

MEMORANDUM

November 14, 1974

TO: Bruce Johnson

FROM: Pat Lee

State of
Washington
Department
of Ecology



On August 13, Dan Glantz and I conducted an effluent survey on Georgia Pacific's facilities in Bellingham. Both the pulping plant and the chlorine plant were surveyed. For the pulping plant, an efficiency survey was conducted on the clarifier, while effluents #3 and #5 were also sampled. Some field testing was also conducted. The results of the field tests on the clarifier were as follows.

Field Results on Clarifier

| 7 Determinations | Influent | | | | Effluent | | | |
|--|----------|------|------|--------|----------|------|------|--------|
| | Max. | Min. | Mean | Median | Max. | Min. | Mean | Median |
| Temp °C | 23 | 21 | | 22 | 22 | 21 | | 22 |
| pH (Units) | 5.2 | 4.6 | | 4.8 | 5.1 | 4.9 | | 5.0 |
| Conductivity (umhos/cm ²) | 1200 | 650 | | 875 | 775 | 650 | | 700 |
| Settleable Solids (mls/l) | 12.0 | 10.0 | 11.0 | 11.0 | 4.5 | 1.5 | 2.5 | 1.5 |

Field tests were also conducted on #3 effluent and the effluent from the chlorine plant. They are as follows.

| 6 Determinations | <u>#3</u> | | | <u>Chlorine Plant</u> | | |
|--|-----------|------|--------|-----------------------|------|--------|
| | Max. | Min. | Median | Max. | Min. | Median |
| Temp °C | 39 | 34 | 36 | 27.1 | 20.9 | 27.1 |
| pH (Units) | 3.8 | 2.4 | 3.3 | 6.5 | 6.0 | 6.4 |
| Conductivity (umhos/cm ²) | 3000 | 1300 | 1525 | 105 | 70 | 75 |
| Settleable Solids (mls/l) | 50 | 0.6 | 2.0 | | | |
| Chlorine Residual | | | | >1.0 | 0.1 | 0.2 |

The data shows that clarifier is allowing settleable solids to escape to the harbor but is getting about 80% removal. The data from #3 effluent shows that its constituents change drastically with time as the large variations in S.S. and conductivity show. The one large (>1.0 ppm) chlorine residual detected at the chlorine plant came at exactly 1130 hours which is the time that G.P.'s personnel spike the effluent to guarantee that

all monitoring equipment is effective.

For the laboratory we collected and split samples with G.P. from effluents #3, #5, the influent and effluent from the clarifier, the effluent from the chlorine plant and a couple of grabs from the chlorine plant. A summary of these results from the two labs is as follows.

| | D.O.E. Clarifier Discharge (1000 lbs.) | Georgia Pacific Clarifier Discharge (1000 lbs.) | D.O.E. #3 Discharge (1000 lbs.) | G.P. #3 Discharge (1000 lbs.) |
|----------|--|---|---------------------------------------|-------------------------------------|
| BOD | 38.3 | 35.3 | >16.1 | 64.7 |
| T.S.V.S. | 20.5 | 18.6 | 3.6 | 2.8 |
| pH | 5.0 | | 3.6 | |

| | D.O.E. #5 Discharge (1000 lbs.) | G.P. #5 Discharge (1000 lbs.) |
|----------|---------------------------------------|-------------------------------------|
| BOD | 38.8 | 46.5 |
| T.S.V.S. | 12.2 | 16.3 |
| pH | 2.8 | |

From my experience of splitting samples with industry and then analyzing the samples at two different labs, I would say that the numbers match up pretty well. The one obvious anomaly, the BOD value at Discharge #3, can be explained by the fact that our lab underestimated the actual BOD, and thus reported a "greater than" value. The COD value was 3,670 ppm as compared to the >300 ppm BOD value.

The laboratory also ran analyses on the samples from the four hour composites on the clarifier influent and effluent. This data showed no BOD reduction, 30% COD reduction, and a 75% suspended solids reduction. Almost all of the suspended solids proved to be combustible. A couple of coliform grabs taken out of the clarifier effluent had 12,000 and 8,000 total coliform per 100 ml and 50 and 150 fecal coliform per 100 ml. A visual inspection of the clarifier did not turn up anything out of the ordinary. Lab tests on samples taken at the chlorine plant showed minimal organic loading in the effluent with a pH of 6.4 on the composite.

Two samples for mercury were taken, one of the effluent from the chlorine plant and one of sodium hydroxide product. Both samples were analyzed by the Redmond lab and were both reported as less than 0.25 ppb which is the

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minimum detectable limit on DOE equipment, although more specific numbers could have been obtained by using EPA equipment which at the time was under use. Georgia Pacific reported higher concentrations of mercury than the above numbers but they were analyzing composites while ours were grabs.

PL:bjj

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO:
..P.Lee.....
COPIES TO:
.....
.....
LAB FILES.....

DATA SUMMARY

Source GEORGIA PACIFIC @ B'ham. (MANHOLE ?) Collected By P. Lee & D. Glantz

Date Collected 8-13-74 Goal, Pro./Obj. _____

Log Number: 74-3330 31 (24 hr COMP) 32 (Comp. (0800-1200) 1200) 34 35 36 37 38 39 STORET

| Station: | #3 | #5 | CLARIF. EFF. | CL. PLANT | CLARIF. INF. | CLARIF. EFF. | 0845 | 1200 | #6 | 24 hr Comp. | STORET |
|--------------------------------|------|------|--------------|-----------|--------------|--------------|--------|----------|----|-------------|--------|
| pH | 3.6 | 2.8 | 5.0 | 6.4 | 5.3 | 5.4 | | | | | 00403 |
| Turbidity (JTU) | | | | | | | | | | | 00070 |
| Conductivity (umhos/cm) @ 25°C | | | | | | | | | | | 00095 |
| COD | 3670 | 1260 | 792 | 12 | 947 | 676 | | | | | 00340 |
| BOD (5 day) | >300 | 233. | 185 | <4 | 180 | 190 | | | | | 00310 |
| Total Coliform (Col./100ml) | | | | | | | 12,000 | EST 8000 | | | 31504 |
| Fecal Coliform (Col./100ml) | | | | | | | EST 50 | EST 150 | | | 31616 |
| NO3-N (Filtered) | | | | | | | | | | | 00620 |
| NO2-N (Filtered) | | | | | | | | | | | 00615 |
| NH3-N (Unfiltered) | | | | | | | | | | | 00610 |
| T. Kjeldahl-N (Unfiltered) | | | | | | | | | | | 00625 |
| O-PO4-P (Filtered) | | | | | | | | | | | 00671 |
| Total Phos.-P (Unfiltered) | | | | | | | | | | | 00665 |
| Total Solids | | | | | | | | | | | 00500 |
| Total Non Vol. Solids | | | | | | | | | | | |
| Total Suspended Solids | 67. | 73. | 102. | 2 | 282 | 72 | | | | | 00530 |
| Total Sus. Non Vol. Solids | 0. | 0. | 3. | 0 | 0 | 0 | | | | | |
| T.S.V.S. | 67. | 73. | 99 | 2 | 282 | 72 | | | | | |
| PBI* | | | | | | | | | | | |
| MERCURY | | | | | | | | | | | |

Note: All results are in PPM unless otherwise specified. ND is "None Detected"
Convert those marked with a * to PPB (PPM X 10³) prior to entry into STORET

* No PBI due to Lab error.

Summary By Stephen D. Roll Date 8-26-74