

INDUSTRIAL WASTE SURVEY  
Georgia-Pacific Corporation  
Whitefield Paper Division  
Gilman, Vermont  
June 30, 1971

GEORGIA-PACIFIC CORPORATION  
WHITEFIELD PAPER DIVISION  
GILMAN, VERMONT

On June 30, 1971, at the request of the Enforcement Division, Environmental Protection Agency Region I personnel collected samples of the Georgia-Pacific Corporation, Whitefield Paper Division discharges to the Connecticut River and the Connecticut River. The location of each sampling station is shown in Figure 1.

Georgia-Pacific Corporation, Whitefield Paper Division

Georgia-Pacific Corporation, Whitefield Paper Division, a Kraft paper mill, manufacturing printing and check paper, discharges approximately 3.0 mgd of untreated wastewater to the Connecticut River from three main outfalls:

1. Filter backwashing water (GPW-1)
2. Whitewater from two fourdrinier machines (GPW-2)
3. Boiler blowdown (GPW-3)

The paper mill has a maximum capacity of approximately 125 tons/day using 100 percent bleached Kraft pulp, resin sizing, clay, titanium dioxide, starch, and alum as raw materials. As previously stated, the mill discharges into the Connecticut River.

Sampling Information

Figure 1 shows the three industrial outfalls (GPW-1, GPW-2 and GPW-3), as well as the municipal outfalls and the two river stations (CN-03 and CN-04). Table 1 presents the locations of the stations.

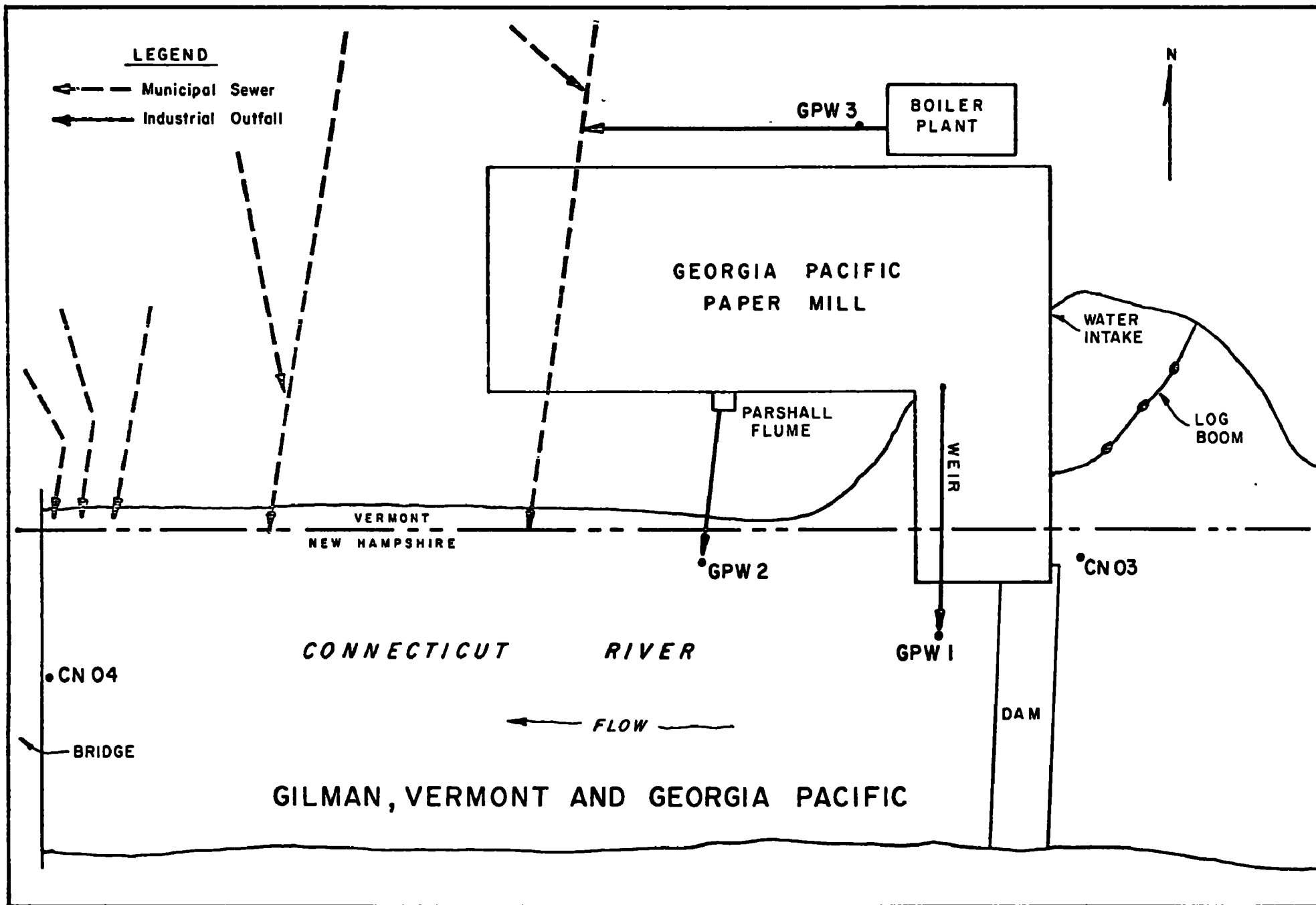


FIGURE 1

TABLE 1

SAMPLE STATION IDENTIFICATION

<u>Station</u>	<u>Latitude</u> ° ' "	<u>Longitude</u> ° ' "	<u>Description</u>
<b>(River)</b>			
CN-03	44 24 38	71 43 08	Connecticut River just upstream from the Gilman Dam.
CN-04	44 24 41	71 43 28	Connecticut River just upstream from the Gilman Bridge.
<b>(Outfalls)</b>			
GPW-1	44 24 36	71 43 10	Weir at south corner of building adjacent to the Gilman Dam.
GPW-2	44 24 38	71 43 12	Outfall at Vermont bank of of river approximately 100 feet downstream of dam.
GPW-3	44 24 42	71 43 10	Boiler blowdown chamber at west end of boiler building immediately outside building.

The mobile field laboratory crew conducted tests for dissolved oxygen, pH and bacteria, plus filtered for non-filterable residues. The remaining samples, including the filtered residue samples, were returned to the Environmental Protection Agency laboratory in Needham, Massachusetts, for analysis.

All samples were collected, preserved and analyzed according to EPA standard methods. The EPA Region I chain of custody record system was used to insure the integrity of the samples.

### Results

Tables 2 and 3 summarize the results of the laboratory analyses. Table 4 shows, for purposes of comparison, an analysis conducted in 1968 by the engineering consultant firm of Webster Martin Company showing a breakdown on the total flow. Since 1968, the company has reportedly tightened up their operation. Table 5 shows an analysis by the same firm on the effluent characteristics of the three discharges. Table 6 shows the calculated loading rates on the Connecticut River.

At the filter backwashing water outfall (Station GPW-1), the grab sample analysis indicates a suspended solids loading on the Connecticut River of 384 pounds/day as compared to 1540 pounds/day based on composite sample analysis. This variation is attributable to a highly variable nature of the wastewater. It is, however, generally accepted that quantitative analysis is best determined from composite sampling since it consists of a number of grab samples, and, therefore, an average (e.g., samples were collected every 15 minutes for one hour proportionate to flow). Total phosphorus loading, based on composite sample analysis is 5.4 pounds per day. This discharge also contains a total

coliform bacterial density in excess of 18,000 per 100 milliliters. All loading rates at this outfall are based on flow rate of approximately 2.0 million gallons per day as measured at the time of sampling.

The outfall discharging whitewater from the two fourdrinier machines (Station GPW-2) had a suspended solids concentration corresponding to a loading rate to the Connecticut River of 3160 pounds per day based upon grab sample analysis and 3240 pounds per day based upon composite sample analysis. Because of the high suspended solids concentration, the discharge was excessively turbid. This discharge also contains degradable organic matter which produced a 1590 pound per day BOD<sub>5</sub> load on the Connecticut River. The whitewater also created a loading rate of 6.7 pounds per day of phosphorus and in the acidic range with an average pH of 5.6. The flow rate at this outfall at the time of sampling was on average 2.3 million gallons per day.

The boiler blowdown chamber (Station GPW-3) discharge contains an average concentration of 53.8 mg/l of suspended solids and 1.92 mg/l of phosphorus. The flow rate at this location was not measured, but was observed to be small compared to Station GPW-2.

The combined loading rates of the discharges at Stations GPW-1 and GPW-2 are shown on Table 6. It should be noted that actual loading rates are in excess of those given since the effects of the boiler blowdown discharge are not included. Because of the close proximity of the Gilman Dam to these outfalls, the stream sample analyses do not show the full effect of the plant discharges.

## SAMPLE ANALYSIS

### ABBREVIATIONS AND UNITS OF MEASURE

<u>Analysis</u>	<u>Description</u>	<u>Measured In</u>
pH	Hydrogen ion concentration	Standard units (SU)
Temperature	Sample temperature	Degrees centigrade (°C)
DO	Dissolved oxygen	milligrams per liter (mg/l)
BOD <sub>5</sub>	5-day biochemical oxygen demand, incubated at 20°C	(mg/l)
Total nonfilterable residue	Total suspended solids	(mg/l)
Total coliforms	Total coliform bacteria	per 100 milliliters
Fecal coliforms	Fecal coliform bacteria	per 100 milliliters
Total P	Total phosphorus	mg/l as phosphorus
Turbidity		Jackson Candle Turbidity Units (JTU)

#### Letter Code:

- K - less than
- J - estimated value

TABLE 2  
SUMMARY SHEET  
MILL DISCHARGES  
JUNE 30, 1971

GRAB SAMPLES

Station	Time	Lab No.	Temp. °C	DO (mg/l)	Total Coliforms /100 ml	Fecal Coliforms /100 ml	BOD <sub>5</sub> (mg/l)	Total NF Residue ( mg/l)*	Total P (mg/l)	Turbidity JTU	pH
GPW-1	0840	27255	27.0	4.6	43,000	120	--	24.2	--	6	6.6
GPW-2	0815	27257	35.0	4.1	1,000	K100	--	188.0	--	300	4.8
GPW-3	0755	27269	29.0	4.2	10,000	K10,000	15.2	60.0	3.84	23	9.2
GPW-1	1005	27265	23.0	4.7	19,000	K10	--	21.0	--	7	6.7
GPW-2	1015	27263	37.0	4.6	1,100	K100	--	70.8	--	300	5.3
GPW-3	1005	27266	28.5	3.9	10,000	K10,000	--	52.4	1.92	24	8.6
GPW-1	1435	27275	24.0	4.4	18,000	10	--	24.0	--	8	6.9
GPW-2	1450	27273	37.0	5.3	2,300	100	--	236	--	900	6.8
GPW-3	1405	27276	30.0	5.2	K10,000	K10,000	11.2	49.0	--	22	8.7

COMPOSITE SAMPLES

GPW-1	0730-0815	27254					--	136.8	.30		
GPW-2	0735-0820	27256					86	153.2	--		
GPW-1	0920-1005	27264					--	46.0	.30		
GPW-2	0915-1000	27262					100	100.8	.36		
GPW-1	1350-1435	27274					7	94.6	.36		
GPW-2	1345-1430	27272					64	252.8	.24		

\*Nonfilterable residue is a measure of suspended solids



TABLE 3  
SUMMARY SHEET  
CONNECTICUT RIVER  
JUNE 30, 1971

Station	Time	Lab No.	Temp. °C	DO mg/l	Total Coliforms /100 ml	Fecal Coliforms /100 ml	BOD <sub>5</sub> mg/l	Total NF Residue mg/l*	Total P mg/l	Turb. JTU	pH
CN-03	0815	27252	23.0	1.2	19,000	K100	6.0	13.5	.28	4	6.4
CN-04	0830	27253	--	1.8	15,000	40	--	16.0	.38	5	6.4
CN-03	1050	27260	21.5	0.7	7,000	K100	6.3	16.0	.24	4	6.4
CN-04	1110	27261	22.0	1.1	17,000	110	6.0	18.8	.34	7	6.5
CN-03	1445	27270	23.0	0.7	13,000	K100	--	14.8	.36	5	6.0
CN-04	1515	27271	22.5	0.7	9,700	60	J4.0	14.0	.02	9	6.8

\*Nonfilterable residue is a measure of suspended solids

**TABLE 4**  
**Mill Discharges**  
**Analysis by Webster Martin Engineering Consultants**  
**(1968)**

**Analysis of Total Flow:**

	Whitewater Rates	Conc.	Boiler Blowdown & Backwash	Total
Flow	3.4 MGD		.025 Mgd	3.425 MGD
BOD	3364 lb/d	119 mg/l		3364 lb BOD/d
Suspended Solids	9365 lb/d	330 mg/l	2100 lb/d	11,465 lb S.S./d
pH		4.9		

TABLE 5

EFFLUENT CHARACTERISTICS  
Analysis by Webster-Martin Engineering Consultants

<u>Date</u>	<u>pH</u>	<u>BOD</u> (mg/l)	<u>S.S.</u> (mg/l)	<u>Flow</u> (mgd)	<u>BOD</u> lbs/day	<u>S.S.</u> lbs/day
6/12/68		97				
14		150				
26		85				
7/25		64	205	3.2	1,708	5,471
26		40	180	3.1	1,034	4,654
29		102	200	2.7	2,297	4,504
8/ 1		128	320	2.6	2,776	6,939
2		100	210	2.5	2,085	4,379
5		168	180	2.4	3,363	3,603
7		163	455	2.5	3,399	9,487
8		201	360	2.3	3,856	7,289
13		225	-	2.8	5,254	--
14		171	400	2.9	4,136	9,674
15		165	330	3.1	4,266	8,532
16		165	310	2.8	3,853	7,239
21		151	335	1.9	2,456	5,308
22		124	-	2.1	2,172	--
23		83	760	3.1	2,146	19,649
9/ 4		70	465	3.8	2,218	14,737
5		144	315	2.5	3,002	6,568
11		149	415	3.1	3,852	10,729
12		209	360	2.8	4,881	8,407
14		149	415	2.8	3,479	9,691
20		98	440	3.7	3,024	13,578
21		124	350	3.6	372.3	10,508
23		-	345	3.6	--	10,358
25		246	185	3.7	7,591	5,709
26		197	270	4.3	7,065	9,683
27		145	630	3.7	4,474	19,441
10/3		239	1050	3.3	6,578	28,898
4		225	890	3.2	6,005	23,752
5		189	600	3.2	5,044	21,350
10		227	220	3.3	6,247	6,055
11		300	220	3.3	8,257	6,055
12		99	400	3.6	2,972	12,010
16		148	300	3.2	3,950	8,006
18		70	385	2.8	1,635	8,991
<del>19</del>		85	155	2.9	2,056	3,749
3		93	180	3.0	2,327	4,504
24		142	-	3.1	3,671	--
26		38	285	3.6	1,141	8,557
31		58	205	3.3	1,596	5,642

TABLE 5 (Cont.)

<u>Date</u>	<u>pH</u>	<u>BOD</u> (mg/l)	<u>S.S.</u> (mg/l)	<u>Flow</u> (mgd)	<u>BOD</u> lbs/day	<u>S.S.</u> lbs/day
11/1		79	115	3.2	2,108	3,069
2		177	300	3.3	4,871	8,257
20		65	290	3.4	1,844	8,226
22		47	205	3.2	1,065	4,647
27		86	530	2.2	1,578	9,724
28		105	495	2.2	1,927	9,082
29		98	575	1.9	1,553	9,111
12/9	5.8	119	1050	3.2	2,697	23,801
10	5.7	-	510	3.5	--	14,887
11	5.5	-	270	3.6	--	8,106
14	5.2	-	320	3.8	--	10,141
15	4.9	-	245	3.6	--	7,356
16	5.1	77	620	3.7	2,376	19,132
17	5.0	-	200	3.6	--	6,005
18	4.9	-	260	3.7	--	8,023
19	5.0	-	270	3.5	--	7,881
20	4.9	-	140	3.4	--	3,571
21	4.9	-	230	3.4	--	6,524
22	5.0	-	265	3.4	--	7,517
<del>23</del>	<del>5.0</del>	<del>125</del>	<del>450</del>	3.5	3,649	13,136
27	4.6	-	85	3.3	--	2,339
28	5.0	-	460	3.5	--	13,427
29	-	-	260	3.9	--	8,457
30	4.7	123	365	3.6	3,693	10,959
31	4.9	-	160	3.7	--	4,937
1/ 1/69	4.9	-	185	3.5	--	5,400
2	4.7	-	320	3.6	--	9,608
3	4.7	-	250	3.2	--	6,672
4	4.8	-	1000	3.7	--	30,858
5	5.0	-	495	3.7	--	15,275
6	4.7	110	350	3.5	3,211	10,217
7	5.1	-	240	4.4	--	8,807
8	4.9	-	410	3.0	--	10,258
9	5.5	-	200	2.7	--	4,504
10	6.5	-	190	3.0	--	4,754
11	5.1	-	155	3.1	--	4,266
12	4.6	-	455	3.5	--	13,281
13	4.8	50	205	3.4	1,418	5,815
14	4.8	-	155	3.1	--	4,007
15	4.8	-	115	3.9	--	3,740
16	4.8	-	150	2.5	--	3,128
17	5.1	-	420	3.2	--	11,209
18	5.1	-	210	3.2	--	5,604

TABLE 6  
LOADING RATES

Parameter	Loading Rate* (Pounds Per Day)	Webster-Martin Loading Rate (Pounds Per Day)
BOD <sub>5</sub>	1590	3364
Suspended Solids	4780	11,465
Total Phosphorus	12.1	-

\*As calculated by EPA June 30, 1971 study