-	8.1	-	-	-	-	-	9.1	-	-
25%	5	5	5	7.8	-	8.2	25.4	-	23.0	9.1	-	9.1	270	293
25%	5	5	5	-	-	8.2	-	-	-	-	-	9.1	-	-
25%	5	5	5	-	-	8.2	-	-	-	-	-	9.1	-	-
25%	5	5	5	-	-	8.2	-	-	-	-	-	9.1	-	-
50%	5	5	5	7.6	-	8.2	25.7	-	23.0	8.9	-	9.1	370	389
50%	5	5	5	-	-	8.2	-	-	-	-	-	9.1	-	-
50%	5	5	5	-	-	8.2	-	-	-	-	-	9.1	-	-
50%	5	5	4	-	-	8.2	-	-	-	-	-	9.1	-	-
75%	5	4	0	7.5	-	8.3	26.0	-	23.0	8.9	-	9.2	456	480
75%	5	5	0	-	-	8.3	-	-	-	-	-	9.2	-	-
75%	5	2	0	-	-	8.3	-	-	-	-	-	9.2	-	-
75%	5	3	0	-	-	8.3	-	-	-	-	-	9.2	-	-
100%	5	1	0	7.3	-	8.3	26.0	-	23.0	8.9	-	9.1	560	588
100%	5	0	0	-	-	8.3	-	-	-	-	-	9.1	-	-
100%	5	0	0	-	-	8.3	-	-	-	-	-	9.1	-	-
100%	5	0	0	-	-	8.3	-	-	-	-	-	9.1	-	-

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: University Shores STP#1
Address/City: Apopka, Florida
County: Orange
Contact/District: Phil Kane / Central
NPDES Permit #: FL0024856 Outfall #:

Sample Collection: Date 2/18/92 Time 0930
Test Beginning: Date 2/19/92 Time 1130
Test Ending: Date 2/21/92 Time 1130
Test Organism: Ceriodaphnia dubia
Life Stage/Age: <24 hours

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

92-FEB-19-03 LIMS # 29205

Remarks:
LC50 = 59.63% (binomial) entered 2/21/92 KP

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7|10@10	8.5@24°C	24.0@24.1°C	137@23.8@ 134
24 hr				
48 hr	7@7|10@10	8.5@24°C	23.0@23.2	136@23.6@ 137

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	5	8.2		8.1	25.5		23.0	9.1		9.1	168		193
Control	B	5	5	5			8.1						9.1			
Control	C	5	5	5			8.1						9.1			
Control	D	5	5	5			8.1						9.1			
25%	A	5	5	5	7.8		8.2	25.4		23.0	9.1		9.1	220		293
25%	B	5	5	5			8.2						9.1			
25%	C	5	5	5			8.2						9.1			
25%	D	5	5	5			8.2						9.1			
50%	A	5	5	5	7.6		8.2	25.7		23.0	8.9		9.1	370		359
50%	B	5	5	5			8.2						9.1			
50%	C	5	5	5			8.2						9.1			
50%	D	5	5	4			8.2						9.1			
75%	A	5	4	0	7.5		8.3	26.0		23.0	8.9		9.2	456		480
75%	B	5	5	0			8.3						9.2			
75%	C	5	2	0			8.3						9.2			
75%	D	5	3	0			8.3						9.2			
100%	A	5	1	0	7.3		8.3	26.0		23.0	8.9		9.2	560		554
100%	B	5	0	0			8.3						9.2			
100%	C	5	0	0			8.3						9.2			
100%	D	5	0	0			8.3									
Measured/Loaded by:		MF	MF	AJ	MF		AJ	MF		AJ	MF		AJ	MF		AJ
Recorded by:		MF	MF	AJ	AJ		AJ	AJ		AJ	AJ		AJ	AJ		AJ

Investigators' Signatures
Marshall Faircloth
Adam Ofoeda
Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	[illegible]		0.0	colorimetric	Kane, P.
Lab Tot. Resid. Cl2:		0.0	0.0	Hach	M.F.
Alkalinity:		70	130	Hach	AJ
Hardness:		90	150	Hach	AJ
Total Ammonia:		0.0	3.6	Hach	AJ

Ammonia Meter Slope: _____
Ammonia Blank: 0.0
Salinity Sample: 0 ppt

The Bioassay of the University Shores STP #1 effluent sampled on February 18, 1992, NPDES# FL0024856.

