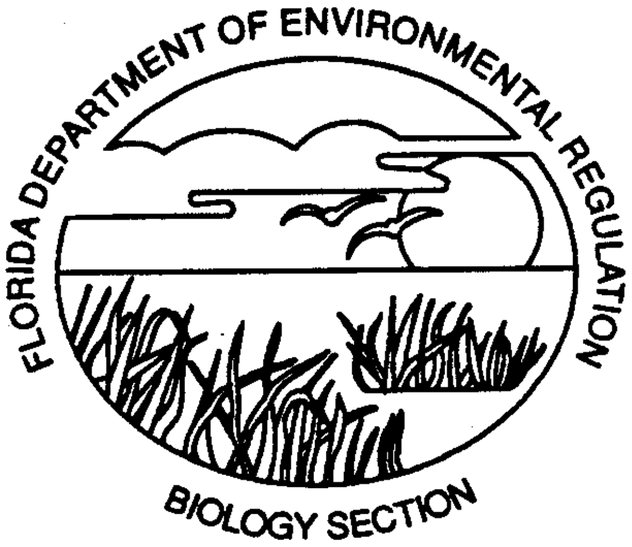


Bioassays of

CSX Transportation Winston Railroad Yard

Lakeland, Polk County, Florida

NPDES #FL0032581

Sampled 5/1/90

July 6, 1990

Biology Section
Division of Administrative and Technical Services

Bioassays of

CSX Transportation Winston Railroad Yard

Lakeland, Polk County, Florida

NPDES #FL0032581

Biology Section
Bureau of Laboratories
July 6, 1990

Introduction

CSX Transportation Winston Railroad Yard, Lakeland, Polk County, Florida, NPDES #FL0032581, on 2 to 4 May, 1990.

This facility is located between SR 542 and Drane Field Road in Lakeland. The facility cleans railroad cars and maintains fueling facilities. Recovered water used in the cleaning process is collected, treated with a lime slurry, and then routed to settling ponds to precipitate phosphate. The recovered water is then aerated to remove unionized ammonia. From the ponds, the recovered water is then routed to an extended aeration biological unit for polishing prior to discharge to Winston Creek.

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 definitive bioassays and one Microtox® assay on a sample of discharge from this facility. Test results indicated that the sample was not toxic to the bioassay test organisms, the waterflea, *Ceriodaphnia dubia*, and the fish, *Notropis leedsi*. The sample proved stimulatory to the Microtox® assay organism, *Photobacterium phosphoreum*.

Chemical analyses were performed on the sample. Trace amounts of petroleum hydrocarbon residue were detected during the organics analyses. The concentration of oil and grease was less than 1.0 mg/l. The metals, arsenic (3.0 µg/l), cadmium (0.2µg/l), and zinc (3.0 µg/l) were also detected in the sample. The sample was unchlorinated. Total and unionized ammonia concentrations were not determined due to an interfering substance(s) in the sample.

Conclusion

The sample from this facility was not toxic on 1 May, 1990.

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

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 static definitive bioassays of a sample of discharge from the CSX Winston Yard facility, Lakeland, Polk County, Florida, NPDES #FL0032681, on 2 to 4 May, 1990.

Facility: **CSX Transportation Winston Railroad Yard** NPDES # **FL0032581** Facility Type: **Industrial**
Location: SR 542 and Drane Field Road, Lakeland Contact/District: D. Demmi
County: Polk Test type: static definitive
Sample Collection Date: **5/1/90** Time: 0930 # tests: 2 Receiving Water: Winston Creek
Test Beginning Date: 5/2/90 Time: 1015 Chlorination Type: **unchlorinated**
Test Ending Date: 5/4/90 Time: 1000 **Page 1 of 2**

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
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	8.4	-	9.0	8.1	-	8.2	22.2	-	21.8	-	-
Control	5	5	5	8.4	-	9.0	8.1	-	8.2	-	-	-	-	-
Control	5	5	5	8.4	-	9.0	8.1	-	8.2	-	-	-	-	-
Control	5	5	5	8.4	-	9.1	8.1	-	8.2	-	-	-	180	180
10%	5	5	5	8.3	-	9.0	7.9	-	8.2	22.2	-	21.3	-	-
10%	5	5	5	8.3	-	9.1	7.9	-	8.2	-	-	-	-	-
10%	5	5	5	8.3	-	9.1	7.9	-	8.2	-	-	-	-	-
10%	5	5	5	8.3	-	9.1	7.9	-	8.2	-	-	-	275	265
30%	5	5	5	8.0	-	9.0	7.7	-	8.1	22.2	-	21.2	-	-
30%	5	5	4	8.0	-	9.0	7.7	-	8.1	-	-	-	-	-
30%	5	5	5	8.1	-	9.1	7.7	-	8.1	-	-	-	-	-
30%	5	5	5	8.1	-	9.1	7.7	-	8.1	-	-	-	465	470
50%	5	5	5	7.9	-	9.0	7.5	-	8.0	22.2	-	21.2	-	-
50%	5	5	5	7.9	-	9.0	7.5	-	8.0	-	-	-	-	-
50%	5	5	5	7.9	-	9.0	7.5	-	8.0	-	-	-	-	-
50%	5	5	5	7.9	-	9.0	7.5	-	8.0	-	-	-	650	645
70%	5	5	5	7.7	-	9.0	7.4	-	8.0	22.2	-	21.2	-	-
70%	5	4	4	7.7	-	9.0	7.4	-	8.0	-	-	-	-	-
70%	5	5	5	7.7	-	9.0	7.4	-	8.0	-	-	-	-	-
70%	5	5	5	7.7	-	9.0	7.4	-	8.0	-	-	-	830	840
85%	5	5	5	7.6	-	9.0	7.2	-	7.9	22.2	-	21.2	-	-
85%	5	5	5	7.6	-	9.0	7.2	-	7.9	-	-	-	-	-
85%	5	5	5	7.6	-	9.0	7.2	-	7.9	-	-	-	-	-
85%	5	5	4	7.6	-	9.0	7.2	-	7.9	-	-	-	950	970
100%	5	5	4	7.5	-	9.0	7.1	-	7.9	22.3	-	21.3	-	-
100%	5	5	5	7.5	-	9.0	7.1	-	7.9	-	-	-	-	-
100%	5	5	5	7.5	-	9.0	7.1	-	7.9	-	-	-	-	-
100%	5	5	5	7.5	-	9.0	7.1	-	7.9	-	-	-	1080	1100

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

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	125	112
Cond. Control Water (daphnids):	67	75
100% Sample:	40	278

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

-continued-

Table 2. Continued.

Facility: **CSX Transportation Winston Railroad Yard** NPDES # **FL0032581** Facility Type: **Industrial**
Location: SR 542 and Drane Field Road, Lakeland Contact/District: D. Demmi
County: Polk Test type: static definitive
Sample Collection Date: **5/1/90** Time: 0930 # tests: 2 Receiving Water: Winston Creek
Test Beginning Date: 5/2/90 Time: 1015 Chlorination Type: **unchlorinated**
Test Ending Date: 5/4/90 Time: 1000 **Page 2 of 2**

Organism: ***Notropis leedsi*** Age: 18 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	8.3	8.7	8.5	7.8	8.1	8.2	22.1	19.8	20.7	-	-
Control	5	5	5	8.3	8.6	8.3	7.8	8.1	8.2	-	-	-	180	180
10%	5	5	5	8.2	8.5	8.3	7.7	8.1	8.1	22.0	19.4	20.5	-	-
10%	5	5	5	8.3	8.6	8.3	7.7	8.1	8.1	-	-	-	275	265
30%	5	5	5	8.1	8.5	8.3	7.6	8.0	8.0	22.1	19.2	20.3	-	-
30%	5	5	5	8.1	8.5	8.2	7.6	8.0	8.0	-	-	-	465	470
50%	5	5	5	8.0	8.5	8.3	7.5	7.9	7.9	22.1	19.2	20.3	-	-
50%	5	5	5	8.0	8.5	8.3	7.5	7.9	7.9	-	-	-	650	645
70%	5	5	5	7.8	8.2	7.9	7.4	7.7	7.8	22.2	19.2	20.4	-	-
70%	5	5	5	7.8	8.3	8.0	7.4	7.7	7.8	-	-	-	830	840
85%	5	5	5	7.5	8.3	8.0	7.2	7.6	7.7	22.3	19.2	20.4	-	-
85%	5	5	5	7.5	8.3	8.0	7.2	7.6	7.7	-	-	-	950	970
100%	5	5	5	7.1	8.2	7.9	7.0	7.5	7.5	22.4	19.5	20.7	-	-
100%	5	5	5	7.1	8.2	8.0	7.0	7.5	7.5	-	-	-	1080	1100

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

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	125	112
Cond. Control Water (daphnids):	67	75
100% Sample:	40	278

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

Table 3. Microtox test results, CSX TransportationWinston Yard, Polk County, NPDES #FL0032581, on 2 May, 1990.

Culture Lot # xx

% Sample	Unchlorinated Final Reclaimed Water	
	5-min	15-min
0	53	28
0	46	25
0	50	26
12.38	58	33
12.38	50	27
12.38	48	27
24.75	53	30
24.75	66	39
24.75	56	33
49.5	59	34
49.5	60	37
49.5	61	36
99	68	40
99	65	40
99	67	40

EC_{50} Unchlorinated (15 minute, 15 °C) = stimulatory

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 4. Results of chemical analyses on the sample of discharge from the CSX Transportation Winston Yard, Polk County, Florida.

Organics

Acid Extractables	None detected
Base Neutral Extractables	Trace amounts of petroleum hydrocarbon residue
Oil and Grease	<1.0 mg/l
Pesticide Extractables	None detected
PCB	None detected
Purgeables	None detected

Metals

Arsenic	3.0 µg/l [k]
Cadmium	0.2 µg/l
Lead	1.0 µg/l [k]
Zinc	3.0 µg/l

[k] Actual quanity is known to be less than but at least one half of given quanity.

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: CSX Winston Yard
Address/City: Lakeland, Fl
County: Polk
Contact/District: D. Dommi / Southwest
NPDES Permit #: FL0032581 **Outfall #:** 001

Sample Collection: Date 5/1/90 Time 0930
Test Beginning: Date 5/2/90 Time 1015
Test Ending: Date 5/4/90 Time 1000
Test Organism: Ceriodaphnia dubia
Life Stage/Age: Neonate < 24hr.

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

Remarks: Unchlor

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7.0, 7.9, 9	8.2@23°C	1378 @ 23.9°C @ 1378	23.0°C @ 23.6°C
24 hr	7.0, 7.9	8.7 @ 23°C		24.3 @ 24.2
48 hr		7.8 @ 23°C	1409 @ 24.9 1406	23.1 @ 23.8

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	8.4		9.0	8.1		8.2	22.2		21.8			
Control		5	5	5	8.4		9.0	8.1		8.2						
Control		5	5	5	8.4		9.0	8.1		8.2						
Control		5	5	5	8.4		9.1	8.1		8.2				180		180
10%		5	5	5	8.3		9.0	7.9		8.2	22.2		21.3			
10%		5	5	5	8.3		9.1	7.9		8.2						
10%		5	5	5	8.3		9.1	7.9		8.2						
10%		5	5	5	8.3		9.1	7.9		8.2				275		265
30%		5	5	5	8.0		9.0	7.7		8.1	22.2		21.2			
30%		5	5	4	8.0		9.0	7.7		8.1						
30%		5	5	5	8.1		9.1	7.7		8.1						
30%		5	5	5	8.1		9.1	7.7		8.1				465		470
50%		5	5	5	7.9		9.0	7.5		8.0	22.2		21.2			
50%		5	5	5	7.9		9.0	7.5		8.0						
50%		5	5	5	7.9		9.0	7.5		8.0						
50%		5	5	5	7.9		9.0	7.5		8.0				650		645
70%		5	5	5	7.7		9.0	7.4		8.0	22.2		21.2			
70%		5	4	4	7.7		9.0	7.4		8.0						
70%		5	5	5	7.7		9.0	7.4		8.0						
70%		5	5	5	7.7		9.0	7.4		8.0				830		840
85%		5	5	5	7.6		9.0	7.2		7.9	22.2		21.2			
85%		5	5	5	7.6		9.0	7.2		7.9						
85%		5	5	5	7.6		9.0	7.2		7.9						
85%		5	5	4	7.6		9.0	7.2		7.9				950		970
100%		5	5	4	7.5		9.0	7.1		7.9	22.3		21.3			
100%		5	5	5	7.5		9.0	7.1		7.9						
100%		5	5	5	7.5		9.0	7.1		7.9						
100%		5	5	5	7.5		9.0	7.1		7.9				1080		1100
	Measured by:	MF	MF	MF	MF		SW	MF		SW	MF		SW	MF		SW
	Recorded by:	MF	MF	MF	SW		MF	MF		MF	SW		MF	SW		MF

Investigators' Signatures

Marshal Faircloth

Steven H Wolfe

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Clz:	—	—	—	—	—
Lab Tot. Resid. Clz:	—	—	0.0	Hach	MF
Alkalinity:	125	67	40	Hach	SHW
Hardness:	112	75	278	Hach	SHW
Total Ammonia:	0	0	*	specion	SHW

* Interference

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: CSX Winston Yard
Address/City: Lakeland
County: Polk
Contact/District: David Dommi / Southwest
NPDES Permit #: FL0032581 **Outfall #:** 001

Sample Collection: Date 5/1/90 Time 0930
Test Beginning: Date 5/2/90 Time 10:10
Test Ending: Date 5/4/90 Time 1000
Test Organism: Notropis leedsi
Life Stage/Age: 18 days

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

Remarks:

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	113	5	5	5	8.3	8.7	8.5	7.8	8.1	8.2	22.1	19.8	20.7			
Control	19	5	5	5	8.3	8.6	8.3	7.8	8.1	8.2				235		230
10 %	41	5	5	5	8.2	8.5	8.3	7.7	8.1	8.1	22.0	19.4	20.5			
10 %	20	5	5	5	8.3	8.6	8.3	7.7	8.1	8.1				330		320
30 %	69	5	5	5	8.1	8.5	8.3	7.6	8.0	8.0	22.1	19.2	20.3			
30 %	174	5	5	5	8.1	8.5	8.2	7.6	8.0	8.0				515		505
50 %	39	5	5	5	8.0	8.5	8.3	7.5	7.9	7.9	22.1	19.2	20.3			
50 %	142	5	5	5	8.0	8.5	8.3	7.5	7.9	7.9				695		685
70 %	118	5	5	5	7.8	8.2	7.9	7.4	7.7	7.8	22.2	19.2	20.4			
70 %	76	5	5	5	7.8	8.3	8.0	7.4	7.7	7.8				875		855
85 %	13	5	5	5	7.5	8.3	8.0	7.2	7.6	7.7	22.3	19.2	20.4			
85 %	63	5	5	5	7.5	8.3	8.0	7.2	7.6	7.7				1065		985
100 %	43	5	5	5	7.1	8.2	7.9	7.0	7.5	7.5	22.4	19.5	20.7			
100 %	14	5	5	5	7.1	8.2	8.0	7.0	7.5	7.5				1135		1115
Measured by:		SW	MF	MF	HF	SW	SW	MF	SW	SW	HF	SW	SW	HF		SW
Recorded by:		SW	MF	MF	SW	MF	MF	MF	MF	MF	SW	MF	MF	SW		MF

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:					

County: Polk
Augusta: David Dennis

MICROTOX™ Data Reduction Sheet

SOURCE: CSX Winston Yard Lake Load Fl.

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

SAMPLE DATA:

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.):

DATE ASSAYED: 5/2/90 TIME: 9:00AM

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: Mel Cooper REAGENT VIAL LOT NO. M-

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES 0	
A1	0	53	28	X	X	94	X
B1		46	25			81	
C1		50	26			81	
A2	12.38	58	33	-.04	-.09	94	
B2		50	27			84	-.02
C2		48	27			82	
A3	24.75	53	30	-.15	-.23	92	
B3		66	39			104	-.10
C3		56	33			88	
A4	49.5	59	34	-.17	-.26	92	
B4		60	37			96	-.10
C4		61	36			95	
A5	99	68	40	-.26	-.34	100	
B5		65	40			96	-.13
C5		67	40			97	
EC_{50} (MIN, °C)					Stimulatory		

REVIEWED BY:
DATE: 7/24/90