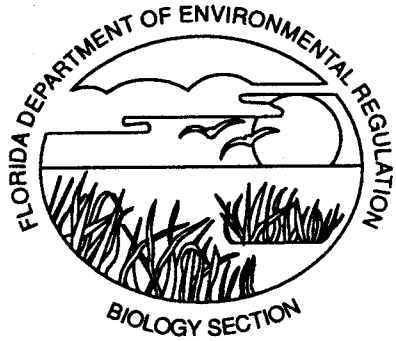


Bioassays of

Champion Paper Company

outfall #001

Cantonment, Escambia County, Florida

NPDES #FL0002526

Sampled 6/26/89

October 20, 1989

Biology Section
Division of Administrative and Technical Services

Bioassays of

Champion Paper Company

outfall #001

Cantonment, Escambia County, Florida

NPDES #FL0002526

Biology Section
Bureau of Laboratories
October 20, 1989

Introduction

Champion Paper Company, Cantonment, Escambia County, Florida, NPDES #FL0002526, on 27 to 29 June, 1989.

This company, formerly the St. Regis Paper Company, is located at the intersection of U.S. Highway 29 and State Road 184 in Cantonment. According to the NPDES permit (#FL0002526, issued in June 1979), this facility operates continuously, processing 1000 tons per day of pulpwood into paper products. Raw materials required for this operation include: pulpwood (pine or hardwood), salt cake, lime, caustic soda, chlorine, salt, sodium chlorate, rosin size, alum, sulfuric acid, and cornstarch.

Prior to discharge to the headwaters of Eleven Mile Creek, the effluent is treated by a clarifier, a series of mechanically aerated lagoons, and final settling in an additional lagoon. This system is designed for a 28 MGD wastewater flow. Champion's outfall #001 is located at State Road 186, approximately 2 miles from the plant site. Eleven Mile Creek eventually empties into the northern portion of Perdido Bay, approximately 12 miles downstream of the plant outfall.

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 discharge from the Champion Paper Company was not toxic to the bioassay test organisms, the water fleas, *Ceriodaphnia dubia* and *Daphnia pulex*, and the fish, *Notropis leedsi*. The Microtox® assay using the organism, *Photobacterium phosphoreum*, was inconclusive, perhaps due to the lack of a color correction factor. The total ammonia concentration in the sample was 4.31 mg/l. The unionized ammonia concentration was 0.28 mg/l. Since the sample was not toxic, further chemical analyses were not performed.

Conclusion

The sample of discharge from the Champion Paper Company was not toxic on 26 June, 1989.

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 definitive bioassay of a sample of discharge from the Champion Paper Company outfall #001, Cantonment, Escambia County, Florida, NPDES #FL0002526, on 27 to 29 June, 1989.

Facility: **Champion Paper Company** NPDES # **FL0002526** Facility Type: **Paper Mill**
Location: Intersection of US29 & Fl. Rd. 184, Cantonment Contact/District: J. Williams / NW
County: Escambia Test type: static definitive
Sample Collection Date: **6/26/89** Time: 1356 # tests: 3 Receiving Water: Eleven Mile Creek
Test Beginning Date: 6/27/89 Time: 1130 Chlorination Type: **nonchlorinated**
Test Ending Date: 6/29/89 Time: 1100 **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	8.9	-	8.6	8.1	-	8.0	20.9	-	21.1	-	-
Control	5	5	5	8.9	-	8.6	8.1	-	8.0	-	-	-	-	-
Control	5	5	5	8.9	-	8.6	8.1	-	8.0	-	-	-	-	-
Control	5	5	5	8.9	-	8.6	8.1	-	8.0	-	-	-	215	230
10%	5	5	5	8.6	-	8.7	8.1	-	8.1	20.9	-	21.1	-	-
10%	5	5	5	8.6	-	8.7	8.1	-	8.1	-	-	-	-	-
10%	5	5	5	8.6	-	8.7	8.1	-	8.1	-	-	-	-	-
10%	5	5	5	8.6	-	8.7	8.1	-	8.1	-	-	-	385	370
30%	5	5	5	8.6	-	8.6	8.1	-	8.2	21.2	-	21.0	-	-
30%	5	5	5	8.6	-	8.6	8.1	-	8.2	-	-	-	-	-
30%	5	5	5	8.6	-	8.6	8.1	-	8.2	-	-	-	-	-
30%	5	5	5	8.6	-	8.6	8.1	-	8.2	-	-	-	640	670
50%	5	5	5	8.5	-	8.6	8.1	-	8.2	21.4	-	21.0	-	-
50%	5	5	5	8.5	-	8.6	8.1	-	8.2	-	-	-	-	-
50%	5	5	5	8.5	-	8.6	8.1	-	8.2	-	-	-	-	-
50%	5	5	5	8.5	-	8.6	8.1	-	8.2	-	-	-	890	955
70%	5	5	5	8.6	-	8.6	8.1	-	8.3	21.5	-	21.0	-	-
70%	5	5	5	8.7	-	8.6	8.1	-	8.3	-	-	-	-	-
70%	5	5	5	8.6	-	8.6	8.1	-	8.3	-	-	-	-	-
70%	5	5	5	8.7	-	8.6	8.1	-	8.3	-	-	-	1170	1230
85%	5	5	5	8.6	-	8.5	8.1	-	8.3	21.7	-	21.0	-	-
85%	5	5	5	8.6	-	8.5	8.1	-	8.3	-	-	-	-	-
85%	5	5	5	8.6	-	8.5	8.1	-	8.3	-	-	-	-	-
85%	5	5	5	8.6	-	8.5	8.1	-	8.3	-	-	-	1380	1430
100%	5	5	5	8.5	-	8.5	8.1	-	8.3	21.9	-	20.9	-	-
100%	5	5	5	8.6	-	8.5	8.1	-	8.3	-	-	-	-	-
100%	5	5	5	8.6	-	8.5	8.1	-	8.3	-	-	-	-	-
100%	5	5	5	8.5	-	8.5	8.1	-	8.3	-	-	-	1560	1660

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

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	0.06	0.00
100% Sample:	4.31	0.28

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	120	120
Cond. Control Water (daphnids):	125	122
100% Sample:	290	205

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

Table 2. Continued.

Facility: **Champion Paper Company** | NPDES # **FL0002526** | Facility Type: **Paper Mill**
Location: Intersection of US29 & Fl. Rd. 184, Cantonment | Contact/District: J. Williams / NW
County: Escambia | Test type: static definitive
Sample Collection Date: **6/26/89** Time: 1356 | # tests: 3 | Receiving Water: Eleven Mile Creek
Test Beginning Date: 6/27/89 Time: 1130 | Chlorination Type: **nonchlorinated**
Test Ending Date: 6/29/89 Time: 1100 | **Page 2 of 2**

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

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	0.06	0.00
100% Sample:	4.31	0.28

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	120	120
Cond. Control Water (daphnids):	125	122
100% Sample:	290	205

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

Organism: ***Daphnia pulex*** Life stage: neonate
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	8.9	-	8.7	8.1	-	8.1	21.0	-	20.8	-	-
Control	5	5	5	8.9	-	8.7	8.1	-	8.1	-	-	-	-	-
Control	5	5	4	8.9	-	8.7	8.1	-	8.1	-	-	-	-	-
Control	5	5	5	8.9	-	8.7	8.1	-	8.1	-	-	-	215	235
100.0%	5	5	5	8.6	-	8.6	8.1	-	8.2	21.9	-	20.8	-	-
100.0%	5	5	4	8.6	-	8.6	8.1	-	8.2	-	-	-	-	-
100.0%	5	5	5	8.6	-	8.6	8.1	-	8.2	-	-	-	-	-
100.0%	5	5	5	8.6	-	8.6	8.1	-	8.2	-	-	-	1580	1665

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	8.6	8.4	7.9	7.6	7.8	7.8	22.3	20.1	20.7	-	-
Control	5	5	5	8.6	8.4	7.9	7.6	7.8	7.8	-	-	-	225	225
10%	5	5	5	8.7	8.6	8.3	7.7	7.9	7.9	22.4	20.0	20.6	-	-
10%	5	5	5	8.7	8.6	8.3	7.7	7.9	7.9	-	-	-	380	370
30%	5	5	5	8.5	8.2	8.1	7.8	8.0	8.0	22.4	20.0	20.4	-	-
30%	5	5	5	8.5	8.2	8.1	7.8	8.0	8.0	-	-	-	685	660
50%	5	5	5	8.5	8.0	8.0	7.8	8.0	8.0	22.5	19.9	20.4	-	-
50%	5	5	5	8.5	8.0	8.0	7.8	8.0	8.0	-	-	-	980	940
70%	5	5	5	8.1	7.7	7.8	7.9	8.1	8.1	22.8	19.8	20.3	-	-
70%	5	5	5	8.1	7.7	7.8	7.9	8.1	8.1	-	-	-	1285	1245
85%	5	5	5	8.1	7.6	7.4	7.9	8.1	8.1	22.8	19.8	20.3	-	-
85%	5	5	5	8.1	7.5	7.4	7.9	8.1	8.1	-	-	-	1510	1455
100%	5	5	5	8.0	7.5	7.3	7.9	8.1	8.1	22.8	19.8	20.3	-	-
100%	5	5	5	8.0	7.5	7.3	7.9	8.1	8.1	-	-	-	1720	1620

Table 3. Microtox test results, Champion Paper Company, Escambia County, NPDES #FL0002526, on 27 June, 1989.

Microtox Test

% Sample	Final Reclaimed Water nonchlorinated	
	5-min	15-min
0	63	31
0	75	31
0	68	32
12.38	73	35
12.38	65	31
12.38	73	33
24.75	66	30
24.75	58	27
24.75	63	31
49.5	66	29
49.5	58	30
49.5	63	37
99	58	30
99	59	27
99	69	31

EC_{50} Nonchlorinated (15 minute, 15 °C) = noncalculable

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.)

FT 048

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Champion PAPER CO
Address/City: Cantonment fl
County: Escambia
Contact/District: J. Williams NWFT
NPDES Permit #: fl 0002526 exp 1-3-88 Outfall #: 000

Sample Collection: Date 6/26/89 Time 1356
Test Beginning: Date 6/27/89 Time 1130
Test Ending: Date 6/29/89 Time 1130
Test Organism: C. dubia
Life Stage/Age: Neonate

Test Number: 1 of 3 Test Type: Screening | (Definitive)
(Static) | Static Renewal | Flow-through

Remarks:

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7.0, 7.9	8.8 @ 21°C	1307 @ 21°C	21.3 @ 21.3
24 hr	7.0, 7.9	8.9 @ 21.5	13	21.8 @ 21.8
48 hr	7.0, 7.9	8.7 @ 23°C	1326 @ 22°C / 1326	22.0 @ 22.0

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	1	5	5	5	8.9		8.6	8.1		8.0	20.2		21.1			
Control	2	5	5	5	8.9		8.6	8.1		8.0						
Control	3	5	5	5	8.9		8.6	8.1		8.0						
Control	4	5	5	5	8.9		8.6	8.1		8.0				215		230
10%	5	5	5	5	8.6		8.7	8.1		8.1	20.9		21.1			
10%	6	5	5	5	8.6		8.7	8.1		8.1						
10%	7	5	5	5	8.6		8.7	8.1		8.1						
10%	8	5	5	5	8.6		8.7	8.1		8.1				235		220
30%	9	5	5	5	8.6		8.6	8.1		8.2	21.2		21.0			
30%	10	5	5	5	8.6		8.6	8.1		8.2						
30%	11	5	5	5	8.6		8.6	8.1		8.2						
30%	12	5	5	5	8.6		8.6	8.1		8.2				640		670
50%	13	5	5	5	8.5		8.6	8.1		8.2	21.4		21.0			
50%	14	5	5	5	8.5		8.6	8.1		8.2						
50%	15	5	5	5	8.5		8.6	8.1		8.2						
50%	16	5	5	5	8.5		8.6	8.1		8.2				870		955
70%	17	5	5	5	8.6		8.6	8.1		8.3	21.5		21.0			
70%	18	5	5	5	8.7		8.6	8.1		8.3						
70%	19	5	5	5	8.6		8.6	8.1		8.3						
70%	20	5	5	5	8.7		8.6	8.1		8.3				1170		1230
85%	21	5	5	5	8.6		8.5	8.1		8.3	21.7		21.0			
85%	22	5	5	5	8.6		8.5	8.1		8.3						
85%	23	5	5	5	8.6		8.5	8.1		8.3						
85%	24	5	5	5	8.6		8.5	8.1		8.3				1330		1430
100%	25	5	5	5	8.5		8.5	8.1		8.3	21.9		20.9			
100%	26	5	5	5	8.6		8.5	8.1		8.3						
100%	27	5	5	5	8.6		8.5	8.1		8.3						
100%	28	5	5	5	8.5		8.5	8.1		8.3				1560		1660
	Measured by:	SHW	MF	MF	MF		MF	MF		MF	MF		MF	MF		MF
	Recorded by:		MF	MF	MF		MF	MF		MF	MF		MF	SHW		MF

Investigators' Signatures

Marshall Faircloth

Steven H Wolfe

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			NA		
Lab Tot. Resid. Cl2:					
Alkalinity:	120	125	290	titrn	MF
Hardness:	120	122	205	titrn	MF
Total Ammonia:	0.0	0.056	4.31	Orion	MF

slope -60.3

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Champion Paper Co
Address/City:
County:
Contact/District:
NPDES Permit #: ____ Outfall #: 001

Sample Collection: Date 6/26/89 Time 1356
Test Beginning: Date 6/27/89 Time 1130
Test Ending: Date 6/29/89 Time 1130
Test Organism: D. pulex
Life Stage/Age: Neonate

Test Number: 2 of 3
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	29	5	5	5	8.9		8.7	8.1		8.1	21.0		20.8			
Control	30	5	5	5	8.9		8.7	8.1		8.1						
Control	31	5	5	4	8.9		8.7	8.1		8.1						
Control	32	5	5	5	8.9		8.7	8.1		8.1				215		235
100%	33	5	5	5	8.6		8.6	8.1		8.2	21.9		20.8			
100%	34	5	5	4	8.6		8.6	8.1		8.2						
100%	35	5	5	5	8.6		8.6	8.1		8.2						
100%	36	5	5	5	8.6		8.6	8.1		8.2				1580		1665
	Measured by:	MF	MF		MF		MF	MF		MF	MF		MF	MF		
	Recorded by:	MF	MF		MF		MF	MF		MF	MF		MF	SHW		

Investigators' Signatures

Steven H. Wolfe

Marshall Fairclothe

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl_2:					
Lab Tot. Resid. Cl_2:					
Alkalinity:					
Hardness:					
Total Ammonia:					

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Champion Paper Co
Address/City:
County:
Contact/District:
NPDES Permit #: Outfall #: 004

Sample Collection: Date 6/26/87 Time 1356
Test Beginning: Date 6/27/87 Time 1130
Test Ending: Date 6-28-87 Time 1130
Test Organism: N. Pelis
Life Stage/Age: 18 days

Test Number: 3 of 3 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	19	5	5	5	8.6	8.4	7.9	7.6	7.8	7.8	22.3	20.1	20.7			
Control	10	5	5	5	8.6	8.4	7.9	7.6	7.8	7.9				225		225
10 %	180	5	5	5	8.7	8.3	8.3	7.7	7.9	8.0	22.4	20.0	20.6			
10 %	14	5	5	5	8.7	8.3	8.3	7.7	7.9	8.0				380		370
30 %	56	5	5	5	8.5	8.2	8.1	7.8	8.0	8.1	22.4	20.0	20.4			
30 %	113	5	5	5	8.5	8.2	8.1	7.8	8.0	8.1				685		660
50 %	62	5	5	5	8.5	8.0	8.0	7.8	8.0	8.1	22.5	19.9	20.4			
50 %	17	5	5	5	8.5	8.0	8.0	7.8	8.0	8.1				930		940
70 %	130	5	5	5	8.1	7.7	7.8	7.9	8.1	8.1	22.8	19.8	20.3			
70 %	39	5	5	5	8.1	7.7	7.8	7.9	8.1	8.1				1285		1245
85 %	68	5	5	5	8.1	7.6	7.4	7.9	8.1	8.1	22.8	19.8	20.3			
85 %	2	5	5	5	8.1	7.5	7.4	7.9	8.1	8.1				1510		1455
100 %	69	5	5	5	8.0	7.5	7.3	7.9	8.1	8.1	22.8	19.8	20.3			
100 %	16	5	5	5	8.0	7.5	7.3	7.9	8.1	8.1				1720		1620
Measured by:		MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF		MF
Recorded by:		MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MW		MK

Investigators' Signatures

Steven H Wall
Marshall Steinbeck

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: Champion Paper Co. 15 min Non-calculable

GRAPH CALC EC 50 (5 MIN, 5 °C) = 671.83 %SAMPLE mg/L

Non-classical
No formulation for this sample

SAMPLE DATA:

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.):

DATE ASSAYED: 6/21/89 TIME: 1320

VISUAL COLOR: Tannic CORRECTION REQUIRED: YES NO

VISUAL TURBIDITY: Moderate SEPARATION REQUIRED: YES NO

INITIAL pH: 5.0 pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS (DRY NaCl) OTHER

PRIMARY DILUTION OF SAMPLE:

OPERATOR: M. Fairchild REAGENT VIAL LOT NO. M- N C N

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES
A1	0	63	31	X	X	
B1		75	31			
C1		68	32			
A2	12.38	73	35	-.02	-.05	
B2		65	31			
C2		73	33			
A3	24.75	66	30	0.10	+.07	
B3		58	27			
C3		63	31			
A4	49.5	58	29	0.17	-.02	
B4		59	30			
C4		69	37			
A5	99	55	30	0.26	+07	
B5		52	27			
C5		54	31			
EC_{50} (MIN, °C)				671.83	Non-calculable.	

REVIEWED BY:

DATE: 10/25/89