

STATE OF  
WASHINGTONDixy Lee Ray  
Governor

DEPARTMENT OF ECOLOGY

Olympia, Washington 98504

206/753-2800

M E M O R A N D U M

March 29, 1978

To: Gerry Calkins

From: Greg Cloud

Re: Weyerhaeuser Raymond (Twin Harbors)  
Class II Inspection

## Findings and Conclusions:

The Weyerhaeuser Company (Twin Harbors area) in Raymond is strictly a sawmill for finished and dimensional lumber. The effluent water is that used by the hydraulic debarkers. The on-site sewage is piped to the city of Raymond's sanitary sewer. The two people responsible for the operation of the effluent system and lab work are Jim Taylor and Rick Karr. Rick is the lab tech who picks up the composite samples and does the analysis for Total Suspended Solids.

The composite samplers used by Weyco at Raymond have no cooling or icing capability. The data from unrefrigerated BOD samples have doubtful value. The immediate use of the new Isco samplers, purchased by Weyco, should be initiated with some provisions for icing the composite samples as they are collected.

The length of time between the collection of the BOD samples and set up in the laboratory is excessive. The sample is iced and sent to the Weyco Longview laboratory on Tuesday. Longview receives the sample on Wednesday and sets it up on Friday. It is recommended that the samples be taken to the Cosmopolis mill for analysis. This would require only one trip a week and would insure that the samples be set up within 24 hours of collection.

The flow is measured with an in-line meter which is located on the inflow line that comes directly from the river. At the present there is no way to allow for calibration of the meter. The use of a standard weir or flume to check calibration of the meter is recommended.

At the time of the inspection the clarifier was bypassing directly to the river due to a plugged pipe between the clarifier and holding vat. This plugging was due to a styrofoam float which supported a pH probe. It is strongly recommended that quality assurance (sample collection, transport and analysis) and equipment maintenance be improved to solve this and previously noted deficiencies.

GC:ee

cc: Dick Cunningham  
Central Files  
Bill Yake

Class II Field Review and Sample Collection  
24 Hour Composite Sampler Installations

Sampler	Date and Time Installed	Location
1. influent aliquot - 250 ml/30 min.	1/25/78 at 0945	wet well prior to clarifier
2. unchlor. effluent aliquot - 250 ml/30 min.	1/25/78 at 1000	end of clarifier
3. aliquot -		

Grab Samples

	Date and Time	Analysis	Sample Location
1.	1-25-78 1125 & 1335 comp.	T. oils - phenols	Influent - Effluent
2.	1-26-78 1000 hrs.	T. oils - phenols	Influent - Effluent
3.	1-26-78 1010 hrs.	T. oils - phenols	Influent - Effluent
4.			
5.			
6.			

Flow Measuring Device

1. Type in-line flow meter
2. Dimensions - -

a. Meets standard criteria  Yes

No Explain: There is no way to measure or check the accuracy of the meter. The meter should be located at the end of the clarifier.

b. Accuracy check

	Actual Instan. Flow	Recorder Reading	Recorder Accuracy (% of inst. flow)
1.	no way to measure	no recorder reading	
2.			
3.			

is within accepted 15% error limitations

is in need of calibration (Plant personnel made no mention of calibration after installation)

Field Data

Parameter	Date and Time	Sample Location	Result
Temp	1/26/78 at 1000	Influent	10.5
pH	"	"	6.0
Cond.	"	"	10,900
Temp.	1/26/78 at 1010	Effluent	10.5
pH	"	"	6.3
Cond.	"	"	10,000

## Review of Laboratory Procedures and Techniques

The only lab analysis run at the Raymond mill is TSS. This procedure appears to be in order although the mills influent TSS results were lower than those determined by DOE. This may partially be due to the large particulate size which makes representative sample collection difficult. The results on the effluent were within close agreement.

Weyco collects total oils and phenols samples from the composite samplers. These must be collected as grabs only. The phenol values are very low. This is due to the absence of gluing or lamination operations at the plant. It is therefore recommended that the test for phenols be dropped.

The BOD<sub>5</sub> results on this survey compare poorly. This is probably due to the length of time that the Weyco samples were held before being set up (1 week). It is suggested that:

- 1.) All BOD<sub>5</sub> analysis be set up within 24 hours of sampling time.
- 2.) The BOD<sub>5</sub> samples should not be frozen.
- 3.) Adequate cooling should be used during the time of collection.

The following table is a comparison of laboratory results from 24 hour composite(s) together with NPDES permit effluent limitations. Additional results pertinent to this inspection have also been included.

analysis by DOE Lab. 1/25-26/78	DOE Comp.			Weyco at Raymond composite		NPDES (Monthly average)
	influent	unchl. effluent		influent	unchl. effluent	
BOD <sub>5</sub> mg/l lbs/day	92 268	96 279		88 256	92 268	500
TSS mg/l lbs/day	413 1202	67 195				600
Total Plant Flow MGD					.349 mgd	
<hr/>						
analysis by Weyco Lab						
BOD <sub>5</sub> mg/l lbs/day	44 128	36 105		51 148	53 154	500
TSS mg/l lbs/day	290 844	45 131		206 600	44 128	600
<hr/>						
analysis by DOE Lab	1/25/78 effluent at 1140 hrs.	1/26/78 effluent at 1000 hrs.	1/26/78 effluent at 1040 hrs.			
T. oils	N.D.	<1	5			
Phenols	.0009	.002	.010			

\* Field analysis      "<" is "less than" and ">" is "greater than"

## Long-Term BOD Results

BOD was determined after 2, 5, 8, 15 and 20 days. The rate constant (k) was determined by performing a linear regression on the variables time (T) in days and  $[T/BOD_t]^{1/3}$  where  $BOD_t$  is the biochemical oxygen demand exerted after T days. This yields a linear equation of the form:

$$\text{Eq. 1. } [T/BOD_t]^{1/3} = A + TB$$

The rate constant was then determined according to Equation 2:

$$\text{Eq. 2 } k = 2.61 B/A$$

The ultimate BOD was obtained by applying Equation 3 to the 20 day BOD:

$$\text{Eq. 3 } BOD_t = \frac{BOD_u}{(1-10^{-kt})}$$

The results of the test and succeeding calculations are presented below:

Time (T)	BOD <sub>t</sub> (mg/l)	[T/BOD <sub>t</sub> ] <sup>1/3</sup>
2	62	.318
5	96	.373
8	98	.434
15	109	.516
20	116	.557

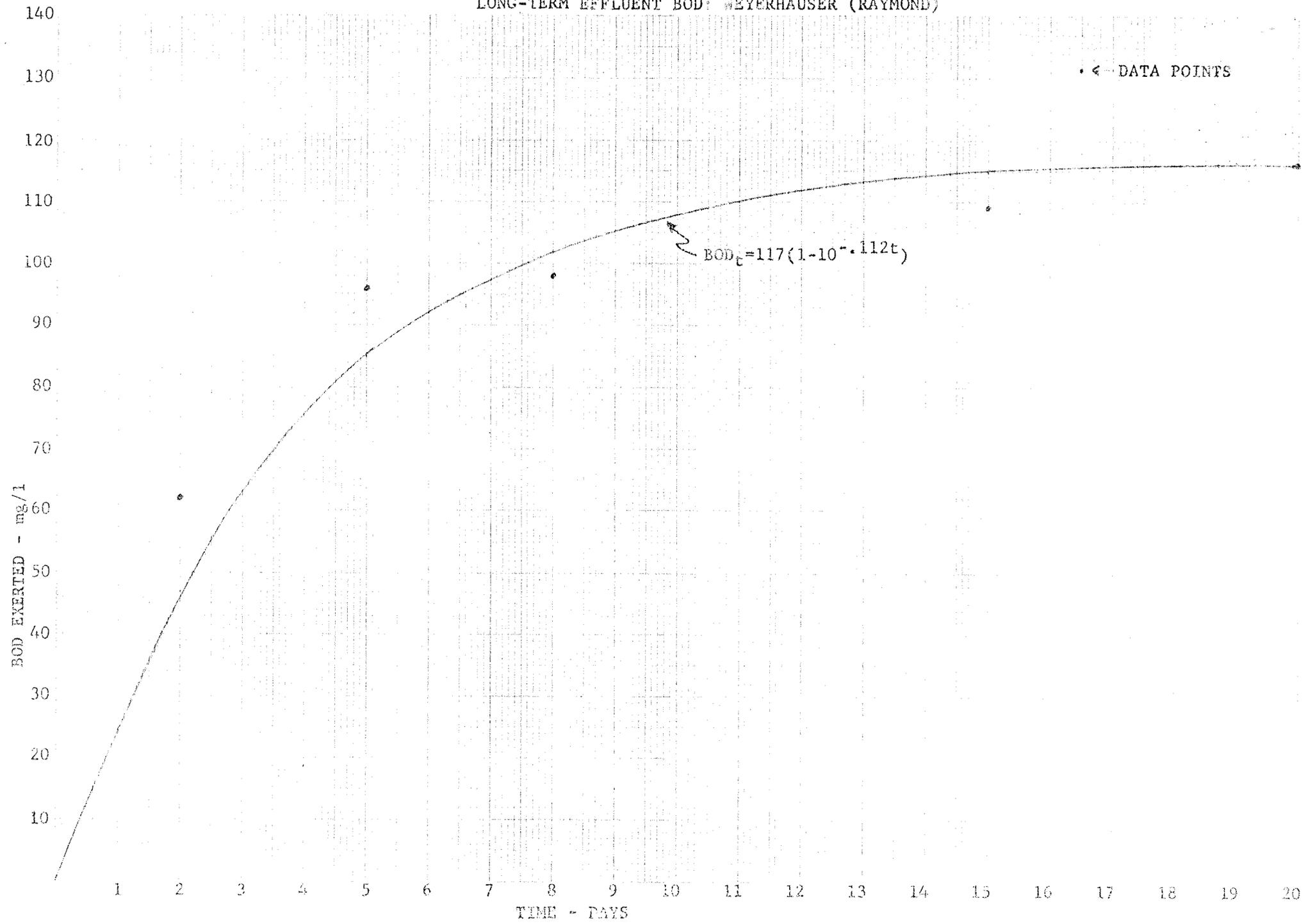
$$\begin{aligned} A &= .0132 \\ B &= .308 \\ k &= .112 \\ BOD_u &= 117 \end{aligned}$$

The equation for the idealized BOD curve is thus:

$$\text{Eq. 4 } BOD_t = 117 (1-10^{-.112 t})$$

The rate constant determined here is roughly equivalent to that found in domestic sewage. Because the COD of this waste water is much higher than the calculated ultimate BOD, it is very possible that wood particles which would exert BOD over much longer periods of time are not being degraded by the 20 day, standard BOD procedures. The possibility of this source of error should be considered in interpreting these results.

FIGURE 1  
LONG-TERM EFFLUENT BOD: WEYERHAUSER (RAYMOND)





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lbs/day	268	279		256	268	
TSS mg/l	413	67				600
lbs/day	1202	195				
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TSS mg/l	290	45		206	44	600
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