Bioassays of

Georgia-Pacific

Palatka, Putnam County, Florida

NPDES #FL0002763

Sampled 4/23/90

July 6, 1990

Biology Section
Division of Administrative and Technical Services

Bioassays of

Georgia-Pacific

Palatka, Putnam County, Florida

NPDES #FL0002763

Biology Section
Bureau of Laboratories
July 6, 1990

Introduction

Georgia-Pacific, Palatka, Putnam County, Florida, NPDES #FL0002763, on 24 to 26 April, 1990

This facility, formerly Hudson Pulp and Paper, is located on State Road 216, approximately 3 miles north of Palatka, Putnam County, Florida. The mill produces approximately 950 tons of paper products per day using an unbleached Kraft and bleached pulp process. Effluent of from 27 to 50 MGD is discharged, with approximately one half of this consisting of process wastewater. Treatment prior to discharge includes primary clarification and 40 days nominal retention in four oxidation ponds. The effluent is aerated in the last pond using several mechanical aerators. Discharge is to Rice Creek, a tributary of the St. Johns River.

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 toxicity bioassays, using the bioassay test organisms, the waterflea, *Ceriodaphnia dubia*, and the fish, *Notropis leedsi*, on a sample of discharge from this facility. The test results indicated that the sample was not toxic to *N. leedsi*. The sample was also considered not toxic to *C. dubia*, although several random deaths occurred during the test. Control mortality was 20%. The control deaths occurred in one vial and were attributed to an improperly rinsed probe.

The sample affected the Microtox® assay test organism, *Photobacterium phosphoreum*, producing an EC_{50} of 107%. The sample was unchlorinated with a total ammonia concentration of 0.57 mg/l and an unionized ammonia concentration of 0.02 mg/l.

Conclusion

The sample of discharge from this facility was not toxic on 23 April, 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 48 hour static definitive bioassay of sample of discharge from the Georgia-Pacific facility, Palatka, Putnam County, Florida, NPDES #FL002763, on 24 to 26 April, 1990.

Facility: **Georgia Pacific**
Location: P.O. Box 919, Palatka
County: Putnam
Sample Collection Date: **4/23/90** Time: 1015
Test Beginning Date: 4/24/90 Time: 1000
Test Ending Date: 4/26/90 Time: 1000

NPDES # **FL0002763**
Contact/District: G. Marchman
Test type: static definitive
tests: 2
Chlorination Type: **unchlorinated**

Facility Type: **Paper Mill**
Receiving Water: Rice Creek

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	1	1	8.4	-	8.1	8.0	-	8.2	22.1	-	22.0	-	-
Control	5	5	5	8.4	-	8.1	8.0	-	8.2	-	-	-	-	-
Control	5	5	5	8.5	-	8.2	8.0	-	8.2	-	-	-	-	-
Control	5	5	5	8.5	-	8.2	8.0	-	8.2	-	-	-	180	180
10%	5	5	5	8.4	-	8.2	8.0	-	8.4	22.2	-	21.8	-	-
10%	5	5	5	8.4	-	8.2	8.0	-	8.4	-	-	-	-	-
10%	5	5	5	8.4	-	8.2	8.0	-	8.4	-	-	-	-	-
10%	5	5	5	8.4	-	8.2	8.0	-	8.4	-	-	-	340	325
30%	5	5	5	8.4	-	8.1	8.1	-	8.6	22.1	-	21.8	-	-
30%	5	4	4	8.2	-	8.1	8.0	-	8.6	-	-	-	-	-
30%	5	4	4	8.2	-	8.2	8.0	-	8.6	-	-	-	-	-
30%	5	4	4	8.2	-	8.2	8.0	-	8.6	-	-	-	670	690
50%	5	5	5	8.1	-	8.1	8.0	-	8.7	22.1	-	21.8	-	-
50%	5	5	4	7.9	-	8.1	8.0	-	8.7	-	-	-	-	-
50%	5	5	5	7.9	-	8.1	8.0	-	8.7	-	-	-	-	-
50%	5	4	4	7.9	-	8.1	8.0	-	8.7	-	-	-	980	985
70%	5	5	5	7.9	-	8.0	8.0	-	8.8	22.1	-	21.8	-	-
70%	5	5	5	7.7	-	8.0	8.0	-	8.8	-	-	-	-	-
70%	5	5	5	7.7	-	8.0	8.0	-	8.8	-	-	-	-	-
70%	5	5	5	7.7	-	8.0	8.0	-	8.8	-	-	-	1315	1365
85%	5	4	4	7.5	-	7.8	8.0	-	8.8	22.1	-	21.9	-	-
85%	5	5	5	7.5	-	7.8	8.0	-	8.8	-	-	-	-	-
85%	5	5	5	7.5	-	7.9	8.0	-	8.8	-	-	-	-	-
85%	5	5	5	7.5	-	7.9	8.0	-	8.8	-	-	-	1540	1595
100%	5	5	5	7.3	-	7.8	8.0	-	8.8	22.1	-	22.0	-	-
100%	5	5	5	7.3	-	7.8	8.0	-	8.8	-	-	-	-	-
100%	5	5	4	7.3	-	7.8	8.0	-	8.9	-	-	-	-	-
100%	5	5	5	7.3	-	7.8	8.0	-	8.9	-	-	-	1775	1850

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:	0.57	0.03

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	85	120
Cond. Control Water (daphnids):	50	85
100% Sample:	395	170

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

-continued-

Table 2. Continued.

Facility:	**Georgia Pacific**		NPDES #	**FL0002763**	Facility Type: **Paper Mill**
Location:	P.O. Box 919, Palatka		Contact/District:	G. Marchman	
County:	Putnam		Test type:	static definitive	
Sample Collection Date:	**4/23/90**	Time: 1015	# tests:	2	Receiving Water: Rice Creek
Test Beginning Date:	4/24/90	Time: 1000	Chlorination Type:	**unchlorinated**	
Test Ending Date:	4/26/90	Time: 1000			**Page 2 of 2**

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	8.3	8.4	8.0	7.8	8.2	8.3	21.9	19.3	20.5	-	-
Control	5	5	5	8.4	8.4	8.0	7.8	8.2	8.3	-	-	-	235	230
10%	5	5	5	8.2	8.2	7.8	7.9	8.2	8.3	21.8	19.1	20.0	-	-
10%	5	5	5	8.2	8.2	7.8	7.9	8.2	8.3	-	-	-	395	380
30%	5	5	5	7.9	7.9	7.4	7.9	8.2	8.4	21.8	19.1	19.4	-	-
30%	5	5	5	7.9	7.9	7.4	7.9	8.2	8.4	-	-	-	730	700
50%	5	5	5	7.5	7.3	6.9	7.9	8.3	8.4	21.8	19.1	19.9	-	-
50%	5	5	5	7.6	7.6	6.9	7.9	8.3	8.4	-	-	-	1055	1015
70%	5	5	5	7.3	7.0	6.2	7.9	8.3	8.4	21.8	19.1	20.0	-	-
70%	5	5	5	7.3	7.0	6.1	7.9	8.3	8.4	-	-	-	1365	1290
85%	5	5	5	6.4	6.6	5.7	7.9	8.3	8.4	21.8	19.1	20.1	-	-
85%	5	5	5	6.4	6.7	5.7	7.9	8.3	8.4	-	-	-	1610	1545
100%	5	5	5	5.9	6.0	5.4	7.9	8.3	8.4	22.0	19.3	20.5	-	-
100%	5	5	5	5.9	6.2	5.3	7.9	8.3	8.4	-	-	-	1835	1755

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:	0.57	0.03

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	85	120
Cond. Control Water (daphnids):	50	85
100% Sample:	395	170

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

Table 3. Microtox test results, Georgia Pacific, Putnam County, NPDES #FL0002763, on 24 April, 1990.

% Sample	Unchlorinated Final Reclaimed Water	
	5-min	15-min
0	25	17
0	24	16
0	26	16
12.38	25	17
12.38	28	18
12.38	25	16
24.75	24	13
24.75	23	15
24.75	21	15
49.5	19	12
49.5	18	11
49.5	19	11
99	14	9
99	14	9
99	14	9

EC_{50} Unchlorinated (15 minute, 15 °C) = 107% 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, CA).

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: GEORGIA PACIFIC
Address/City: P.O. BOX 919, PALATKA FL 32078
County: PUTNAM
Contact/District: NW Brady L. Marshburn
NPDES Permit #: FL0002763 Outfall #: 001

Sample Collection: Date 4/23/90 Time 10:15
Test Beginning: Date 4/24/90 Time 1000
Test Ending: Date 4/26/90 Time 1000
Test Organism: Cyprinodon variegatus
Life Stage/Age: Juvenile

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

Remarks: UNCHLORINATED

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7.9 7.9	8.2 @ 23°C	1361 @ 23.3°C 1301	22.3 @ 22.8
24 hr	7.9 7.9	8.7 @ 23°C		22.5 @ 23°C
48 hr	7.9 7.9	8.2 @ 23°C	1261 @ 23.3°C 1261	22.3 @ 22.9

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	1	1	8.4		8.1	8.0		8.2	22.1		22.0			
Control		5	5	5	8.4		8.1	8.0		8.2			"			
Control		5	5	5	8.5		8.2	8.0		8.2						
Control		5	5	5	8.5		8.2	8.0		8.2				180		180
10 %		5	5	5	8.4		8.2	8.0		8.4	22.2		21.8			
10 %		5	5	5	8.4		8.2	8.0		8.4						
10 %		5	5	5	8.4		8.2	8.0		8.4						
10 %		5	5	5	8.4		8.2	8.0		8.4				340		325
30 %		5	5	5	8.2		8.1	8.1		8.6	22.1		21.8			
30 %		5	4	4	8.2		8.1	8.0		8.6						
30 %		5	4	4	8.2		8.2	8.0		8.6						
30 %		5	4	4	8.1		8.2	8.0		8.6				670		690
50 %		5	5	5	7.9		8.1	8.0		8.7	22.1		21.8			
50 %		5	5	4	7.9		8.1	8.0		8.7						
50 %		5	5	5	7.9		8.1	8.0		8.7						
50 %		5	4	4	7.9		8.1	8.0		8.7				980		985
70 %		5	5	5	7.7		8.0	8.0		8.8	22.1		21.8			
70 %		5	5	5	7.7		8.0	8.0		8.8						
70 %		5	5	5	7.7		8.0	8.0		8.8						
70 %		5	5	5	7.7		8.0	8.0		8.8				1310		1365
85 %		5	4	4	7.5		7.8	8.0		8.8	22.1		21.9			
85 %		5	5	5	7.5		7.8	8.0		8.8						
85 %		5	5	5	7.5		7.9	8.0		8.8						
85 %		5	5	5	7.5		7.9	8.0		8.8				1540		1595
100 %		5	5	5	7.3		7.8	8.0		8.8	22.1		22.0			
100 %		5	5	5	7.3		7.8	8.0		8.8						
100 %		5	5	4	7.3		7.8	8.0		8.9						
100 %		5	5	5	7.3		7.8	8.0		8.9				1775		1850
Measured by:		SW	mf	mf	SW		SW	SW		SW	SW		SW	SW		SW
Recorded by:		mf	mf	mf	MGC		mf	MGC		MF	MGC		mf	MGC		MF

Investigators' Signatures

Marshall Faircloth
Steve Howell
Mike Cimino

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:	85 *	50 *	395 *	Hach	mf
Hardness:	120 *	55	170	Hach	mf
Total Ammonia:	0.0	0.0	0.51	~~Hach~~ Orion	mf

slope -57.1

* checked 2x

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: GEORGIA PACIFIC
Address/City: P.O. Box 919, PALATKA Fl. 32078
County: PUTNAM
Contact/District: NW
NPDES Permit #: FL0002763 Outfall #: 001

Sample Collection: Date 4/23/90 Time 1015
Test Beginning: Date 4/24/90 Time 1000
Test Ending: Date 4/26/90 Time 1000
Test Organism: N. tenuis lab std
Life Stage/Age: 14 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	3	5	5	5	8.3	8.4	8.0	7.8	8.2	8.3	21.4	19.3	20.5			
Control	13	5	5	5	8.4	8.4	8.0	7.8	8.2	8.3				235		230
10%	63	5	5	5	8.2	8.2	7.8	7.9	8.2	8.3	21.8	19.1	20.0			
10%	76	5	5	5	8.2	8.2	7.8	7.9	8.2	8.3				345		330
30%	113	5	5	5	7.9	7.9	7.4	7.9	8.2	8.4	21.8	19.1	19.9			
30%	50	5	5	5	7.9	7.9	7.4	7.9	8.2	8.4				730		700
50%	20	5	5	5	7.5	7.3	6.9	7.9	8.3	8.4	21.8	19.1	19.9			
50%	41	5	5	5	7.6	7.3	6.9	7.9	8.3	8.4				1055		1015
70%	287	5	5	5	7.3	7.0	6.2	7.9	8.3	8.4	21.8	19.1	20.0			
70%	17	5	5	5	7.3	7.0	6.1	7.9	8.3	8.4				1365		1290
85%	187	5	5	5	6.4	6.6	5.7	7.9	8.3	8.4	21.8	19.1	20.1			
85%	87	5	5	5	6.4	6.7	5.7	7.9	8.3	8.4				1610		1595
100%	43	5	5	5	5.9	6.8	5.4	7.9	8.3	8.4	22.0	19.3	20.5			
100%	19	5	5	5	5.9	6.7	5.3	7.9	8.3	8.4				1835		1755
Measured by:		MF	MF	MF	SW	MF	SW	SW	MF	SW	SW	MF	SW	SW		SW
Recorded by:		MF	MF	MF	MGC	MGC	MGC	MGC	MGC	MF	MGC	MGC	MF	MGC		MF

Investigators' Signatures

Marshall Faircloth

Alice H. Wicks

Melissa J. Chapman

Reviewer

Water-quality Parameters

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

Requestor: Bradley L. Marshman
County: Putnam
District: NW

MICROTOX™ Data Reduction Sheet

SOURCE: Georgia Pacific

GRAPH CALC : EC _____ (_____ MIN, _____ °C) = _____ %SAMPLE mg/L

SAMPLE DATA:

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.):

DATE ASSAYED: 4/24/90 TIME: 10:00 AM

VISUAL COLOR: brown CORRECTION REQUIRED: YES NO

VISUAL TURBIDITY: none SEPARATION REQUIRED: YES NO

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH; MOAS (DRY NaCl) OTHER NLN

PRIMARY DILUTION OF SAMPLE:

OPERATOR: Bill Clayton REAGENT VIAL LOT NO. M-

REMARKS: Reading in 7 MIN *

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	I5	I15	NOTES Ic	Ic
A1	0	25	17	X	X	91	X
B1		26	16			89	
C1		26	16			91	
A2	12.38	25	17	-.04	-.04	80	.10
B2		28	18			88	
C2		25	16			74	
A3	24.75	24	13	.10	.14	76	.24
B3		23	15			69	
C3		21	15			70	
A4	49.5	19	12	.34	.44	59	.48
B4		18	11			60	
C4		19	11			61	
A5	99	14	09	.79	.81	48	.82
B5		14	09			51	
C5		14	09			47	
EC_{50} (15 MIN, 15 °C)				109.95	106.70		109.95

REVIEWED BY:
DATE: 7/24/90

* Fire alarm drill.