

JOB REPORT

R. Marek, Jr.  
Marine Chemist

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Name of Project: Industrial Waste Control in Region MP-1

Period Covered: June 31, 1958 through June 31, 1959. Job No: F-3-e

Bio-assay and Chemical Analysis of East Texas Pulp  
and Paper Company's Waste Waters, Evadale, Texas

Abstract: East Texas Pulp and Paper Company started production in December, 1954, and has been having waste control problems from the start. Wastes from the mill have contaminated all of East Canal, Lake Bayou, and, on occasions, sections of the Neches River. Four pollution complaints have been filed against the pulp company since they began operations, the latest one filed in August, 1958. Company officials have announced that several methods of treatment are being investigated but no progress appears to have been made so far.

Objectives: To determine pollutional effects of paper mill wastes to receiving waters. To determine toxic limits to aquatic life and chemical compounds present. Encourage East Texas Pulp and Paper Company to correct their waste problems as soon as possible.

Procedure: Sampling stations were established in Lake Bayou and the Neches River and at the plant site. Periodic sampling trips were made and the water samples were brought back to the Seabrook Laboratory for analysis. Several meetings with plant officials were held to discuss our findings and to promote corrective measures.

Findings: East Texas Pulp and Paper Company produces daily some 330 tons of pulp and paper by the Kraft process. Approximately 18,000,000 gallons of waste waters are discharged to the Neches River daily. The wastes reach the Neches via a 14 mile effluent canal constructed from the mill to a 5,000 acre swamp area. From the swamp area the wastes flow down East Canal into Lake Bayou and finally into the Neches River, a total distance of approximately 20 miles.

The wastes receive no treatment other than three large settling basins (12,000,000 gallons total capacity) one of which is usually being drained and cleaned. These settling basins allow some of the solids and pulp fibers to settle out before the wastes are dumped into the effluent canal. There is some stabilization of the wastes in its journey down the 14 mile canal and the swamp area, however, the waters still have their high oxygen consuming qualities, foul disagreeable odors, black color and toxic materials. (SEE ATTACHED CHEMICAL AND TOXICITY DATA).

As a result all of East Canal, Lake Bayou and its tributaries are polluted by pulp mill wastes to such an extent that it is unfit for marine and aquatic life. During low tides the polluted waters from Lake Bayou are pulled out into the Neches River and makes it unfit for aquatic life and recreation. Warden Clarence Beezley filed 3 pollution charges against the pulp company in 1955 and Warden R.Z. Finchum filed one in 1958. Plant management was warned on many occasions to correct their waste problems and the Game and Fish Commission was assured something would be done to correct the situation. However, to date no evidence of improvement in the polluted area exists.

Comments: Pulp and paper wastes are very difficult to treat and apparently little has been done on treatment of such wastes.

Public sentiment and a constant drive by enforcement agencies should speed up pollution abatement practices by pulp industries.

Prepared by R. Marek, Jr.

Approved by:

*Howard T. Lee*  
Howard T. Lee

Marine Chemist

Date Approved:

7 August 1959

Table I

East Texas Pulp and Paper Company,

July 17, 1958

Stations	pH	Tannins*	Dissolved Oxygen
#A High BOD (At Plant)	8.3	800	0.0
#B Settable Solids Pond (At Plant)	5.1	20	0.0
#C Bleach Water (At Plant)	2.3	--	0.0
#1 Effluent - Channeling through swamp into Lake Bayou tributaries	6.2	160	0.0
#2 Junction East Canal and Lake Bayou	6.3	8	2.9
#3 Lake Bayou (Wide Part)	6.2	85	0.0
#4 200 yards up Lake Bayou from Neches River	6.3	6	4.0
#5 100 yards below mouth of Lake Bayou in Neches River	6.1	7	5.0
#6 100 yards above mouth of Lake Bayou in Neches River	6.1	6	4.5

\*Includes tannins, lignins and aromatic hydroxyl compounds as tannic acid.

Table II

East Texas Pulp and Paper Co., Evadale, Texas,

June 31, 1958

Ten Mile Bayou Station (Comparison Station)

One Mile up Tenmile Bayou D.O. = 5.2 ppm

Lake Bayou Stations:

#1. Effluent channeling through swamp into Lake Bayou tributaries	D.O. = 0.0 ppm
#2. Junction East Canal and Lake Bayou	D.O. = 5.8 ppm
#3. Lake Bayou (wide part)	D.O. = 0.0 ppm
#4. Two Hundred yards up Lake Bayou from Neches River	D.O. = 6.1 ppm
#5. One Hundred yards below mouth of Lake Bayou in Neches River	D.O. = 6.2 ppm
#6. One hundred yards above mouth of Lake Bayou in Neches River	D.O. = 6.2 ppm

Table III

Toxicity of East Texas Pulp and Paper Company's Waste Waters from  
Plant Ponds August 26, 1958

Species	Concentration	Physiological Observations
5 Black Bass ( <u>Micropterus salmoides</u> )	Control	All alive and O K after 24 hours
5 Black Bass ( <u>Micropterus salmoides</u> )	100%	Extreme irritation noted immediately. All fish became extremely violent. All tried to jump out of test jars. All dead within 5 minutes.
5 Black Bass ( <u>Micropterus salmoides</u> )	75%	Same as 100% concentration except all died within 8 minutes.
5 Black Bass ( <u>Micropterus salmoides</u> )	50%	Extreme irritation noted after 2 minutes. All dead within ten minutes.
5 Black Bass ( <u>Micropterus salmoides</u> )	25%	Discomfort noted after 10 minutes. All dead within 2 hours.

Table IV

Analysis of East Texas Pulp &amp; Paper Company's Waste Waters, Evadale, Texas, August 26, 1958

Station Location	Dissolved Oxygen ppm	pH	Color % Trans- mission	Odor	Chemical Oxygen Demand
#A High BOD Pond at Plant	0.0	9.0	Black	Strong Sulfide & Mercaptan (Paper Mill Odor)	783 ppm
#B Settable Solids Pond at Plant	0.0	5.2	Cloudy	Strong Sulfide & Mercaptan (Paper Mill Odor)	
#1 Effluent Channeling through swamp into Lake Bayou tributaries	0.0	6.7	Black	Strong Sulfide & Mercaptan (Paper Mill Odor)	
#2 Junction of East Canal and Lake Bayou	0.0	6.4	Dark Amber	Strong Sulfide & Mercaptan (Paper Mill Odor)	1176 ppm
#3 Lake Bayou (wide Part)	0.0	6.4	Dark Amber	Strong Sulfide & Mercaptan (Paper Mill Odor)	
#4 200 yds. up Lake Bayou from Neches River	0.0	6.5	Amber	Strong Sulfide & Mercaptan (Paper Mill Odor)	
#5 100 yds. below mouth of Lake Bayou in Neches River	0.0	6.5	Amber	Sulfided Mercaptan (Paper Mill Odor)	
#6 100 yds above mouth of Lake Bayou in Neches River	0.1	6.5		Sulfided Mercaptan (Paper Mill Odor)	
2 miles above Beaumont Country Club in Neches River	6.0	--	Clear	No Odor	
Beaumont Country Club	3.1	--	Light Amber	Slight Mercaptan (Paper Mill Odor)	
Beaumont Water Supply Pipeline Crossing	2.7	--	Amber	Mercaptan (Paper Mill Odor)	
Ten Mile Bayou	3.5	--	Amber	Mercaptan (Paper Mill Odor)	

Table V

Toxicity of East Texas Pulp and Paper Company's Waste Waters at  
Junction of East Canal and Lake Bayou, August 26, 1958

Species	Concentration	Physiological Observations
5 Black Bass ( <u>Micropterus salmoides</u> )	Control	All alive and O K after 24 hours
5 Black Bass ( <u>Micropterus salmoides</u> )	3%	All alive and O K after 24 hours
5 Black Bass ( <u>Micropterus salmoides</u> )	7%	All alive and O K after 24 hours
5 Black Bass ( <u>Micropterus salmoides</u> )	10%	All alive and O K after 24 hours
5 Black Bass ( <u>Micropterus salmoides</u> )	15%	All alive and O K after 24 hours
5 Black Bass ( <u>Micropterus salmoides</u> )	20%	All alive and O K after 24 hours
5 Black Bass ( <u>Micropterus salmoides</u> )	30%	Discomfort noted for 1st. 2 hrs. Fish swam near surface. Respiration increased. All survived 24 hours.
5 Black Bass ( <u>Micropterus salmoides</u> )	40%	Discomfort noted almost immediately. Fish swam in circles near the surface. 2 deaths in 5 hrs. All dead within 24 hrs.
5 Black Bass ( <u>Micropterus salmoides</u> )	50%	Extreme discomfort noted immediately. Fish tried to jump out of test jars. Respiration increased. All dead within 2 hrs.
5 Black Bass ( <u>Micropterus salmoides</u> )	75%	Fish became extremely violent. Tried to jump out of test jars. All dead within 8 minutes.
5 Black Bass ( <u>Micropterus salmoides</u> )	100%	All dead within 4 minutes.

Table VI

Analysis on East Texas Pulp & Paper Co., Evadale, Texas, October 7, 1958

Stations	Total Solids	Settleable Matter	Tannins, Lignins & Aromatic Hydroxyl Substances
High BOD Pond	777 mg/1	1.2 ml/1	1250
Settleable Solids Pond	734 mg/1	.9 ml/1	375
Bleach Plant Water	3715 mg/1	1.2 ml/1	230
Lakeview Road Crossing	1182 mg/1	.2 ml/1	525