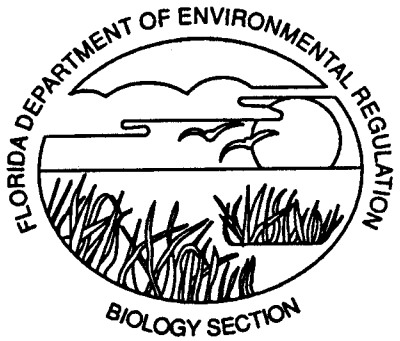


Bioassays of

Buckman Street Sewage Treatment Plant

Jacksonville, Duval County, Florida

NPDES #FL0026000

Sampled 3/28/89

October 13, 1989

Biology Section
Division of Administrative and Technical Services

Bioassays of

Buckman Street Sewage Treatment Plant

Jacksonville, Duval County, Florida

NPDES #FL0026000

Biology Section
Bureau of Laboratories
October 13, 1989

Introduction

Buckman Street Sewage Treatment Plant, Jacksonville, Duval County, Florida, NPDES #FL0026000, on 29 to 31 March, 1989.

This facility is located at 2221 Buckman Street, in Jacksonville. The 54 MGD capacity activated-sludge treatment plant serves a population of approximately 200,000 (FDER 1987), and provides secondary treatment for wastes from a variety of major and minor industrial sources. Treatment consists of primary sedimentation, sludge aeration, secondary clarification and chlorination. Discharge is to the St. John's River, 500 feet from shore. The Buckman Street facility had recently increased its treatment capacity from 35 MGD to approximately 54 MGD with the construction of two new final clarifiers (FDER 1987). A chlorine contact chamber has also been added to the end of the treatment facilities.

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, 1989, *Quality Assurance Manual for Performing Acute Toxicity Tests*, 2nd Edition.

Results and Discussion

The sample of chlorinated discharge from the Buckman Street STP was toxic to the bioassay test organisms, *Ceriodaphnia dubia* and *Daphnia pulex* (water fleas), producing LC_{50}'s of < 100%. The chlorinated sample also adversely affected the Microtox® test organism, *Photobacterium phosphoreum*, producing an EC_{50} of 22.7%.

A portion of the sample was dechlorinated in the Biology Section laboratory and bioassays were performed with it. The tests showed that the dechlorinated sample was also toxic to the bioassay test organisms, *C. dubia* and *D. pulex*, producing LC_{50}'s of 17.32% and < 100%, respectively. The dechlorinated sample also adversely affected the Microtox® organism, *P. phosphoreum*, producing an EC_{50} of 27.98%. Both the chlorinated and dechlorinated samples each had one death in the bioassays using the bioassay test organism, *Notropis leedsi*, the bannerfin shiner.

Chemical analyses were performed on the sample. 1,3-dimethylbenzene (250 µg/l), 1,2-dimethylbenzene (200 µg/l), cyclododecanol (2000 µg/l), methylethenyl-dimethylcyclopentanol (500 µg/l), g-BHC (0.05 µg/l), and numerous unidentified components sensitive to ECD and NPD detection, were detected by the organics analyses. Metal components detected were arsenic (5.0 µg/l), cadmium (0.2 µg/l), lead (3.0 µg/l), silver (1.0 µg/l), and zinc (15 µg/l).

The total residual chlorine in the sample was 0.5 µg/l (Hach). Total ammonia (8.18 mg/l) and unionized ammonia (0.13 mg/l) were also detected in the sample. The toxicity in the sample was attributed to the total residual chlorine and to the variety of chemical constituents in the sample.

Conclusion

The sample of discharge from the Buckman Street STP was toxic on 28 March, 1989. The Buckman Street STP was in violation of State toxicity laws unless mitigating circumstances (e.g., variance) are applicable.

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

Daphnia pulex (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	15.0 ml	0.0ml	15 ml
100.0%	0.0 ml	15.0 ml	15 ml

Notropis leedsi (bannerfin shiner)

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. Data recorded during the 48 hour static screening bioassays of a sample of discharge from Buckman Street STP, Jacksonville, Duval County, NPDES #FL0026000, on 29 to 31 March, 1989.

Facility: **Buckman St. Sewage Treatment Plant** NPDES # **FL0026000** Facility Type: **Sewage Treatment**
Location: 2221 Buckman St., Jacksonville Contact/District: J. Carver / NE
County: Duval Test type: Static Screen
Sample Collection Date: **3/28/89** Time: 1116 # tests: 6 Receiving Water: St. Johns River
Test Beginning Date: 3/29/89 Time: 1100 Chlorination Type: **chlorinated**
Test Ending Date: 3/31/89 Time: 1100 **Page 1 of 1**

Total Residual Cl2	mg/l	Method
Field:	0.8	Hach
Lab:	0.5	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	0.00	0.00
100% Sample:	8.18	0.13

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	120	125
Cond. Control Water (daphnids):	90	94
100% Sample:	260	255

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

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
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	48 hour
Control	5	5	#	8.5	-	7.8	8.3	-	8.0	20.7	-	22.6	-	-
Control	5	5	-	8.5	-	7.8	8.4	-	8.0	-	-	-	-	-
Control	5	5	-	8.5	-	7.8	8.3	-	8.0	-	-	-	-	-
Control	5	3	-	8.6	-	7.8	8.3	-	8.0	-	-	-	160	200
100%	5	0	-	8.2	-	7.8	7.5	-	8.1	20.5	-	22.6	-	-
100%	5	0	-	8.2	-	7.8	7.5	-	8.1	-	-	-	-	-
100%	5	0	-	8.2	-	7.8	7.5	-	8.1	-	-	-	-	-
100%	5	0	-	8.2	-	7.8	7.5	-	8.1	-	-	-	1020	1090

48 hour organisms not recorded

Organism: ***Daphnia pulex*** Life stage: neonate
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	48 hour
Control	5	5	#	8.6	-	7.9	8.4	-	8.0	20.2	-	22.5	-	-
Control	5	5	-	8.6	-	7.9	8.3	-	8.0	-	-	-	-	-
Control	5	5	-	8.6	-	8.0	8.3	-	8.0	-	-	-	-	-
Control	5	5	-	8.6	-	8.0	8.3	-	8.0	-	-	-	160	190
100%	5	0	-	8.2	-	8.0	7.5	-	8.1	20.6	-	22.4	-	-
100%	5	0	-	8.2	-	8.0	7.5	-	8.0	-	-	-	-	-
100%	5	0	-	8.2	-	8.0	7.5	-	8.0	-	-	-	-	-
100%	5	0	-	8.2	-	8.0	7.5	-	8.0	-	-	-	1025	1110

48 hour organisms not recorded

Organism: ***Notropis leedsi*** Age: 18-22 days
LC50: -

	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	*	-	-	8.1	-	-	7.7	-	-	21.5	-	-	-	-
Control	*	-	-	8.1	-	-	7.8	-	-	-	-	-	230	-
100%	3**	3	2	7.9	7.5	6.7	7.3	7.9	7.8	21.4	20.8	22.4	-	-
100%	1**	1	1	7.9	7.5	6.7	7.3	7.9	7.8	-	-	-	1075	1090

* due to shortage of test organisms, test 3 of 6 controls were used
** due to shortage of test organisms, only 4 organisms were used

Table 3. Data recorded during the 48 hour static definitive bioassay of a dechlorinated sample of discharge from the Buckman Street STP, Jacksonville, Duval County, Florida, NPDES #FL0026000, on 29 to 31 March, 1989.

Facility: **Buckman St. Sewage Treatment Plant** NPDES # **FL0026000** Facility Type: **Sewage Treatment**
Location: 2221 Buckman St., Jacksonville Contact/District: J. Carver / NE
County: Duval Test type: static definitive
Sample Collection Date: **3/28/89** Time: 1116 # tests: 6 Receiving Water: St. Johns River
Test Beginning Date: 3/29/89 Time: 1100 Chlorination Type: **dechlorinated**
Test Ending Date: 3/31/89 Time: 1100 Dechlor Method: lab, sodium thiosulfate **Page 1 of 2**

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
LC50: 17.32% Binomial: 17.32% 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	8.9	-	8.4	8.4	-	8.1	20.2	-	22.9	-	-
Control	5	5	5	8.9	-	8.4	8.4	-	8.2	-	-	-	-	-
Control	5	5	4	9.0	-	8.4	8.4	-	8.2	-	-	-	160	180
Control	5	5	5	9.0	-	8.4	8.4	-	8.2	-	-	-		
10%	5	5	5	8.9	-	8.3	8.2	-	8.1	20.2	-	22.9	-	-
10%	5	5	5	8.9	-	8.3	8.2	-	8.1	-	-	-	-	-
10%	5	5	5	8.9	-	8.3	8.2	-	8.1	-	-	-	-	-
10%	5	5	5	8.9	-	8.3	8.2	-	8.1	-	-	-	250	260
30%	5	1	0	8.9	-	8.3	7.9	-	8.2	20.2	-	22.8	-	-
30%	5	1	0	8.9	-	8.3	7.9	-	8.2	-	-	-	-	-
30%	5	1	0	8.9	-	8.3	7.9	-	8.2	-	-	-	-	-
30%	5	1	0	8.9	-	8.3	7.9	-	8.2	-	-	-	415	440
50%	5	2	0	8.7	-	8.2	7.7	-	8.2	20.3	-	22.8	-	-
50%	5	2	0	8.7	-	8.2	7.7	-	8.2	-	-	-	-	-
50%	5	2	0	8.7	-	8.2	7.7	-	8.2	-	-	-	-	-
50%	5	2	0	8.7	-	8.2	7.7	-	8.2	-	-	-	595	610
70%	5	1	0	8.6	-	8.3	7.6	-	8.2	20.2	-	22.5	-	-
70%	5	2	0	8.6	-	8.3	7.6	-	8.2	-	-	-	-	-
70%	5	1	0	8.6	-	8.3	7.7	-	8.2	-	-	-	-	-
70%	5	0	0	8.6	-	8.3	7.7	-	8.2	-	-	-	775	795
85%	5	0	0	8.6	-	8.1	7.6	-	8.3	20.2	-	22.7	-	-
85%	5	0	0	8.6	-	8.2	7.6	-	8.2	-	-	-	-	-
85%	5	0	0	8.6	-	8.2	7.6	-	8.2	-	-	-	-	-
85%	5	0	0	8.6	-	8.2	7.6	-	8.2	-	-	-	900	915
100%	5	0	0	8.6	-	8.2	7.6	-	8.2	-	-	-		
100%	5	0	0	8.5	-	8.2	7.5	-	8.2	20.3	-	22.7	-	-
100%	5	0	0	8.5	-	8.2	7.5	-	8.2	-	-	-	-	-
100%	5	0	0	8.5	-	8.2	7.5	-	8.2	-	-	-	-	-
100%	5	0	0	8.5	-	8.2	7.5	-	8.2	-	-	-	1030	1075

Total Residual Cl2	mg/l	Method
Field:	0.8	Hach
Lab:	0.5	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	0.00	0.00
100% Sample:	8.18	0.13

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	120	125
Cond. Control Water (daphnids):	90	94
100% Sample:	260	255

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

Table 3. Continued.

Facility: **Buckman St. Sewage Treatment Plant** NPDES # **FL0026000** Facility Type: **Sewage Treatment**
Location: 2221 Buckman St., Jacksonville Contact/District: J. Carver / NE
County: Duval Test type: static definitive
Sample Collection Date: **3/28/89** Time: 1116 # tests: 6 Receiving Water: St. Johns River
Test Beginning Date: 3/29/89 Time: 1100 Chlorination Type: **dechlorinated**
Test Ending Date: 3/31/89 Time: 1100 Dechlor Method: lab, sodium thiosulfate **Page 2 of 2**

Total Residual Cl2	mg/l	Method
Field:	0.8	Hach
Lab:	0.5	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	0.00	0.00
100% Sample:	8.18	0.13

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	120	125
Cond. Control Water (daphnids):	90	94
100% Sample:	260	255

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

Organism: ***Daphnia pulex*** Life stage: neonate
LC50: <100% Binomial: - 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	8.8	-	8.4	8.4	-	8.1	20.0	-	22.9	-	-
Control	5	5	5	8.8	-	8.4	8.4	-	8.2	-	-	-	-	-
Control	5	5	5	8.8	-	8.4	8.3	-	8.1	-	-	-	-	-
Control	5	5	5	8.8	-	8.4	8.3	-	8.1	-	-	-	160	175
100.0%	5	2	0	8.5	-	8.1	7.5	-	8.2	20.1	-	22.8	-	-
100.0%	5	3	0	8.5	-	8.1	7.5	-	8.2	-	-	-	-	-
100.0%	5	2	0	8.5	-	8.1	7.5	-	8.2	-	-	-	-	-
100.0%	5	2	0	8.5	-	8.1	7.5	-	8.2	-	-	-	1015	1055

Organism: ***Notropis leedsi*** Age: 18-22 days
LC50: - Binomial: - 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	8.2	8.0	7.6	7.7	7.9	7.9	21.7	20.8	22.6	-	-
Control	5	5	5	8.2	8.1	7.9	7.7	8.1	8.0	-	-	-	230	240
10%	5	5	5	8.2	7.7	7.5	7.6	7.9	7.9	20.7	20.9	22.5	-	-
10%	5	5	5	8.2	7.4	7.5	7.7	7.9	7.9	-	-	-	315	320
30%	5	5	5	8.2	6.8	6.6	7.6	7.8	7.7	20.6	20.9	22.3	-	-
30%	5	5	5	8.2	6.8	6.6	7.6	7.8	7.7	-	-	-	495	495
50%	5	5	5	8.2	6.4	6.2	7.5	7.7	7.7	20.5	20.9	22.2	-	-
50%	5	5	5	8.2	6.4	6.2	7.4	7.7	7.8	-	-	-	670	665
70%	5	5	5	8.3	6.3	5.6	7.4	7.8	7.7	20.3	20.9	22.2	-	-
70%	5	5	5	8.3	6.3	5.4	7.4	7.8	7.7	-	-	-	830	840
85%	5	4	4	8.3	5.2	5.6	7.3	7.8	7.8	20.3	20.9	22.2	-	-
85%	5	5	5	8.3	5.1	5.3	7.3	7.8	7.8	-	-	-	955	960
100%	5	5	5	8.3	4.5	5.4	7.3	7.8	7.9	20.3	20.9	22.2	-	-
100%	5	5	5	8.3	4.5	5.3	7.3	7.8	7.9	-	-	-	1080	1090

Table 4. Microtox test results, Buckman St. STP, Duval County, NPDES #FL0026000, on 29 March 1989.

Microtox Test

Culture Lot # M-603

% Sample	Final Reclaimed Water			
	Chlorinated		Dechlorinated	
	5-min	15-min	5-min	15-min
0	86	41	54	34
0	77	40	58	35
0	77	39	56	31
12.38	54	26	42	23
12.38	53	26	43	25
12.38	56	27	42	24
24.75	41	19	34	17
24.75	41	19	34	18
24.75	41	19	34	18
49.5	29	12	22	10
49.5	28	12	22	10
49.5	28	12	22	11
99	22	7	16	6
99	22	7	15	6
99	22	7	15	6

EC_{50} Chlorinated (15 minute, 15 °C) = 22.70% sample
EC_{50} Dechlorinated (15 minute, 15 °C) = 26.98% sample

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, California).

Table 5. LC_{50} Data for the bioassay of the Buckman St. STP, NPDES# FL0026000, on 29 to 31 March, 1989.

Organism	Method of Data Analysis	48 Hour LC_{50} (95% Confidence Intervals)
Chlorinated discharge		
Ceriodaphnia dubia	noncalculated	<100% [a]
Daphnia pulex	noncalculated	<100% [a]
Notropis leedsi	Binomial	b
	Moving Average	b
	Probit	b
Dechlorinated discharge		
Ceriodaphnia dubia	Binomial	17.32% (10.00%, 30.00%)
	Moving Average	b
	Probit	b
Daphnia pulex	noncalculated	<100% [a]
Notropis leedsi	Binomial	b
	Moving Average	b
	Probit	b

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

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 6. Results of chemical analyses on the sample of discharge from the Buckman Street STP, NPDES# FL0026000, Duval County, Florida.

Organics

Acid Extractables	None detected
Base Neutral Extractables	1,3-Dimethylbenzene 250 µg/l j
	1,2-Dimethylbenzene 200 µg/l j
	*Cyclododecanol 2000 µg/l j
	*Methylethenyldimethylcyclopentanol 500 µg/l j
Pesticide Extractables	g-BHC 0.05 µg/l
	Numerous unidentified components sensitive to ECD and NPD

Metals

Arsenic	5.0 µg/l
Cadmium	0.2 µg/l
Lead	3.0 µg/l
Silver	1.0 µg/l
Zinc	15.0 µg/l

j estimated value.
*tentative identification of these and several other naturally occurring organic compounds.

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Buckman St. WWTP
Address/City: Jax
County: Duval
Contact/District: Jay Carver / NE
NPDES Permit #: FL0026000 Outfall #: 001

Test Number: 1 of 6 **Test Type:** Screening | Definitive
Static | Static Renewal | Flow-through

Remarks: de Cl2

Sample Collection: Date 3/29/89 Time 11:45
Test Beginning: Date 3/29/89 Time 1400
Test Ending: Date 3/31/89 Time 1100
Test Organism: Ceriodaphnia dubia
Life Stage/Age: neonate

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7.9@9	8.8@22°C	1350@2220@3?	21.6@21.6
24 hr	7@7.4@4	8.7@23°	1340@23°	21.0@21.0
48 hr	7@7.9@9	8.5@24°	1385@24°@1381	24.0@21.0

		Number Live			DO (mg/l)			pH			Temp. (°C)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	1	5	5	5	8.9		7.4	8.4		8.1	20.2		22.9			
"	2	5	5	5	8.9		8.4	8.4		8.2						
"	3	5	5	4	9.0		8.4	8.4		8.2						
"	4	5	5	5	9.0		8.4	8.4		8.2				160		180
10%	5	5	5	5	8.9		8.3	8.2		8.1	20.2		22.9			
"	6	5	5	5	8.9		8.3	8.2		8.1						
"	7	5	5	5	8.9		8.3	8.2		8.1						
"	8	5	5	5	8.9		8.3	8.2		8.1	20.2			250		260
30%	9	5	1	0	8.9		8.3	7.9		8.2	20.2		22.8			
"	10	5	1	0	8.9		8.3	7.9		8.2						
"	11	5	1	0	8.9		8.3	7.9		8.2						
"	12	5	1	0	8.9		8.3	7.9		8.2				415		440
50%	13	5	2	0	8.7		8.2	7.7		8.2	20.3		22.8			
"	14	5	2	0	8.7		8.2	7.7		8.2						
"	15	5	2	0	8.7		8.2	7.7		8.2						
"	16	5	2	0	8.7		8.2	7.7		8.2				515		610
70%	17	5	1	0	8.6		8.3	7.6		8.2	20.2		22.5			
"	18	5	2	0	8.6		8.3	7.6		8.2						
"	19	5	1	0	8.6		8.3	7.7		8.2						
"	20	5	0	0	8.6		8.3	7.7		8.2				715		795
85%	21	5	0	0	8.6		8.1	7.6		8.3	20.2		22.7			
"	22	5	0	0	8.6		8.2	7.6		8.2						
"	23	5	0	0	8.6		8.2	7.6		8.2						
"	24	5	0	0	8.6		8.2	7.6		8.2				930		915
100%	25	5	0	0	8.5		8.2	7.5		8.2	20.3		22.9	900*		
"	26	5	0	0	8.5		8.2	7.5		8.2						
"	27	5	0	0	8.5		8.2	7.5		8.2						
"	28	5	0	0	8.5		8.2	7.5		8.2				880		1075
Measured by:		SKW		MF	SKW		MF	SKW		MF	SKW		MF	SKW	MF	MF
Recorded by:		KHill		MF	MF		MF	MC		MC	MF		MC	MF	MF	MC

* From here down - any that are alive are barely twitching

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	—	—	0.75	Hach	Carver
Lab Tot. Resid. Cl2:	0	0	0.5	Hach	MF
Alkalinity:	120	90	260	Hach	MF
Hardness:	125	94	255	Hach	MF
Total Ammonia:	0.0	0.0	8.13	Orion	MF

Investigators' Signatures

Reviewer

Toxicities - later forms - no counting - 5.13

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Buckman St WWTP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 3/28/89 Time 1116
Test Beginning: Date 3/29/89 Time 1100
Test Ending: Date 3/31/89 Time 1100
Test Organism: Daphnia pulex
Life Stage/Age: neonate

Test Number: 2 of 6
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through

Remarks: deCl2

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

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	29	5	5	5	8.8		8.4	8.4		8.1	20.0		22.4	[illegible]		
"	30	5	5	5	8.8		8.4	8.4		8.2						
"	31	5	5	5	8.8		8.4	8.3		8.1						
"	32	5	5	5	8.8		8.4	8.3		8.1				960		1175
100%	33	5	*2	0	8.5		8.1	7.5		8.2	20.1		22.8	[illegible]		
"	34	5	*3	0	8.5		8.1	7.5		8.2						
"	35	5	*2	0	8.5		8.1	7.5		8.2						
"	36	5	*2	0	8.5		8.1	7.5		8.2				1015		1655
Measured by:		SH GH		MF	SHW		MF	SHW		MF	SHW		MF	SHW		MF
Recorded by:		[illegible]		MF	MF		LAW	MF		LAW	MF		LAW	[illegible]		LAW

* barely alive from here down

Investigators' Signatures

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: Buckman St lWWTP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 3/28/89 Time 1116
Test Beginning: Date 3/29/89 Time 1100
Test Ending: Date 3/31/89 Time 1100
Test Organism: Ceriodaphnia dubia
Life Stage/Age: 18-22 hrs

Test Number: 3 of 6
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through

Remarks: deCl2
* Cloudy - small fish hard to see. *B. verfabrpt

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (umhos/cm) 0	24	48
control	14	5	5	5	8.2	8.0	7.6	7.7	7.9	7.9	21.7	20.8	22.4			
"	5	5	5	5	8.2	8.1	7.9	7.7	8.1	8.0				230		240
10%	18	5	5	5	8.2	7.7	7.5	7.6	7.9	7.9	20.7	20.9	22.5			
"	164	5	5	5	8.2	7.4	7.5	7.7	7.9	7.9				315		320
30%	71	5	5	5	8.2	6.8	6.6	7.6	7.8	7.7	20.6	20.9	22.3			
"	37	5	5	5	8.2	6.8	6.6	7.6	7.8	7.7				495		495
50%	16	5	5	5	8.2	6.4	6.2	7.5	7.7	7.7	20.5	20.9	22.3			
"	281	5	5	5	8.2	6.4	6.2	7.4	7.7	7.8				670		665
70%	27	5	5	5	8.3	6.3	5.6	7.4	7.8	7.7	20.3	20.9	22.3			
"	2	5	5	5	8.3	6.3	5.4	7.4	7.8	7.7				820		840
85%	18	5	4*	4	8.3	5.2	5.6	7.3	7.8	7.8	20.3	20.9	22.2			
"	70	5	5	5	8.3	5.1	5.3	7.3	7.8	7.8				955		960
100%	52	5	5	5	8.3	4.5	5.4	7.3	7.8	7.9	20.3	20.9	22.2			
"	54	5	5*	5	8.3	4.5	5.3	7.3	7.8	7.9				1090		1090
Measured by:		MF	KB	MF	SAW	RBF	MF	SAW	RBF	MF	SAW	RBF	MF	SAW		MF
Recorded by:		MF	MF	MF	MF	KML	LMC	MF	KML	LMC	MF	KML	LMC	MF		LMC

Investigators' Signatures

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: Bierman St. WWTP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____
Test Number: 4 of 6
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Remarks: 42

Sample Collection: Date 3/28/89 Time 1116
Test Beginning: Date 3/29/89 Time 1120
Test Ending: Date 3/31/89 Time 1100
Test Organism: C. dubia
Life Stage/Age: _____

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (umhos/cm) 0	24	48
Control	B 37	5	5		8.5		7.8	8.3		8.0	20.7		22.6			
"	B 38	5	5		8.5		7.8	8.4		8.0						
"	B 39	5	5		8.5		7.8	8.3		8.0				160		200
"	B 40	5	5		8.6		7.8	8.3		8.0						
100%	B 41	5	0		8.2		7.8	7.5		8.1	20.5		22.6			
"	B 42	5	0		8.2		7.8	7.5		8.1						
"	B 43	5	0		8.2		7.8	7.5		8.1				1020		1640
"	B 44	5	0		8.2		7.8	7.5		8.1						
Measured by:		SHW			SHW		MF	SHW		MF	SHW		MF	SHW		MF
Recorded by:		MF			MF		LAW	MF		LAW	MF		LAW	MF		LAW

Investigators' Signatures:
Mark Gaudet
Steven H Wolfe
Lisa Williams
_____
_____
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: Buckman St. WWTP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____

Test Number: 5 of 6 **Test Type:** Screening | Definitive
Static | Static Renewal | Flow-through

Remarks: Cl2

Sample Collection: Date 3/28/89 Time 1116
Test Beginning: Date 3/29/89 Time 1100
Test Ending: Date 3/31/89 Time 1100
Test Organism: Daphnia Pulex
Life Stage/Age: neonate

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

		Number Live			DO (mg/l)			pH			Temp. (°C)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	45	5	5		8.6		7.9	8.4		8.0	20.2		22.5			
"	46	5	5		8.6		7.9	8.3		8.0						
"	47	5	5		8.6		8.0	8.3		8.0						
"	48	5	5		8.6		8.0	8.3		8.0				450		490
100%	49	5	0		8.2		8.0	7.5		8.1	20.6		23.4			
"	50	5	0		8.2		8.0	7.5		8.0						
"	51	5	0		8.2		8.0	7.5		8.0						
"	52	5	0		8.2		8.0	7.5		8.0				435		1110
Measured by:		MF			SHW		MF	SHW		MF	SHW			SHW		MF
Recorded by:		DW			MF		LA-MF	LAW		LAW	MF			MF		LAW

Investigators' Signatures

Marshall Frisbeth

Sharon H Wolfe

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 b... Sheet

Sample Source: Buckman St. WWTP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____

Sample Collection: ... 3/28/89 Time 1116
Test Beginning: Date 3/29/89 Time 1100
Test Ending: Date 3/31/89 Time 1100
Test Organism: Notropis lecdas
Life Stage/Age: _____

Test Number: 6 of 6
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through

Remarks: * control - started on fish no control for dead was used, only 4 reps for 100%

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

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	228	5	0*	—	8.1	X	X	7.7	X	X	21.5	20.8	22.4	230		
"	64	5	0	—	8.1			7.8								
100%	21	5	3	2	7.9	7.5	6.7	7.3	7.9	7.8	21.4	20.8	22.4			
"	87	5	1	1	7.9	7.5	6.7	7.3	7.9	7.8				1075		1070
Measured by:		MF		MF	SAW	RBF	MF	SAW		MF	SAW	RBF	ME	SAW		MT
Recorded by:		MF		MF	MF	KMH	LAW	MF		LAW	SDF	KMH	LAW	MF		LAW

Investigators' Signatures *
Marshall Faircloth
Steven H Wolfe
Reviewer

Water-quality Parameters

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

MICROTOX™ Data Reduction Sheet

SOURCE: Buckman Street

GRAPH CALC EC 50 (15 MIN, 15 °C) = 22.7 (%SAMPLE) mg/L

SAMPLE DATA

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.): effluent Cl2

DATE ASSAYED: 3-29-89 TIME: 9:45 AM

VISUAL COLOR: none COLOR CORRECTION REQUIRED: YES (NO)

VISUAL TURBIDITY: none SEPARATION REQUIRED: YES (NO)

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: NOAS (DRY NaCl) OTHER:

PRIMARY DILUTION OF SAMPLE:

OPERATOR: Lisa Williams MICROTOX UNIT NO. 603

REMARKS:

MICROTOX™ 96 TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	T5	T15	NOTES
A1	0	86	41	X	X	
B1		77	40			
C1		77	39			
A2	12.38	84	26	.472	.519	
B2		53	26			
C2		56	27			
A3	24.75	41	19	.951	1.105	
B3		41	19			
C3		41	19			
A4	49.5	29	12	1.824	2.333	
B4		28	12			
C1		28	12			
A5	99	22	7	2.636	4.714	
B5		22	7			
C5		22	7			
EC_{50} (MIN, °C)				27.9	22.7	

REVIEWED BY:

DATE: 10/24/89

MICROTOX™ Data Reduction Sheet

SOURCE: Buckman Street

GRAPH CALC: EC 50 (15 MIN, 15 °C) = 26.9 (SAMPLE) mg/L

SAMPLE DATA:

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.): effluent de Cl_2

DATE ASSAYED: 3-29-89 TIME: 10:05

VISUAL COLOR: none CORRECTION REQUIRED: YES (NO)

VISUAL TURBIDITY: none SEPARATION REQUIRED: YES (NO)

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS (DRY NaCl) OTHER

PRIMARY DILUTION OF SAMPLE:

OPERATOR: Leslie Allen REAGENT VIAL LOT NO. M-603

REMARKS:

MICROTOX™ 89% TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	I5	I15	NOTES
A1	0	54	34	X	X	
B1		50	35			
C1		56	31			
A2	12.38	42	23	.931	.589	
B2		43	25			
C2		42	24			
A3	24.75	34	17	.647	.807	
B3		34	18			
C3		34	18			
A4	49.5	22	10	1.545	2.226	
B4		22	10			
C4		22	11			
A5	99	16	6	2.652	4.556	
B5		15	6			
C5		15	6			
EC_{50} (MIN, °C)				26.5	26.9	

REVIEWED BY:

DATE: 10/24/89