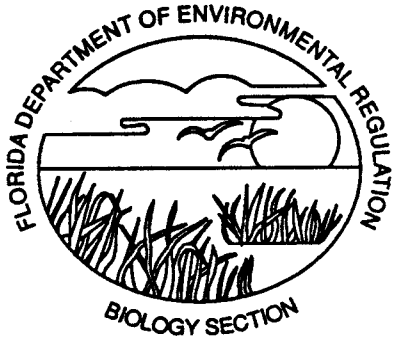


Bioassays of

Buckman Street Sewage Treatment Plant

Jacksonville, Duval County, Florida

NPDES #FL0026000

Sampled 8/12/91

September 6, 1991

Biology Section
Division of Technical Services

Bioassays of

Buckman Street Sewage Treatment Plant

Jacksonville, Duval County, Florida

NPDES #FL0026000

Biology Section
Bureau of Laboratories
September 6, 1991

Introduction

Buckman Street Sewage Treatment Plant, Jacksonville, Dual County, Florida, NPDES #FL0026000, on 13 to 15 August, 1991.

This facility is located at 2221 Buckman Street in Jacksonville. The 54 MGD activated sludge sewage treatment plant serves a population of approximately 200,000. The plant also provides secondary treatment wastewater from a variety of major and minor industrial sources. Treatment includes grit removal, primary and secondary clarification, chlorination for disinfection, and dechlorination prior to discharge. Discharge is to the St. Johns River, 500 feet from shore.

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 Biology Section performed two static acute screening bioassays on a sample of effluent from this facility. The bioassay test organisms, the water flea, *Ceriodaphnia dubia,* and the fish, *Notropis leedsi*, were used for these tests. The test results indicated that the sample was not toxic to the fish, but was toxic to the water fleas, producing an $LC_{50} < 100\%$.

The sample contained no total residual chlorine as the effluent from this facility is dechlorinated prior to discharge. The total and unionized ammonia concentrations were 11.9 mg/L and 0.14 mg/L, respectively. Further chemical analysis tentatively identified the following organic compounds and their estimated concentrations: aliphatics, 290 µg/L, and aromatics, 70 µg/L. Pesticides were undetected. The cause of toxicity in this sample was not determined.

Conclusion

The sample of effluent from this facility was toxic to *C. dubia* on 12 August, 1991. The cause of toxicity was not determined.

Table 1. Concentration Series and Volumes Used for the Static Screening Bioassays of the Buckman Street STP, NPDES# FL0026000, on 13 to 15 August, 1991.

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%	0 mL	500 mL	500 mL

Table 2. Data recorded during the static acute screening bioassay of a sample of dechlorinated effluent from the Buckman Street Sewage Treatment Plant, NPDES# FL0026000, Jacksonville, Duval County, Florida, on 13 to 15 August, 1991.

Facility:	**Buckman Street STP**		NPDES #	FL0026000	Facility Type: **Sewage Treatment Plant**
Location:	2221 Buckman St., Jacksonville		Contact/District:	Jim Wright / NE	
County:	Duval		Test type:	static acute screen	
Sample Collection Date:	8/12/91	Time: 1150	# tests:	2	Receiving Water: St. Johns River
Test Beginning Date:	8/13/91	Time: 1330	Chlorination Type:	**dechlorinated**	
Test Ending Date:	8/15/91	Time: 1200		plant dechlorination unit	**Page 1 of 1**

Total Residual Cl2	mg/l	Method
Lab:	0.0	Hach

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	0.00	0.00
100% Sample:	11.90	0.14

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	115	120
Cond. Control Water (daphnids):	63	80
100% Sample:	195	230

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

LC50: < 100%

	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	24 hour
Control	5	4	*	9.2	9.5	-	8.1	8.3	-	21.1	20.8	-	173	196
Control	5	4	*	-	9.5	-	-	8.3	-	-	-	-	-	-
Control	5	5	*	-	9.5	-	-	8.3	-	-	-	-	-	-
Control	5	5	*	-	9.5	-	-	8.3	-	-	-	-	-	-
100%	5	0	*	8.2	9.3	-	7.4	8.5	-	20.2	20.9	-	912	924
100%	5	0	*	-	9.3	-	-	8.5	-	-	-	-	-	-
100%	5	0	*	-	9.4	-	-	8.5	-	-	-	-	-	-
100%	5	0	*	-	9.4	-	-	8.5	-	-	-	-	-	-

* test terminated at 24 hours

Organism: ***Notropis leedsi*** Age: 18 days

LC50: - Binomial: - Moving Average: - Probit: -

	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	9.1	9.2	9.2	7.8	8.2	8.3	21.3	20.3	20.5	245	244
Control	5	5	5	9.1	9.3	9.2	7.8	8.2	8.3	-	-	-	-	-
100%	5	5	5	8.2	8.6	8.7	7.4	8.0	8.3	19.4	20.3	20.3	949	952
100%	5	5	5	8.2	8.6	8.8	7.4	8.0	8.3	-	-	-	-	-

Table 3. LC_{50} Data for the Bioassay of the Buckman Street STP, NPDES# FL0026000, on 13 to 15 August, 1991.

Organism	Method of Data Analysis	48 Hour LC_{50}
Dechlorinated discharge		
Ceriodaphnia dubia	not calculated	<100%[a]

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

Table 4. Results of chemical analysis on the sample of effluent from the Buckman Street STP, NPDES# FL0026000, on 12 August, 1991.

Base-Neutral-Acid Extractables

The following compounds were tentatively identified and their estimated concentrations were:

Aliphatics	290 µg/L
Aromatics	70 µg/L

Pesticide Extractables

None detected.

Metals

Aluminum	63 µg/L[a]
Iron	166 µg/L[a]
Nickel	5 µg/L
Zinc	12 µg/L[a]

[a] Value reported is the mean of two or more determinations.

Sample Source: Buckman ST. STP
Address/City:
County: DUVAL
Contact/District: JIM WRIGHT / NE
NPDES Permit #: FL0026000 Outfall #:

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

Remarks: test terminated at 24 hours

Sample Collection: Date 8/12/91 Time 1150
Test Beginning: Date 8/13/91 Time 1330
Test Ending: Date 8-14-91 Time 1200
Test Organism: C. dubia
Life Stage/Age: <24 HRS

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7.0 8.9	8.9 @21.5°	1372 1420 1336	21.5 @24
24 hr	7.87 8.09	8.8 @23°	1377 @24.5 @1355	21.5 @24
48 hr	7.96 8.09	8.1 @21.5	1373 @24.6 @1341	21.5 @24.

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	A	5	4		9.2	9.5		8.1	8.5		21.1	20.8		173	196	
control	B	5	4			9.5			8.5							
control	C	5	5			9.5			8.5							
control	D	5	5			9.5			8.3							
100%	A	5	0		8.2	9.3		7.4	8.5		20.2	20.9		912	924	
100%	B	5	0			9.3		KP	8.5							
100%	C	5	0			9.4		w/wm	8.5							
100%	D	5	0			9.4		control	8.5							
								KP 8/13 1340								
Measured/Loaded by		KP	MF		MF	MF		MF	MF		MF	MF		MF	MF	
Recorded by		KP	MF		KP	MF		KP	AJ		KP	MF		KP	MF	

21509 91-AUG-13-05-01
BIOLOGY Matrix: W-EFFLUENT
Date Collected: 12-AUG-1991 11:50:00.
Buckman Street STP
BSY-SN-CLD BSY-SN-FSH

Investigators' Signatures
Kim Pearce
Marshall Faircloth
Hasan Jordan

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2					
Lab Tot. Resid. Cl2			0.0	Hach	MF
Alkalinity	115	63	195	Hach	KP
Hardness	120	50	230	Hach	KP
	6.0	8.0	11.9	Brinkmann	MF

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: 32nd Ave ST. STP
Address/City:
County: DUVAL
Contact/District: JIM WRIGHT / NE
NPDES Permit #: FL0026000 Outfall #:

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

Remarks:

Sample Collection: Date 8/12/91 Time 1150
Test Beginning: Date 8-13-91 Time 1330
Test Ending: Date 8-15-91 Time 1200
Test Organism: M. beryllina
Life Stage/Age: 7 days

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7.96@9	8.1@21.5	1372@24.2	21.1@23.9
24 hr	7@7.96@9	8.8@22°	1378@24.5	21.5@24.2
48 hr	7@7.96@9	5.9@21.5	1372@24.0 1381	21.5@24.3

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	75	5	5	5	9.1	9.2	9.2	7.8	8.2	8.3	21.3	20.3	20.5			
control	32	5	5	5	9.1	9.3	9.2	7.8	8.2	8.3				245	243	241
100%	48	5	5	5	8.2	8.6	8.7	7.4	8.0	8.3	19.4	20.3	20.3			
100%	39	5	5	5	8.2	8.6	8.8	7.4	8.0	8.3				949	945	952
Measured/Assisted by		MF	AJ	AJ	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by		KP	AJ	AJ	KP	AJ	AJ	KP	AJ	AJ	KP	AJ	AJ	KP	AJ	AJ

Investigators' Signatures

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2	[illegible]				
Lab Tot. Resid. Cl2	[illegible]		0.0	Hach	MF
Alkalinity:	115	63	195	Hach	KP
Hardness:	120	80	230	Hach	KP
Total Ammonia:	0.0	0.0	11.0	Colorimeter Hach	MF