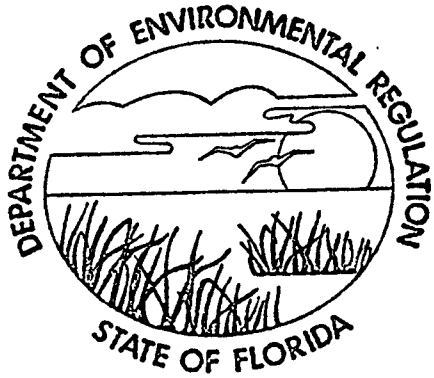


BIOASSAYS OF CHAMPION INTERNATIONAL COMPANY

KRAFT DIVISION

CANTONMENT, ESCAMBIA COUNTY, FLORIDA

NPDES #FL0002526

SAMPLED 10/26/87

JANUARY 20, 1988

Biology Section
Division of Environmental Programs

BIOASSAYS OF CHAMPION INTERNATIONAL COMPANY

KRAFT DIVISION

CANTONMENT, ESCAMBIA COUNTY, FLORIDA

NPDES #FL0002526

Biology Section
Bureau of Laboratories and
Special Programs
January 20, 1988

EXECUTIVE SUMMARY

Champion International Corporation, Cantonment, NPDES #FL0002526, 27 to 29 October, 1987.

Champion International Company in Escambia County processes 1000 tons of pulpwood into a variety of paper products. Four separate static acute toxicity bioassays were performed on a sample of effluent collected from Champion International Corporation's Outfall #001. The sample proved to be non-toxic to the test organisms Ceriodaphnia dubia, Daphnia pulex, Notropis leedsi, and Pimephales promelas. The Microtox® assay, using the bacterium Photobacterium phosphoreum, exhibited slight toxicity of an unknown nature. Effluent concentrations of total and unionized ammonia measured (0.467 mg/l and 0.020 mg/l, respectively) were not high enough to have caused any toxicity. The sample was not acutely toxic so chemical analyses were not performed.

INTRODUCTION

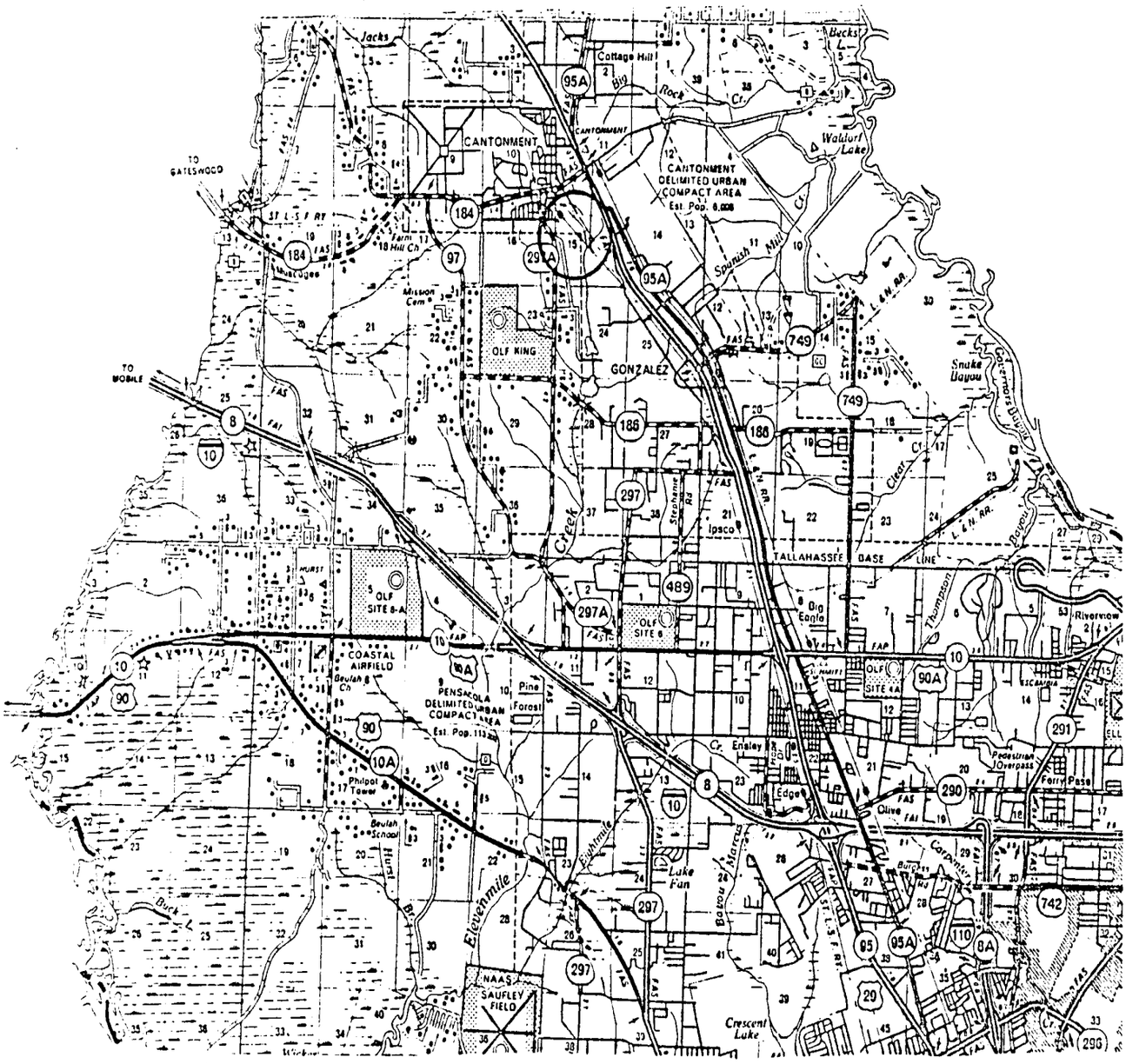
The Champion International Company, formerly the St. Regis Paper Company, is located at the intersection of U.S. Highway 29 and State Road 184 in Cantonment, Escambia County (Fig. 1). According to the NPDES permit (#FL0002526, issued in June 1979), this facility operates continuously, processing 1000 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.

Figure 2 depicts the water flow through the Champion Plant in Cantonment. The following compounds are associated with the paper manufacturing process and may be found in the watewater stream: primaric acid, isoprimaric acid, sandaracoprimaric acid, abietic acid, dehydroabietic acid, 3, 4, 5, trichloroquaiacol, 3, 4, 5, 6, tetrachloroquaiacol, mono-chloro-dehydroabietic acid (2 isomers), 9, 10, epoxystearic acid, hydrogen sulfide, methyl mercaptan, glycol inks, and sodium sulfide. Prior to discharge to the headwaters of Eleven Mile Creek, the wastewater 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.

On 17 to 19 February, 1981, the Biology Section performed three separate static bioassays on an effluent sample from the Champion Paper Company, Outfall #001. The results of those tests indicated that the sample was not toxic to the test organisms, Daphnia pulex, Simocephalus serrulatus, and Pimephales promelas (FDER 1987).

To again determine the existence and extent of toxicity of this effluent, the Biology Section performed additional bioassays on samples of effluent collected from Champion Paper Company's Outfall #001 and from Eleven Mile Creek downstream of the outfall boil. The tests were performed from 20 to 23 August, 1985. The results of those tests indicated that both samples were acutely toxic to Notropis leedsi. Ammonia was believed to have been mostly responsible for this toxicity (FDER 1987). As a result of this toxicity, the Northwest District requested that further bioassays be performed. A sample of effluent was collected from Champion's Outfall #001 on 28 April, 1986, and two 48 hour static bioassays were performed. At this time, the effluent was not toxic to the test organisms, Daphnia pulex and Notropis leedsi (FDER 1987). In April of 1987, the Biology Section received a sample collected from Champion's Outfall #001 and performed three static acute toxicity bioassays. At this time, the effluent was not toxic to the test organisms, Ceriodaphnia dubia, Daphnia pulex, or Notropis leedsi. (FDER 1987).

In October of 1987, the Biology Section received a sample collected from Champion's Outfall #001 and performed four static acute toxicity bioassays. Results are presented in this report. Those involved in performing the tests and in preparation of this report were: D. A. Chasteen, J. M. Faircloth, and K. M. Lurding.



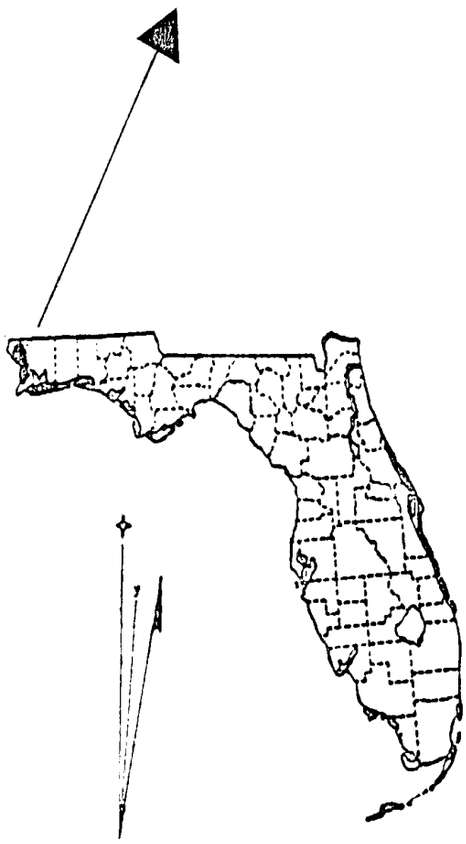
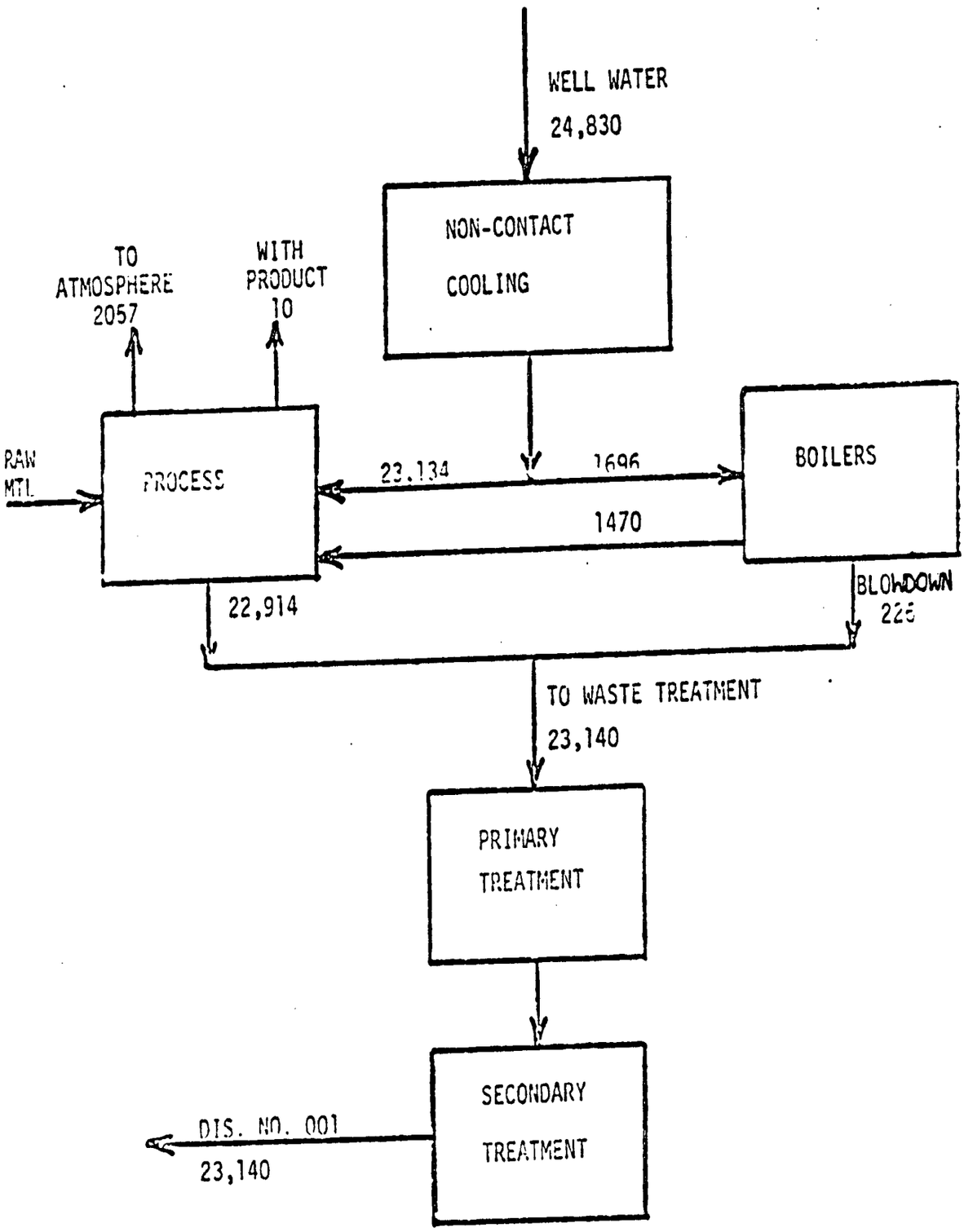


Figure 1. Portions of Escambia County, including the location of the Champion facility.



FLOW UNITS - 1000 GAL/DAY

Figure 2. SCHEMATIC OF WATER FLOW
ST. REGIS PAPER COMPANY
CANTONMENT
ESCAMBIA COUNTY
FLORIDA
JUNE 20, 1978

METHODS AND MATERIALS

Test methods used to conduct these static bioassays are extensively described by Peltier and Weber (1985) and the FDER Biology Section (1985). The organisms selected for this study include species recommended by Peltier and Weber (1985) and the FDER Biology Section (1985). Additionally, the Biology Section maintains cultures of several species of organisms indigenous to the State of Florida. One of these indigenous species was also selected for testing. Life histories of these test organisms and maintenance procedures used to culture them are detailed below.

The Microtox® assay was run according to the manufacturer's protocol described in the Microtox® System Operating Manual (Beckman 1982).

History and Maintenance of Bioassay Organisms

Daphnia pulex (water flea) - A breeding culture of Daphnia pulex was obtained from the EPA laboratory in Athens, Georgia, in June, 1987. This culture has been maintained since its arrival in 2 1/2 gallon all-glass aquaria, filled with unchlorinated DER well water, under a 16:8 hour light-dark cycle. Organisms are fed a liquified blend of Purina Trout Chow® and Cerophyl® twice daily, once daily on weekends, and are kept at a constant temperature of 22° ± 2°C. The aquaria are cleaned weekly by siphoning off half the water along with the detritus and excess organisms, and then refilling with fresh aerated well water. Additional measures are taken and/or new cultures started in the event of abnormal circumstances such as: declining populations, ephippia formation, or excessive fungal or bacterial growth.

Ceriodaphnia dubia (water flea) - A breeding culture of Ceriodaphnia dubia was obtained from the EPA laboratory in Athens, Georgia, in June, 1985. The culture is maintained in 2-1/2 gallon all-glass aquaria, filled with unchlorinated DER well water, under a 16:8 hour light-dark cycle. Organisms are fed a liquified blend of Purina Trout Chow®, Cerophyl® and Fleischmann's® yeast twice daily, once daily on weekends, and are kept at a constant temperature of 26° ± 2°C. The aquaria are cleaned weekly by siphoning off half the water along with the detritus and excess organisms, and then refilling with fresh aerated well water. Additional measures are taken and/or new cultures started in the event of abnormal circumstances such as: declining populations, ephippia formation, or excessive fungal or bacterial growth.

Pimephales promelas (fathead minnows) - A breeding culture of approximately 100 adult fathead minnows was obtained from the EPA laboratory in Cincinnati, Ohio, in May, 1979. This breeding population is augmented with fry hatched in our laboratory and with additional adult fish from EPA as required. The fish are maintained in all-glass aquaria (15 to 125 gallons), equipped with flow-through water exchange systems, using unchlorinated well water obtained from a deep well near the DER laboratory. The fathead minnows are reared at a temperature of 22° ± 2°C under a 16:8 hour light-dark cycle. These fish are fed Glencoe Mills "#3

size enriched trout fry granules" or Tetra-Min®, and frozen Artemia (brine shrimp) at a rate of 0.75g/30 fish, twice daily, and once daily on weekends. Breeding has been encouraged by placing several halved clay pots in each tank to serve as substrates for eggs and to provide cover for the fish. Tanks are examined twice daily (at feeding time) for egg production. Clay pots containing egg clusters are immediately transferred to 2-1/2 to 15 gallon aerated aquaria for hatching. A new aquarium is prepared for each week's production of eggs, thereby segregating fish into even age groups to be used for testing. After hatching, fathead minnow fry are fed twice daily with freshly hatched Artemia. The fish used in this test were 22 days old at the time of the test.

Notropis leedsi (bannerfin shiner) - Approximately 40 adult bannerfin shiners were obtained from an indigenous population in the upper Suwannee River during October, 1981. The breeding stock is maintained in 30 and 125 gallon all-glass aquaria equipped with a flow-through water exchange system. Water for this system is unchlorinated and is pumped from the DER deep well. The bannerfin shiners are reared at 22° ± 2°C under a 16:8 hour light-dark cycle and are fed Tetra-Min® and frozen Artemia (brine shrimp) twice daily, and once daily on weekends. Breeding and egg hatching are encouraged at 25°C. The eggs are laid between stacked red ceramic tiles separated by a 3mm bead of silicone. Most of the eggs adhere to the tiles and are easily removed to heated, aerated hatching tanks. The narrow space between the tiles eliminates egg predation by adult fish. New hatching tanks are started regularly to segregate fry into even age groups. Newly hatched fry are fed a liquefied blend of Purina Trout Chow® and Cerophyl® twice daily. After one week, feeding is augmented with newly hatched Artemia nauplii and finely crushed Tetra Min®. The fish used in this test were 26 days old at the time of the test.

Photobacterium phosphoreum, a luminescent marine bacterium, is maintained as a freeze-dried culture, purchased from Microbics Corporation. Lot number M-603 was used in this assay. Immediately prior to the assay, the culture is rehydrated with 1.0 ml of specially purified water (Microtox® Reconstitution Solution).

Standard Reference Toxicity Assays

To ensure the uniform sensitivity of these test organisms to toxic substances, the Biology Section conducts monthly standard reference toxicant bioassays using sodium lauryl sulfate as the reference toxicant.

Test Methods

Methods used to perform acute toxicity bioassays are described by Peltier and Weber (1985) and the FDER Biology Section (1985). Some of the methods described below are more specific than those of Peltier and Weber. These will be noted in more detail.

Sampling Methods and Test Dates

Four static acute toxicity bioassays were performed on a sample of effluent collected from Champion International Company's Outfall #001. The tests were conducted from 1100 hours on 27 October to 1100 hours on 29 October, 1987.

The sample was collected by Mr. Barry Long of DER's Northwest District Office at 0940 hours on 26 October, 1987, using standard wastewater sampling procedures. The sample was placed on ice and transported to the DER laboratory in Tallahassee for analyses within 26 hours of collection.

Test Temperature

Upon arrival of the iced (4°C) bioassay samples in the Tallahassee laboratory, the containers were placed in warm water and the temperature of the samples allowed to rise to 20° ± 2°C. Although this temperature may be different than the temperature of the sample during collection, it is the temperature range to which the test organisms are acclimatized and is the range recommended in the above referenced bioassay protocols. This avoids stressful effects caused by exposure to unusually cold or warm samples.

Freshwater Tests

Freshwater for dilution of the recovered water samples was obtained from the same DER deep well that is used to culture the test organisms. The concentration series selected for this study (Table 1) is that recommended by APHA (1980).

Two replicates, of each concentration and a control, were used to test with the water fleas, Ceriodaphnia dubia and Daphnia pulex. Flint glass jars of either 60 ml (for C. dubia) or 250 ml (for D. pulex) capacity were used as test chambers, and either 50 ml or 200 ml of the appropriate test concentration was placed in each chamber. Ceriodaphnia were siphoned into a large culture dish and neonates were transferred by glass pipette, and loaded 10 per chamber, resulting in 20 per test concentration. Daphnia were siphoned into a large culture dish to isolate the proper size and age organisms (neonates). To accomplish this, the Daphnia were siphoned through a stainless steel screen. The trapped adults were then discarded. These neonates were then transferred by glass pipette, examined for injury, and were loaded 10 per chamber, resulting in 20 per test concentration. Water fleas were not fed during these tests.

Two replicates, of each concentration and a control, were used for the Pimephales promelas (fathead minnow) and the Notropis leedsi (bannerfin shiner) bioassay. The fish were transferred individually or by twos, into wide mouth quart jars containing 500 ml each of the appropriate test concentration, and were loaded 5 per chamber, resulting in 10 per concentration. Fish were not fed during these tests.

Test Parameters

Dissolved oxygen (YSI Model 57 oxygen meter), pH (Corning Model 7 pH meter with Orion Ross® combination electrode), temperature (NBS calibrated glass thermometer), and the number of live organisms were recorded for each test concentration at 0 hours, 24 hours, and 48 hours. Total alkalinity and total hardness (measured as $CaCO_3$ using HACH Chemical Company reagents) were recorded at the beginning of the test for the controls and the 100% sample concentration. The specific conductance (YSI Model 33 S-C-T meter) of each test concentration was recorded at the beginning and end of the test. All instruments were calibrated daily according to manufacturer's recommendations. Ammonia concentrations, including the total and unionized fraction (expressed in mg/l as N and as NH_3, respectively), were recorded in the controls and the 100% sample concentration at the beginning of the test. Total ammonia concentrations were determined using an Orion® specific ion probe and an Orion Ionalyzer®. The unionized fraction was then calculated based on the total ammonia concentration, and the pH, temperature, and salinity of the sample. These values were recorded on the bioassay data forms and are presented in Table 2.

Microtox® Test

Upon receipt at the DER laboratory, a 20 ml subsample was collected in a small beaker. The sample was adjusted to 2% salinity with reagent grade dry sodium chloride to maintain the osmotic balance of the test bacterium during the assay. Four two fold dilutions were made of the test sample resulting in a test range of 97%, 49.5%, 24.75%, 12.38%, and 0%. An incubation temperature of 15°C was maintained throughout the assay. Ten microliters of bacterial suspension was added to each of the 1.0 ml test dilutions. Light output (luminescence) was read after 5 and 15 minutes incubation, using the Microtox® analyzer and recorded on a Perkin-Elmer strip chart recorder. In the presence of a toxicant, the luminescence of the test organisms will decrease. In the presence of a stimulant, the luminescence will increase. Toxicity is calculated as a function of the light lost in the test sample, normalized to the control, and is reported as the effective concentration at which a 50% reduction, of light output is determined in 15 minutes (EC_{50}). Results are given in Table 3.

RESULTS AND DISCUSSION

The sample of effluent collected from Champion International Company's Outfall #001 was not acutely toxic to the test organisms, Ceriodaphnia dubia, Daphnia pulex, Notropis leedsi, and Pimephales promelas. No mortality occurred during the 48 hour C. dubia, N. leedsi and P. promelas tests, and only two organisms died in the D. pulex bioassay (Table 2). The sample exhibited slight toxicity of an unknown nature to the test organism Photobacterium phosphoreum (Table 3) used in the Microtox® Assay producing an EC_{50} = 99.5% sample. The ammonia measured in this effluent (0.467 mg/l total and 0.02 mg/l unionized) was insufficient to have caused any toxicity. Because the sample was not acutely toxic, chemical analyses were not performed.

Table 1. Concentration Series and Volumes Used for These Static Bioassays.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	50.0 ml	--------	50 ml
50.0%	25.0 ml	25.0 ml	50 ml
100.0%	--------	50.0 ml	50 ml

Daphnia pulex (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	200.0 ml	--------	200 ml
50.0%	100.0 ml	100.0 ml	200 ml
100.0%	--------	200.0 ml	200 ml

Pimephales promelas (fathead minnow)

Notropis leedsi (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 ml	--------	500 ml
50.0%	250 ml	250 ml	500 ml
100.0%	------	500 ml	500 ml

Table 2. Data recorded during 48 hour Ceriodaphnia dubia, Daphnia pulex, Notropis leedsi, Pimephales promelas, static acute toxicity bioassays of Champion International Company, Cantonment, Escambia County, NPDES #FL0002526, on 27 to 29 October, 1987.

Facility:	Champion International Corporation			NPDES # FL0002526		Facility Type:	Industrial
Location:	Escambia County			Contact/District:	Bob Brazzell/NW		
Sample Collection Date:	10/26/87	Time:	940	Test type:	Static Screening		
Test Beginning Date:	10/27/87	Time:	1100	# tests	4		
Test Ending Date:	10/29/87	Time:	1100	Chlorination Type:	Non-chlorinated	Receiving Water:	Eleven Mile Creek

Parameter		
Total Residual Cl2:	0	
Method:	Hach	
By:	DAC	
Ammonia:	Control Water	100% Sample
Unionized NH3:		0.02
Total NH3:	0	0.467

Organism: ***Ceriodaphnia dubia*** Age/Life stage: Neonates
LC50: Binomial: Moving Average: Probit:
non-toxic

Concentrations	SURVIVAL # at 0 hour	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	10	10	10	8.7	8.1	8.8	7.8	8	7.9	21.8	19	19.3		
Control	10	10	10	8.7	8.4	8.8	7.8	8	8					
50%	10	10	10	8.2	8.2	8.3	7.9	8.2	8.2	22.3	18.8	19.1		
50%	10	10	10	8.1	8.1	8.3	7.8	8.3	8.2					
100%	10	10	10	8.1	8.2	8.3	7.9	8.4	8.5	21.9	18.9	19.1		
100%	10	10	10	8	8.1	8.3	7.9	8.4	8.5					

	Control water	100% sample
Alkalinity:	124	310
Hardness:	132	170

Organism: ***Notropis leedsi*** Age/Life stage: 26 Days
LC50: Binomial: Moving Average: Probit:
non-toxic

Concentrations	SURVIVAL # at 0 hour	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	8.5	8.1	8.1	7.4	8.1	7.7	20.5	18.7	18.8		
Control	5	5	5	8.5	8.3	8	7.4	7.9	7.7				222	212
50%	5	5	5	8.4	7	7.6	7.7	8	8	20.5	18.8	18.7		
50%	5	5	5	8.4	7.2	7.6	7.7	8	8				1100	1100
100%	5	5	5	8.1	6.6	6.9	7.8	8.1	8.2	20.5	18.8	18.7		
100%	5	5	5	8.1	6.7	7	7.8	8.1	8.2				1900	1910

	Control water	100% sample
Alkalinity:	116	310
Hardness:	119	170

Organism: ***Daphnia pulex*** Age/Life stage: Neonates
LC50: Binomial: Moving Average: Probit:
non-toxic

Concentrations	SURVIVAL # at 0 hour	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	10	10	10	8.8	8.5	8.9	7.9	8.1	8	19.4	18.9	18.9		
Control	10	9	9	8.8	8.7	8.9	7.9	8	8					
50%	10	10	10	8.8	8	8.7	7.8	8.2	8.2	19.4	18.9	18.9		
50%	10	10	10	8.7	8	8.6	7.8	8.2	8.3					
100%	10	9	9	8.1	7.9	8.6	7.9	8.4	8.5	19.7	18.8	18.7		
100%	10	10	10	8.1	7.9	8.6	7.9	8.4	8.5					

	Control water	100% sample
Alkalinity:	124	310
Hardness:	132	170

Organism: ***Pimephales promelas*** Age/Life stage: 22 days
LC50: Binomial: Moving Average: Probit:
non-toxic

Concentrations	SURVIVAL # at 0 hour	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	8.5	7.8	7.8	7.4	7.8	7.7	20.6	19.2	18.9		
Control	5	5	5	8.5	7.4	7.8	7.4	7.8	7.7				210	220
50%	5	5	5	8.5	6.9	7.4	7.7	7.9	7.9	20.6	18.5	18.6		
50%	6	6	6	8.4	6.2	7.5	7.7	7.9	7.9				1100	1080
100%	5	5	5	8.1	6.4	7.2	7.8	8	8.2	20.6	18.7	18.6		
100%	5	5	5	8.1	6.5	7.2	7.9	8.1	8.2				1910	1900

	Control water	100% sample
Alkalinity:	116	310
Hardness:	119	170

Table 3. Microtox test results, Champion International Company discharge, Escambia County, NPDES #FL0002526 on 27 October, 1987.

Microtox Test Culture Lot # M-603

Final Reclaimed Water

% Sample	Non-chlorinated	
	5-min	15-min
0	90	61
0	94	64
0	94	63
12.38	96	67
12.38	87	63
12.38	85	57.5
24.75	87	61
24.75	88	60
24.75	78	53
49.5	76	53
49.5	75	53
49.5	76	53
99	61	43
99	64	45
99	63	43

EC50 Non-chlorinated (15 minute, 15 degrees C) = 99.5% sample

EC50 (15 minute, 15 degrees C) is calculated using the Data Reduction Computer Program developed by Microbics Corporation for the Sharp Model EL-5100 (Microbics) Systems Operating Manual, 1982.

LITERATURE CITED

Beckman Instruments, Inc. 1982. Microtox System Operating Manual.

Florida Department of Environmental Regulation, Biology Section. 1985. Quality Assurance Manual for Performing Acute Toxicity Tests (Second Edition). FDER.

_____. 1987. Bioassays of Champion Paper Company Cantonment, Escambia County, Florida. NPDES #FL0002526. FDER. 10 p.

Peltier, W. and C. I. Weber. 1985. Methods for measuring the acute toxicity of effluents to aquatic organisms (Third Edition). Environmental Research Laboratory. Athens, Georgia. EPA-600/4-85-012. 217 p.

Laboratory/Applicant: Champion Int'l Corp.
Address:
Contact/District: NW - Bob Brazzell
Effluent Serial Number:
NPDES Permit Number: FL0027529

SURVEILLANCE DATA FORM

Test Number: 1 of 3&4
Test Type: Static Renewal Screening Conventional
Other:

Sample Collection: Date 10-26-87 Time 0940
Test Beginning: Date 10-27-87 Time 1100
Test Ending: Date 10-31-87 Time 1100
Test Organism: Ceriodaphnia dubia
Age/Life Stage: neonates

Conc. or %	Test Container Number	Number of Live Organisms 0	24	48	72	96	Dissolved Oxygen (mg/l) 0	24	48	72	96	pH 0	24	48	72	96	Temperature °C 0	24	48	72	96	0	24	48	72	96
Control	71	10	10	10			8.7	8.4	8.8			7.8	8.0	7.9			21.8	19.0	18.3							
Control	85	10	10	10			8.7	8.4	8.8			7.8	8.0	8.0												
50%	91	10	10	10			8.2	8.2	8.3			7.7	8.2	8.2			22.3	18.8	19.1							
50%	83	10	10	10			8.1	8.1	8.3			7.8	8.3	8.2												
100%	65	10	10	10			8.1	8.2	8.3			7.9	8.4	8.5			21.9	18.9	19.1							
100%	63	10	10	10			8.0	8.1	8.3			7.9	8.4	8.5												
Initial of Investigator		DAC	DAC	JMF			UNF	DAC	JMF			UNF	DAC	JMF			UNF	DAC	JMF							

Alkalinity/Hardness (mg/l as $CaCO_3$)
Control Water: 124/1
100% Sample: 310/1
Other:
Measured by: DAC

Ammonia unionized/tot
(mg/l as NH_3/N)
Hour 0
.467 Total NH_3
Control Water: 0.0
100% Sample: .467
Other:

Hour ____
Control Water:
100% Sample:
Other:
Measured by: RBF

Signatures:
David Austin
Linda Sing
Joseph M Faircloth

Instrument Calibrations:

	pH Meter:	DO Meter:	S-C-T Meter:
0 Hours	7.07 9.09	9.2 @ 20°C	10:10 28:32
24 Hours	7.07 9.09	9.2 @ 20°C	
48 Hours	7.07, 9.09	9.1 @ 20.5°C	10:10, 29:30
72 Hours			
96 Hours			

Remarks:

Total Residual Chlorine:
Field data: ____ Method: ____
Lab: 0.0 Method: Hach D
Lab: ____ Method: ____
Reviewed by:
De-chlorinated:
Measurements by: DAC
Date: 11/9/87

Industry/Toxicant Champion Intl. Corp.
Address
Contact/District NW - Bob Brazzell
Effluent Serial Number
NPDES Permit Number

BIOASSAY DATA FORM

Test Number: 2 of 4
Test Type: (Static) Renewal, (Screening) Conventional
Other:

Sample Collection: Date 10/26/87 Time 0900
Test Beginning: Date 10/27/87 Time 1100
Test Ending: Date 10-29-87 Time 1100
Test Organism Daphnia pulex
Age/Life Stage 1

Conc. or %	Test Container Number	Number of Live Organisms 0	24	48	72	96	Dissolved Oxygen (mg/l) 0	24	48	72	96	pH 0	24	48	72	96	Temperature °C 0	24	48	72	96					
Control	72	10	10	10			5.8	8.5	8.9			7.9	8.1	8.0			19.4	18.9	18.9							
Control	57	10	9	9			5.8	8.7	8.9			7.9	8.0	8.0												
50%	132	10	10	10			5.8	8.0	8.7			7.8	8.2	8.2			19.4	18.9	18.9							
50%	66	10	10	10			5.7	8.0	8.6			7.8	8.2	8.3												
100%	49	10	9	9			5.1	7.9	8.6			7.9	8.4	8.5			19.7	18.8	18.7							
100%	5	10	10	10			5.1	7.9	8.6			7.9	8.4	8.5												
Initial of Investigator		JMF DAC JMF					JMF DAC JMF					JMF DAC JMF					JMF DAC JMF									

Alkalinity/Hardness (mg/l as $CaCO_3$)
Control Water: 124/132
100% Sample: 310/170
Other:
Measured by: DAC

Ammonia unionized/total (mg/l as NH_3/N)
Hour 0
Control Water:
100% Sample:
Other:
Hour
Control Water:
100% Sample:
Other:
Measured by:

Signatures:
David Chaston
H M Lurding
Joseph Foindexter

Instrument Calibrations:

	pH Meter:	DO Meter:	S-C-T Meter:
0 Hours			
24 Hours			
48 Hours			
72 Hours			
96 Hours			

Total Residual Chlorine:
Field data: Method:
Lab: Method:
Lab: Method:
De-chlorinated:
Measurements by:

Reviewed by:
Date: 1/19/88

Remarks: volume reduced by half (rooms) to be able to count bugs in the toxic effluent. Not enough volume to fit conductivity probe

Facility/Applicant: Champion Int'l. Corp.
Address:
Contact/District: NW-Ed Brazzell
Effluent Serial Number:
NPDES Permit Number:

ACUTE BIOASSAY DATA FORM

Test Number: 3 of 4
Test Type: (Static) Renewal, (Screening) Conventional
Other:

Sample Collection: Date 10/24/87 Time 0940
Test Beginning: Date 10/27/87 Time 1100
Test Ending: Date 10/31/87 Time 1100
Test Organism: Mysidopsis bahia
Age/Life Stage: 1-36 days

Conc. or %	Test Container Number	Number of Live Organisms 0	24	48	72	96	Dissolved Oxygen (mg/l) 0	24	48	72	96	pH 0	24	48	72	96	Temperature °C 0	24	48	72	96	Conductivity (umhos) 0	24	48	72	96
Control	13	5	5	5			8.5	8.1	8.1			7.4	8.1	7.7			20.5	18.7	18.8							
Control	23	5	5	5			8.5	8.3	8.0			7.4	7.9	7.7								222		212		
50%	68	5	5	5			8.4	7.8	7.6			7.7	8.0	8.0			20.5	18.8	18.7							
50%	63	5	5	5			8.4	7.2	7.6			7.7	8.0	8.0								1100		1100		
100%	239	5	5	5			8.1	6.6	6.9			7.8	8.1	8.2			20.5	18.8	18.7							
100%	2	5	5	5			8.1	6.7	7.0			7.8	8.1	8.2								1900		1910		
Initial of Investigator		KAH	DAC	KAH			JMF	DAC	JMF			JMF	DAC	JMF			JMF	DAC	JMF			JMF		JMF		

Alkalinity/Hardness (mg/l as $CaCO_3$)
Control Water: 116/119
100% Sample: 310/320
Other:
Measured by: DAC

Ammonia unionized/total (mg/l as NH_3/N)
Hour 0
Control Water: 0.0
100% Sample: 0.467
Other:

Hour ____
Control Water:
100% Sample:
Other:
Measured by: RBF

Signatures:
Ed Brazzell
F.M. Lording
Joseph M. Landolt

Instrument Calibrations:

	pH Meter:	DO Meter:	S-C-T Meter:
0 Hours			
24 Hours			
48 Hours			
72 Hours			
96 Hours			

Remarks:

Total Residual Chlorine:
Field data: ____ Method: ____
Lab: ____ Method: ____
Lab: ____ Method: ____

De-chlorinated:
Measurements by: ____

Reviewed by: [signature]
Date: 1/19/88

Industry/Toxicant Champion Int'l Corp
Address
Contact/District NW
Effluent Serial Number
NPDES Permit Number

BIOASSAY DATA FORM

Test Number: 4 of 4
Test Type: (Static) Renewal, (Screening) Conventional
Other:

Sample Collection: Date 10/26/87 Time 0900
Test Beginning: Date 10/27/87 Time 1100
Test Ending: Date 10-31-87 Time 1100
Test Organism Pimephales promelas
Age/Life Stage 1-2 days

Conc. or %	Test Container Number	Number of Live Organisms 0	24	48	72	96	Dissolved Oxygen (mg/l) 0	24	48	72	96	pH 0	24	48	72	96	Temperature °C 0	24	48	72	96	Conductivity (umhos) 0	24	48	72	96
Control	32	5	5	5			8.5	7.8	7.8			7.4	7.8	7.7			20.6	18.2	18.9							
Control	50	5	5	5			8.5	7.4	7.8			7.4	7.8	7.7								210		220		
50%	37	5	5	5			8.5	6.9	7.4			7.7	7.9	7.9			20.6	18.5	18.6							
50%	76	6	6	6			8.4	6.2	7.5			7.7	7.9	7.9								1100		1080		
0%	51	5	5	5			8.1	6.4	7.2			7.8	8.0	8.2			20.6	18.7	18.6							
100%	42	5	5	5			8.1	6.5	7.2			7.9	8.1	8.2								1910		1900		
Initial of Investigator		KAL	DAC	KAL			JMF	DAC	JMF			JMF	DAC	JMF			JMF	DAC	JMF			JMF		JMF		

Alkalinity/Hardness (mg/l as $CaCO_3$)

Control Water:
100% Sample:
Other:
Measured by:

Ammonia unionized/total (mg/l as NH_3/N)
Hour 0

Control Water:
100% Sample:
Other:

Hour

Control Water:
100% Sample:
Other:
Measured by:

Signatures:
David Charles
K. McLendon
Joseph McFarlett

Instrument Calibrations:

	pH Meter:	DO Meter:	S-C-T Meter:
0 Hours			
24 Hours			
48 Hours			
72 Hours			
96 Hours			

Remarks:

Total Residual Chlorine:

Field data: Method:
Lab: Method:
Lab: Method:

De-chlorinated:
Measurements by:

Reviewed by:
Date: 12/19/88

MICROTOX™ Data Reduction Sheet

SOURCE: Champion Paper Co

GRAPH / CALC EC 50 (15 MIN, 15 °C) = 99.5 (%SAMPLE) mg/L

SAMPLE DATA:

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

DATE ASSAYED: 10-27-87 TIME: 9:45

VISUAL COLOR: pale yellow 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: none

OPERATOR: Sara Williams REAGENT VIAL LOT NO. M-606

REMARKS: no residual

MICROTOX™ 99% TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES
A1 B1 C1	0	90 94 94	61 64 63	X	X	
A2 B2 C2	12.38	96 87 85	67 63 57.5	.04	.003	
A3 B3 C3	24.75	87 88 78	61 60 53	.10	.08	
A4 B4 C4	49.5	76 73 76	53 53 53	.22	.18	
A5 B5 C5	99	61 64 63	43 45 43	.48	.44	
EC_{50} (MIN, °C)				179.5	99.5	

REVIEWED BY:

DATE: 11/19/87