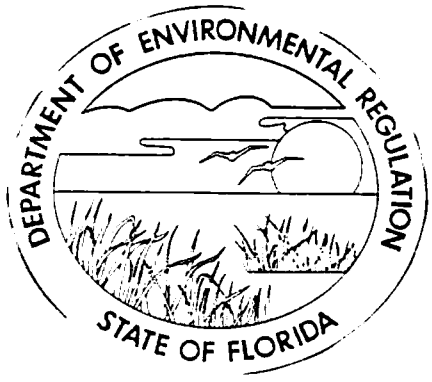


BIOASSAY OF NITRAM CHEMICALS, INCORPORATED

HILLSBOROUGH COUNTY, FLORIDA

NPDES PERMIT # FL0001643

Biological Section
Bureau of Water Analysis
22 April 1980

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INTRODUCTION

Nitram Chemicals, Incorporated, is located at 5321 Hartford Street in Tampa, Florida (Figure 1). This company discharges an average of 0.45 MGD wastewater from outfall #001 to a canal, and then to Delaney Creek which flows into Hillsborough Bay (Figure 2).

Nitram Chemicals began operation in 1963, producing up to 1200 tons/day of ammonium nitrate fertilizer. The company operates two ammonium prilling plants and two nitric acid plants in the manufacturing process. The daily plant operation requires 1.10 MGD intake water. After its use, this water is split into domestic wastewater and process wastewater prior to treatment (Figure 3). Sanitary wastewater (0.002 MGD) is routed through a package sewage treatment plant and then to complete retention in an evaporation pond. Process wastewater, consisting of noncontact cooling and boiler blowdown water (0.45 MGD), is temporarily retained on site in a holding pond. Treatment includes a diversion system for the retention of contaminants and an ammonium/ammonium nitrate recovery system prior to discharge to Delaney Creek.

Noncompliance with NPDES permit specifications was noted on 29 November 1974 when Nitram, Inc., received a Notice of Violation for exceeding the maximum pH limit in its effluent. Potentially toxic substances in the discharge water may include: chromium; zinc, oil and grease, ammonium, nitrate,nitrite, and chlorine.

On 22 April 1980 the Biological Section obtained effluent samples from Nitram Chemicals, Inc., outfall #001 and performed a static bioassay to determine the existence and extent of toxicity to the biota of the receiving waters.

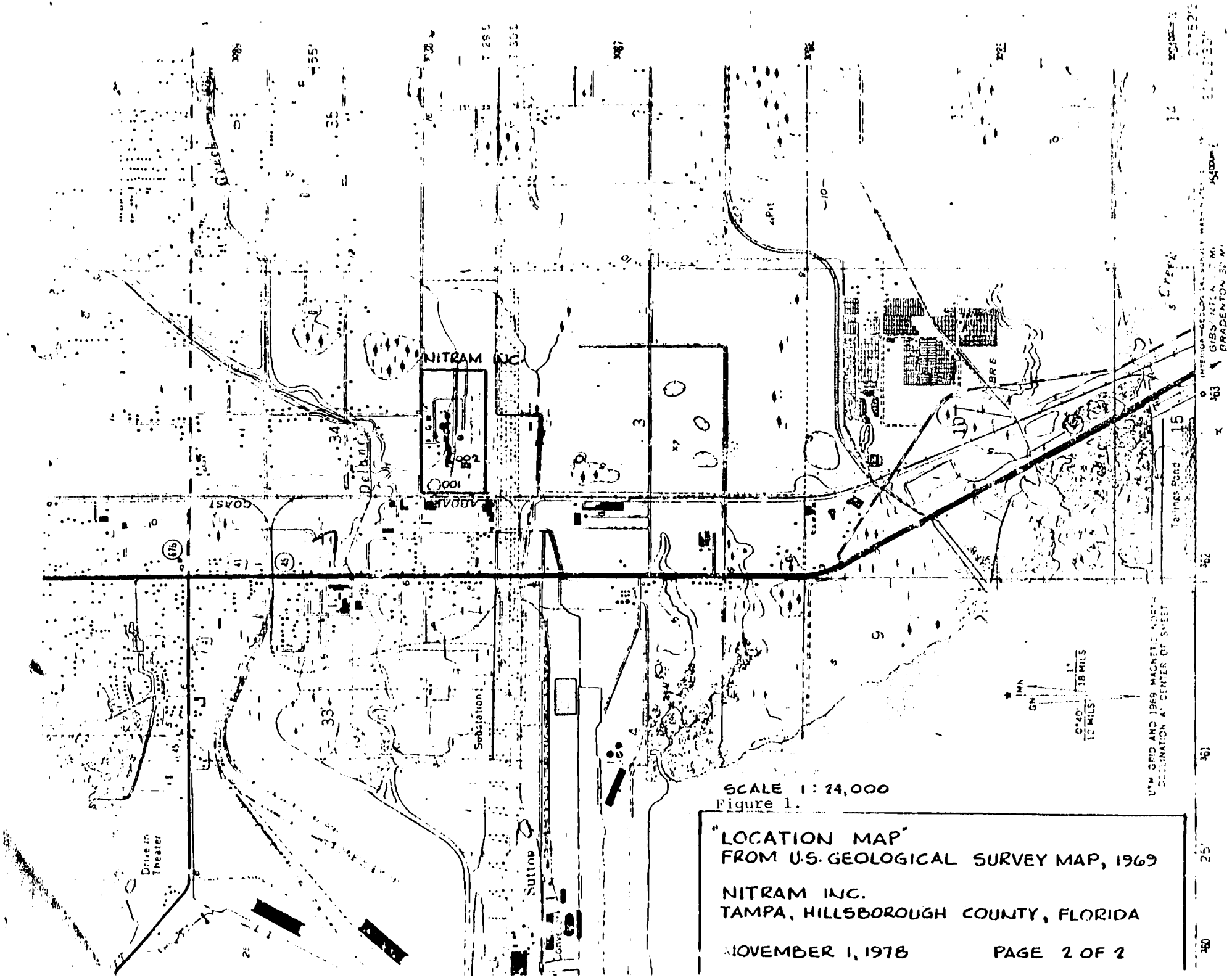


Figure 1.

"LOCATION MAP"
FROM U.S. GEOLOGICAL SURVEY MAP, 1969

NITRAM INC.
TAMPA, HILLSBOROUGH COUNTY, FLORIDA

NOVEMBER 1, 1978 PAGE 2 OF 2

ATTACHMENT A-1

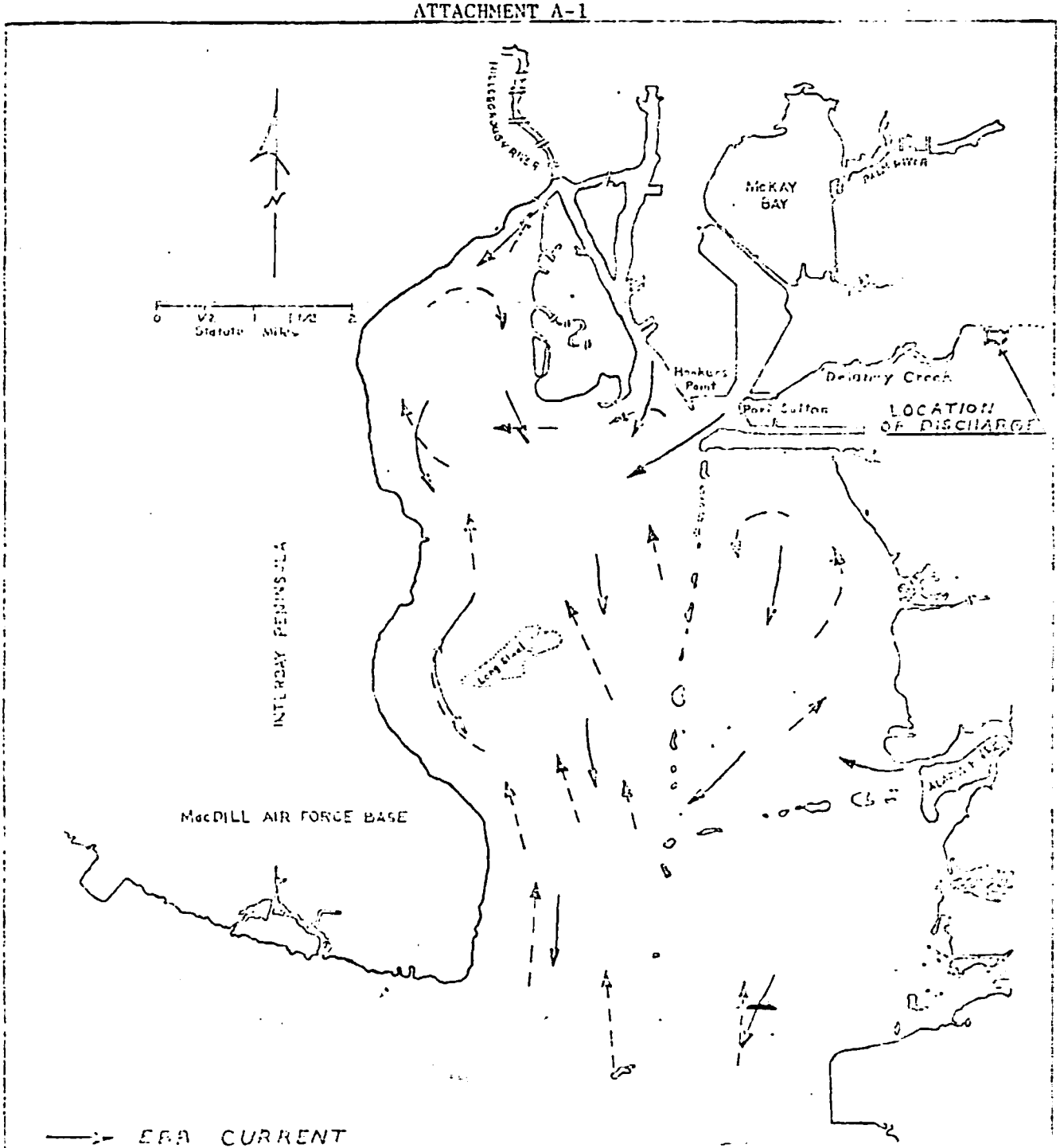


Figure 2.

EXISTING DISCHARGE
HILLSBOROUGH BAY
at DELANEY CREEK
HILLSBOROUGH CO., FLA.
by NITRAM CHEMICALS
6-28-71 SHEET 1 of 2

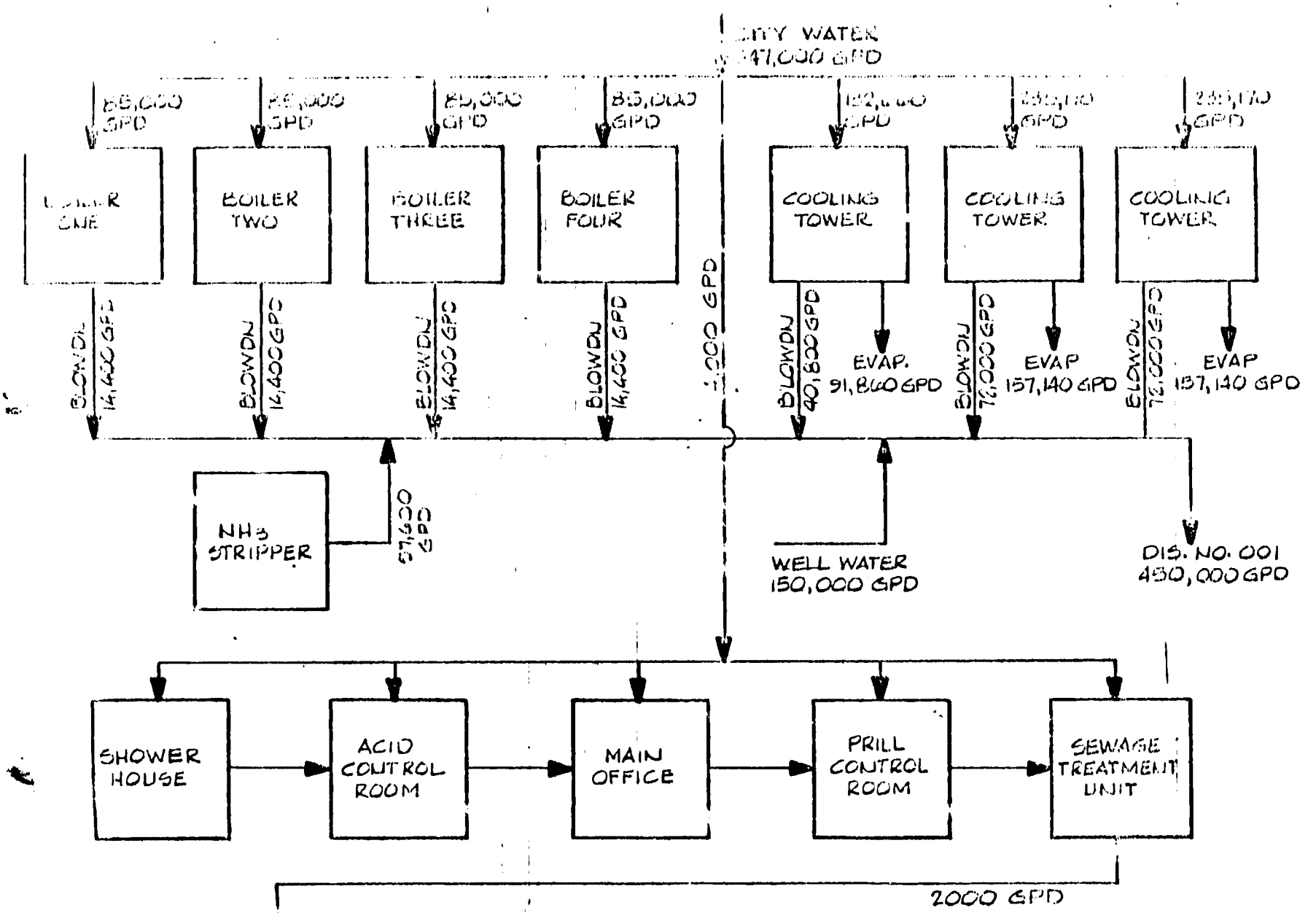


Figure 3.

SCHEMATIC OF WATER FLOW

NITRAM INC.
TAMPA, HILLSBOROUGH COUNTY, FLORIDA

NOVEMBER 1, 1978 PAGE 1 OF 2

METHODS AND MATERIALS

Test methods used for conducting this static bioassay are extensively described by Peltier (1978). The organism selected for this study is among those recommended by Peltier (1978) and the U.S. EPA (1978). The life history of this test organism and maintenance procedures used to culture it are detailed below.

History and Maintenance of Bioassay Organisms

A breeding culture of Daphnia pulex (water flea) was obtained from the EPA laboratory in Athens, Georgia on March 9, 1979. This culture has been maintained since its arrival, in 2½ gallon all glass aquaria using a 16:8 hour light-dark cycle. Organisms have been fed a liquified blend of Purina Trout Chow ® and Cerophyl ® twice daily. Daphnia used in this bioassay were siphoned into a large culture dish through a series of nested stainless steel screens to isolate the proper size and age organisms (neonates). These neonates were then pipetted individually from the culture dish and placed into the test chambers at the beginning of the test.

Test Methods

A 48 hour static bioassay was conducted from 1400 hours on 22 April to 1400 hours on 24 April 1980 on a grab sample of effluent from outfall #001. The sample was collected by Mr. Steve Palmer of the Bureau of Water Analysis at 1525 hours on 21 April 1980, using standard wastewater sampling procedures. The unpreserved sample was iced and transported to the DER laboratory in Tallahassee within 24 hours of collection.

Fresh water for dilution of the effluent sample was obtained from the same City of Tallahassee well that is used to culture the test organisms. The concentration series selected for this study are those recommended by APHA (1976) (see Table 1).

Two replicates, each with six concentrations of effluent and a control, were used in this static test. Flint glass jars of 250 ml capacity were used as test chambers and 200 ml of the appropriate test concentration was placed in each chamber. Daphnia were transferred individually by glass pipette and were loaded 10 per chamber, resulting in 20 per test concentration.

Dissolved oxygen, pH, and the number of live organisms were recorded for each test chamber at 0 hours, 24 hours, and 48 hours. Total alkalinity and total hardness were recorded at the beginning of the test for the controls and the 100% effluent concentration. These values were recorded daily on the bioassay data forms and are presented in Table 2. Organisms were not fed during this test.

Table 1.

Concentration Series and Volumes used for this Static Bioassay

CONCENTRATION	DILUTION WATER	EFFLUENT	TOTAL VOL.
Control	200 ml	-	200 ml
5.6%	189 ml	11 ml	200 ml
10.0%	180 ml	20 ml	200 ml
18.0%	164 ml	36 ml	200 ml
32.0%	136 ml	64 ml	200 ml
56.0%	88 ml	112 ml	200 ml
100 %	-	200 ml	200 ml

Table 2. . Data recorded during 48 hour, Daphnia pulex, static acute toxicity bioassay performed on Nitram Chemicals, Inc., Tampa, Hillsborough County, Florida. 22 April to 24 April 1980. NPDES Permit #FL0001643. Outfall #001.

Conc. or %	Test Container Number	Number of Live Organisms					Dissolved Oxygen (mg/l)					pH					Total Alkalinity (mg/l as $CaCO_3$)					Total Hardness (mg/l as $CaCO_3$)					Conductivity (Umhos/cm)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Control	A	10	10	8			94	89	88			7.9	7.7	7.7			120					128									
Control	B	10	10	10			93	89	87			7.9	7.7	7.7																	
5.6%	A	10	10	10			94	90	88			7.8	7.6	7.7																	
5.6%	B	10	10	10			94	90	88			7.8	7.6	7.7																	
10.0%	A	10	10	10			93	90	87			7.75	7.6	7.7																	
10.0%	B	10	10	10			94	90	87			7.8	7.6	7.8																	
18.0%	A	10	10	10			93	90	86			7.75	7.6	7.7																	
18.0%	B	10	10	10			93	90	86			7.75	7.6	7.7																	
32.0%	A	10	10	10			92	90	87			7.7	7.5	7.7																	
32.0%	B	10	10	10			91	89	87			7.7	7.5	7.7																	
56.0%	A	10	10	10			88	89	87			7.6	7.5	7.7																	
56.0%	B	10	10	10			87	89	87			7.6	7.5	7.7																	
100%	A	10	10	10			83	88	86			7.5	7.4	7.6			130					485									
100%	B	10	10	10			82	88	85			7.4	7.4	7.6																	

Remarks: 1. Test temperature range 22.0 to 23.5°C.

RESULTS AND DISCUSSION

This effluent sample from Nitram, Incorporated, proved to be non-toxic to *Daphnia pulex*.

LITERATURE CITED

American Public Health Association. 1976. Standard Methods for the Examination of Water and Wastewater. 14th ed. pp. 1193.

Peltier, William. 1978. Methods for measuring the acute toxicity of effluents to aquatic organisms. Environmental Research Laboratory. Athens, Georgia. EPA-600/4-78-012 (Revised July 1978) 51p.

U.S. Environmental Protection Agency. 1978. Bioassay procedures for the Ocean Disposal Permit Program. Environmental Research Laboratory. Gulf Breeze, Florida. EPA-600/9-78-010.