

INDUSTRIAL WASTE SURVEY

MARCAL PAPER MILLS INC.

SOUTH HADLEY, MASSACHUSETTS

JUNE 8, 1972

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On June 8, 1972, at the request of the United States Attorney for Massachusetts, Richard Boyton, Environmental Protection Agency's Region I, Technical Operations Section and Donald Porteous, Technical Studies Section, accompanied Philip Ripper, Massachusetts Division of Water Pollution Control (MDWPC) on an unannounced visit to Marcal Paper Mill in South Hadley, Massachusetts. The basic purpose of the visit was to sample Marcal effluent and its effect on Stony Brook for possible enforcement action under the 1899 Refuse Act. (see figure 1 and table 1)

Marcal Paper Mills, Inc.

At approximately 0830 hours the sampling crew met with Larry Messier, plant manager. Mr. Ripper informed Mr. Messier that the visit was a state function and EPA personnel were accompanying him. EPA personnel informed Mr. Messier that the sampling was for possible enforcement action.

The plant uses two paper machine lines. Line #1 employs treatment of the white water waste while, at the time of sampling, line #2 had no such system in use. EPA personnel sampled the effluent from lines #1 and #2, (MP01 and MP02 respectively), and the combined effluent just prior to discharge to Stony Brook (MP03). During sampling the heights of flow at the company's 60° V-notch weir was noted as 5.5 inches or approximately 0.135 million gallons per day (MGD).

Stony Brook

Stony Brook starts in Granby and flows through parts of Chicopee,

Ludlow and South Hadley before discharging to the Connecticut River. The Marcal Paper Mill in South Hadley discharges to Stony Brook about two miles above the confluence with the Connecticut River. Stony Brook was sampled above (MPO4) and below (MPO5) this discharge. Due to the back water from the high flows in the Connecticut River, the tracer dye released at the plant did not reach the confluence during a two hour period.

### Sampling Procedures

Sample collection and analyses were according to standard EPA procedures. The EPA chain of custody system was used for identification and handling of the samples.

The sampling crew made field readings for pH and temperature. The polychlorinated biphenyls (PCB) sample was sealed and shipped to Bay St. Louis, Mississippi for analysis. The EPA Region I Laboratory at Needham, Massachusetts performed the remaining analyses. A pre-numbered field data card was filled out for each station to record pH, temperature, weather conditions, sampling locations, and analyses to be performed.

### Results and Conclusions

The results of the sampling analyses are summarized in Table 2.

The effluent from machine line #2 contained a high concentration of suspended solids (725.5 mg/l) and 5-day biochemical oxygen demand (BOD<sub>5</sub>) (approximately 330 mg/l). The effluent from machine line #1, which receives treatment, contained much lower concentrations of suspended solids (1.33 mg/l) and BOD<sub>5</sub> (12.5 mg/l).

The combined waste flow from the two lines contained relatively high concentrations of suspended solids and BOD<sub>5</sub> due to the untreated discharge from machine line #2. This combined waste contained approximately 360 pounds per da

of suspended solids and approximately 270 pounds per day of BOD<sub>5</sub>.

Stony Brook showed a marked increase in both suspended solids and BOD<sub>5</sub> as it passed the Marcal plant. Suspended solids discharged from a paper mill of this type include wood fibres plus miscellaneous particulate matter washed into the discharge during normal operation. In the brook, the suspended solids interfere with the normal light penetration and consequently photosynthesis activity. Some of the suspended solids settle out covering the bottom with a layer of sludge affecting benthic organisms and eliminating potential food supplies for fish. In addition the organic solids which settle out decompose causing an oxygen demand on the overlying waters.

The oxygen demand of the waste indicates the potential of the waste for reducing the dissolved oxygen (DO) content of the receiving water. Adequate DO levels are necessary to support fish and other clean water organisms.

PCB can cause skin diseases, cancer or birth deformities by entering the food chain in unacceptable quantities. EPA suggested guidelines for stream concentration of PCB's is 0.01 parts per billion (PPB). The undiluted combined effluent from Marcal contained 0.15 PPB of PCB's or 15 to 1 dilution of the effluent is necessary to meet the recommended guideline.

TABLE 1  
STATION DESCRIPTION

STATION	RIVER MILE	LATITUDE			LONGITUDE			STATION DESCRIPTION
		°	'	"	°	'	"	
MPO1	2.5	42	14	53	72	34	49	Effluent from paper line #1 after treatment but before combining with the effluent from line #2.
MPO2	2.5	42	15	53	72	34	49	Effluent from paper line #2 but before combining with the effluent from line #1.
MPO3	2.5	42	15	53	72	34	49	Combined effluent from lines #1 & #2 just prior to discharge to Stony Brook
MPO4	2.5 <sup>-</sup>	42	15	54	72	34	49	Stony Brook immediately upstream of the combined discharge
MPO5	2.5 <sup>+</sup>	42	15	52	72	34	49	Stony Brook immediately downstream of the combined discharge.

SAMPLE ANALYSES  
ABBREVIATIONS AND UNITS OF MEASURE

<u>Analyses Reported</u>	<u>Description</u>	<u>Measured In</u>
Temperature	Sample temperature	Degrees centigrade (°C)
pH		Standard units (SU)
Turbidity	Turbidity	Jackson candle turbidity units (JTU)
DO	Dissolved Oxygen	Milligrams per liter (mg/l)
BOD 5-day	5-day biochemical oxygen demand, in- cubated at 20°C	mg/l
Total Residue	Total Solids	mg/l
Total nonfilterable residue	Total Suspended solids	mg/l
Fixed Nonfilterable residue	Inorganic suspended solids	mg/l
Total fixed residue	Total inorganic solids	mg/l
PCB	Polychlorinated biphenyls	parts per billion (ppb)

Letters preceding a reported value denote the following:

J - estimated as, value not accurate

TABLE 2  
SUMMARY OF RESULTS  
MARCAL PAPER COMPANY  
SOUTH HADLEY, MASS.

STA. #	DATE	TIME Hrs.	LAB.CODE #	DEPTH Ft.	TEMP. °C	DO Probe	BOD <sub>5</sub>	TURBIDITY	FIELD pH	Total	RESIDUES (mg/l)			PCB
											Total Fixed	Total Nflt.	Fixed Nflt.	
MP01	72/06/08	0930	29440	-	-	-	12.5	.8	6.6	320	259.5	1.33	0.07	-
MP02	72/06/08	0935	29441	-	-	-	J330	280	6.2	964.1	251.1	725.5	56.2	-
MP03	72/06/08	0920	29442	-	-	-	J240	100.	6.8	556.2	233.3	325.4	29.5	0.15
MP04	72/06/08	0950	29443	0.5	16.5	9.6	1.4	3	6.8	106.5	65.2	3.8	1.0	-
MP05	72/06/08	1010	29444	1.0	17.0	9.8	5.2	6	7.1	115.0	66.9	9.4	7.6	-

MARCAL PAPER COMPANY  
South Hadley, Massachusetts

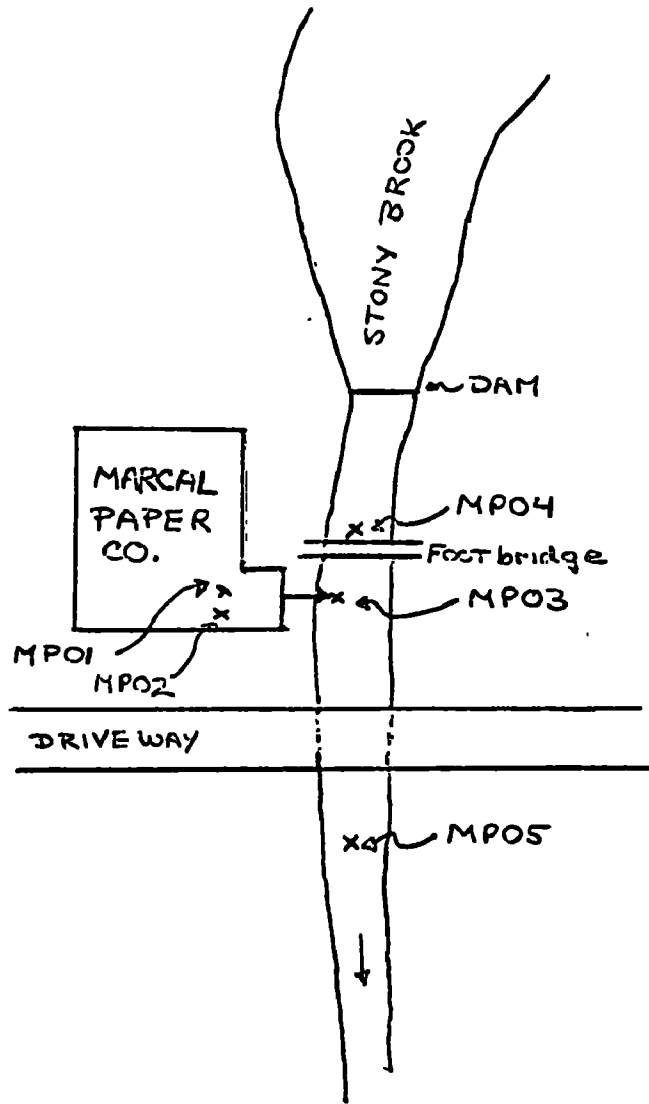


FIGURE 1