

Bioassays of

Seminole Kraft Paper Mill Wastewater Treatment Facility

Jacksonville, Duval County, Florida

NPDES #FL0000400

Sampled 3/10/97

June 1997

Biology Section

Division of Administrative & Technical Services

Comprehensive Quality Assurance Plan #870346G

Bioassays of

Seminole Kraft Paper Mill Wastewater Treatment Facility

Jacksonville, Duval County, Florida

NPDES #FL0000400

Biology Section
Bureau of Laboratories
June 1997

Introduction

Seminole Kraft Paper Mill WWTF, 9469 Eastport Road, Jacksonville, Duval County, Florida, NPDES #FL0000400, tests performed on 11 to 13 March, 1997.

This paper mill's wastewater treatment facility has a design flow of 20.0 MGD. Industrial wastewater is treated by primary clarification, pH-stabilization, and aeration prior to being discharged to the St. Johns River. Domestic wastewater is chlorinated after treatment in an above-ground septic tank, then added to the industrial wastewater before the primary clarifier. The industrial wastewater is not chlorinated and dilutes the domestic wastewater enough for the combined wastewaters to be considered non-chlorinated (facility summary provided by Teresa Valdespino, FDEP, Jacksonville).

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1993, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition, EPA/600/4-90/027F.

Results and Discussion

The FDEP Biology Section performed two 48 hour static acute screening toxicity bioassays on a sample of effluent from this facility. The test species used for these bioassays were the freshwater species; the water flea, *Ceriodaphnia dubia* and the bannerfin shiner, *Cyprinella leedsi*. The 100% whole effluent tests did not show toxicity to the *Ceriodaphnia dubia*. The *Cyprinella leedsi* test was invalidated at 48 hours due to excessive control mortality (20% @ 48 hours); however, there was 90% mortality in the *Cyprinella leedsi* 100% effluent test. This suggests that the sample was toxic to the *Cyprinella leedsi* and another test may be appropriate.

Total residual chlorine was not detected in the laboratory. The total and unionized ammonia concentrations at test initiation were 1.14 mg/L and 0.034 mg/L, respectively. At 48 hours the total and unionized ammonia values were, respectively, 1.0 mg/L and 0.174 mg/L. The concentration of unionized ammonia increased during the test period due to an increase in the pH of the test solution. The unionized ammonia concentration may partially explain the mortality in the *Cyprinella leedsi* 100% sample. Further chemical analyses were performed on the sample and an organic compound, azobenzene / 1,2-diphenylhydrazine, was detected (Table 2). Chemical analyses for metals were not performed.

Conclusion

The sample of effluent collected from this facility on March 10, 1997, did not show toxicity to *Ceriodaphnia dubia*, but is suspected of causing toxicity to the *Cyprinella leedsi*. The unionized ammonia concentration, as well as possible unidentified components of the sample, are suspected of causing the observed mortality. Resampling this site is recommended due to the *Cyprinella leedsi* control failure and high sample mortality.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Seminole Kraft WWTF, Jacksonville, Duval County, Florida, NPDES# FL0000400, performed on 11 to 13 March, 1997.

Facility:	**Seminole Kraft WWTF**	**NPDES #**	**FL0000400**	Facility Type:	**Paper Mill**
Location:	9469 Eastpoint Road, Jacksonville	Contact/District:	Teresa Valdespino/Northeast		
County:	Duval	Test type:	static acute screen		
Sample Collection Date:	3/10/97 Time: 1445	# tests:	2	Receiving Water:	St. Johns River
Test Beginning Date:	3/11/97 Time: 1500	Chlorination Type:	non-chlorinated		
Test Ending Date:	3/13/97 Time: 1415				**Page 1 of 1**

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

Concentrations	Sample/Diluent Volume(mL)	SURVIVAL # Alive 0 hr	24 hr	48 hr	pH 0 hour	24 hour	48 hour	Temperature[A] 0 hour	24 hour	48 hour	Dissolved Oxygen 0 hour	24 hour	48 hour	Conductivity µmhos/cm 0 hour	48 hour
Control A	0/20	5	5	5	7.9	-	8.2	23.8	-	24.5	7.6	-	7.5	175	195
Control B	0/20	5	5	5	-	-	8.2	-	-	24.5	-	-	7.5	-	210
Control C	0/20	5	5	5	-	-	8.2	-	-	24.4	-	-	7.6	-	200
Control D	0/20	5	5	5	-	-	8.2	-	-	24.4	-	-	7.5	-	230
100% A	20/0	5	5	5	7.9	-	8.6	24.6	-	24.5	6.4	-	7.5	1810	1610
100% B	20/0	5	5	5	-	-	8.6	-	-	24.6	-	-	7.4	-	1700
100% C	20/0	5	5	5	-	-	8.5	-	-	24.6	-	-	7.3	-	1770
100% D	20/0	5	5	5	-	-	8.6	-	-	24.6	-	-	7.3	-	1695

[A] Temperature of test incubator was continously recorded on a strip chart recorder. Incubator temperature range for the test period was 24.4-25.6°C.

Organism: ***Cyprinella leedsi*** Age: 12 days

Concentrations	Sample/Diluent Volume(mL)	SURVIVAL # Alive 0 hr	24 hr	48 hr	pH 0 hour	24 hour	48 hour	Temperature[B] 0 hour	24 hour	48 hour	Dissolved Oxygen 0 hour	24 hour	48 hour	Conductivity µmhos/cm 0 hour	48 hour
Control A	0/500	5	5	5	7.8	8.2	8.3	24.8	23.8	24.3	7.5	8.3	7.8	255	255
Control B	0/500	5	5	4	7.8	8.2	8.3	24.8	23.6	24.2	7.7	8.3	7.8	255	250
Control C	0/500	5	5	4	7.8	8.2	8.3	24.8	23.5	24.2	7.8	8.4	7.8	255	255
Control D	0/500	5	4	3	7.8	8.2	8.3	24.8	23.7	24.2	7.7	8.4	7.8	255	250
100% A	500/0	5	2	0	7.9	8.3	8.5	25.1	23.8	24.2	6.8	6.4	6.5	1895	1840
100% B	500/0	5	3	1	7.9	8.3	8.5	25.1	23.7	24.1	6.9	6.4	6.5	1840	1850
100% C	500/0	5	0	0	7.9	8.3	8.5	25.1	23.7	24.1	6.8	6.4	6.3	1895	1850
100% D	500/0	5	1	1	7.9	8.3	8.5	25.1	23.9	24.2	6.8	6.5	6.0	1900	1850

[B] Temperature of test room was continously recorded on a strip chart recorder. Room temperature range for the test period was 24.0-25.0°C.

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	<0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	<0.017	<0.017
Control Water (20% DMW) (cladocerans):	<0.017	<0.017
100% Sample @ 0 hour:	1.14	0.060
100% Sample @48 hours:	1.00	0.174

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	120	135
Control Water (20% DMW) (cladocerans):	70	90
100% Sample:	460	550

Salinity	(ppt)
Control Water (fish):	0
Control Water (20% DMW) (cladocerans):	0
100% Sample:	0

Table 2. Results of chemical analyses on the effluent from the Seminole Kraft facility sampled on March 10, 1997.

Base, Neutral, & Acid Extractable Organics	
Azobenzene / 1,2-Diphenylhydrazine	1.1 µg/L[I]

I Value reported is less than the minimum quantitation limit and greater than or equal to the minimum detection limit.

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Seminole Kraft
County: Duval
Contact / District: Teresa Valdespino / Northeast
NPDES Permit #: FL0000400
LIMS Sample #: 17657 LIMS Job #: 97-MAR-1115
sample log: 3/12/97 ow

Sample Collection: Date 3/10/97 Time 1445
Test Beginning: Date 3/11/97 Time 1410
Test Ending: Date 3/13/97 Time 1410
Organism Batch #: 8 Diluent Batch #: 8
Organism Age: ~~1 day~~ <24hours
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Temperature range: room 24-25°C
incubator 24.4-25.6°C
Test Number: 1 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.6 @ 23.7	8.3 @ 24.9 °C	102.2 @ 101.8 981 @ 1001 @ 25.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.9 @ 23.0	8.2 @ 25.1 °C	101.3 @ 101.8 980 @ 1001 @ 24.6 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.5 @ 24.6	8.4 @ 24.0 °C	1059 @ 1013 1004 @ 1001 @ 25.2 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	7.9		8.2	23.8		24.5	7.6		7.5	175		195
Control	B	5	5	5			8.2			24.5			7.5			210
Control	C	5	5	5			8.2			24.4			7.6			200
Control	D	5	5	5			8.2			24.4			7.5			230
100%	A	5	5	5	7.9		8.6	24.6		24.5	6.4		7.5	1810		1610
100%	B	5	5	5			8.6			24.6			7.4			1700
100%	C	5	5	5			8.5			24.6			7.3			1770
100%	D	5	~~5~~ 4 B	5			8.6			24.6			7.3			1695
			B in 24h Was Dead, NOT in KRAFT MF 3/12/97													
Measured/Loaded by:		ND	MF	KR	KS		ER	KR		ER	KR		ER	KR		ER
Recorded by:		MF	MF	KR	KS		ND	KS		ND	KS		ND	KS		ND

Investigators' Signatures

Marshall Faircloth
Kristi Sanders
Kellie Kriston
Kim Johnson
A-Hall
reviewer

form updated 4/01/96

Water Quality Parameters	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):		A miss-read Field Data Sheet	B. NOT measured		
Lab Total Residual Cl2 (mg/L):		<0.05	<0.3	DR100	KS
Alkalinity (mg/L as $CaCO_3$):		75	460	Hach	ER
Hardness (mg/L as $CaCO_3$):		90	550	Hach	ER
Total ammonia (mg/L as N):	<0.017	<0.017	1.14	Orion	MF

Ammonia Meter #98136 Meter Slope: -55.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Seminole Kraft
County: Duval
Contact / District: Teresa Valdospino / Northeast
NPDES Permit #: FL0000400
LIMS Sample #: 171657 LIMS Job #: 97-MAR-11-15
sample log 3/17/97 DW

Sample Collection: Date 3-10-97 Time 1445
Test Beginning: Date 3-11-97 Time 1500
Test Ending: Date 3-13-97 Time 1415
Organism Batch #: 16 Diluent Batch #: well H2O
Organism Age: 12 days
Test Organism: Cyprinella leedsi

Test Type: Screening / Definitive
Static / Static Renewal / Flow-through
Temperature range: room 24-25°C
incubator 24.4-25.6°C
Test Number: 2 of 2
Remarks: D = dead, M = missing

Test invalidated at 48hours due to excessive control mortality 20%.

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0	23.6 @ 23.7	8.3 @ 24.9 °C	102.2 @ 101.8
	7.0 @ 9.0			981 @ 1001 @ 25.1 °C
24 hr	7.0 @ 7.0	22.4 @ 23.0	8.2 @ 25.1 °C	101.3 @ 101.8
	9.0 @ 9.0			980 @ 1001 @ 24.6 °C
48 hr	7.0 @ 7.0	24.5 @ 24.6	8.4 @ 24.6 °C	103.9 @ 101.8
	9.0 @ 9.0			1004 @ 1001 @ 25.2 °C

total ammonia = 1 mg/L @ 48hours

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A1	5	5	5	7.8	8.2	8.3	24.5	23.8	24.3	7.5	8.3	7.8	255	250	255
Control	A2	5	5	4 ID	7.8	8.2	8.3	24.8	23.6	24.2	7.7	8.3	7.8	255	250	250
Control	A3	5	5	4 ID	7.8	8.2	8.3	24.8	23.5	24.2	7.8	8.4	7.8	255	250	255
Control	A4	5	4 ID	3 ID	7.8	8.2	8.3	24.8	23.7	24.2	7.7	8.4	7.8	255	250	250
100%	A5	5	2	0 2D	7.9	8.3	8.5	25.1	23.8	24.2	6.8	6.4	6.5	1895	1830	1840
100%	A6	5	3	1 2D	7.9	8.3	8.5	25.1	23.7	24.1	6.9	6.4	6.5	1900	1840	1850
100%	A7	5	0	0	7.9	8.3	8.5	25.1	23.7	24.1	6.8	6.4	6.3	1895	1840	1850
100%	A8	5	2	1 ID	7.9	8.3	8.5	25.1	23.9	24.2	6.8	6.5	6.0	1900	1850	1850
Measured/Loaded by:		KS	mf	KR	KR	DW	ND	KR	DW	ND	KR	DW	ND	KR	DW	ND
Recorded by:		mf	mf	KR	KS	KS	KR	KS	KS	KR	KS	KS	KR	KS	KS	KR

Investigators' Signatures
A- incorrect initial mf 3/11/97

Marshall Fairbanks
Phil Kane
Kellie Royston
Keith Johnson
Bill Wolfe

Salt Water / Well Water / 20% Min Water

Water Quality Parameters — Based on incorrect Datasheet for data on file 3/12/97

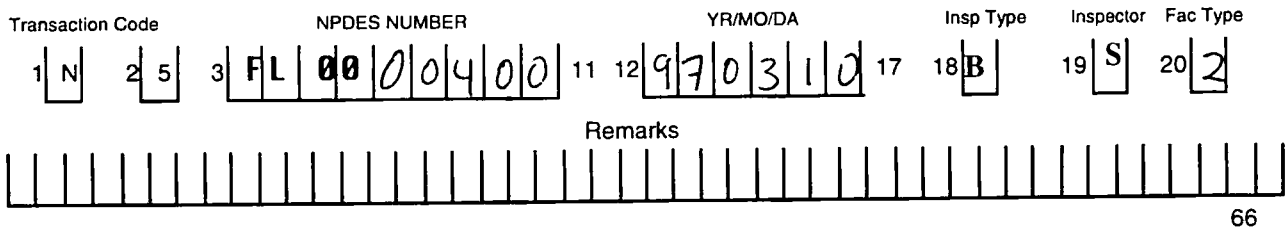
	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L)	B not measured	B 3.24	—	Dr. Phil Kane
Lab Total Residual Cl2 (mg/L)	<0.03	0.03	DR100	KS
Alkalinity (mg/L as $CaCO_3$)	120	460	Hach	KR
Hardness (mg/L as $CaCO_3$)	135	550	Hach	KR
Total ammonia (mg/L as N)	<0.017 <0.017	1.14	Orion	mf

Ammonia Meter #98136 Ammonia Meter Slope -55.5 Ammonia Blank <0.017 Control Salinity: 0 ppt Sample Salinity 0 ppt

e.: ewe: form updated 4/01/96

The Bioassay of the Seminole Kraft Paper Mill WWTF effluent sampled on March 10, 1997, NPDES #FL0000400.

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)



The Priority Pollutants Analysis for the Bioassay of the Seminole Kraft Paper Mill WWTF effluent sampled on March 10, 1997, NPDES #FL0000400.

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)

