Segment No. LL-24-02

Publication No. 78-e06

WA-24-2020

STATE OF WASHINGTON

Dixy Lee Ray
Governor

DEPARTMENT OF ECOLOGY
Olympia, Washington 98504 206/753-2800

MEMORANDUM

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 -	1/25/78 at 0945 250 ml/30 min.	wet well prior to clarifier
2. unchlor. effluent aliquot -	1/25/78 at 1000 250 ml/30 min.	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

/X/ 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_5 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_5 analysis be set up within 24 hours of sampling time.

2.) The BOD_5 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_5 mg/l	92	96		88	92		
lbs/day	268	279		256	268		500
TSS mg/l	413	67					
lbs/day	1202	195					600
Total Plant Flow MGD					.349 mgd		
analysis by Weyco Lab							
BOD_5 mg/l	44	36		51	53		
lbs/day	128	105		148	154		500
TSS mg/l	290	45		206	44		
lbs/day	844	131		600	128		600
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:

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

The rate constant was then determined according to Equation 2:

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

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

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

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

Time (T)	BOD_t (mg/l)	$[T/BOD_t]^{1/3}$
2	62	.318
5	96	.373
8	98	.434
15	109	.516
20	116	.557

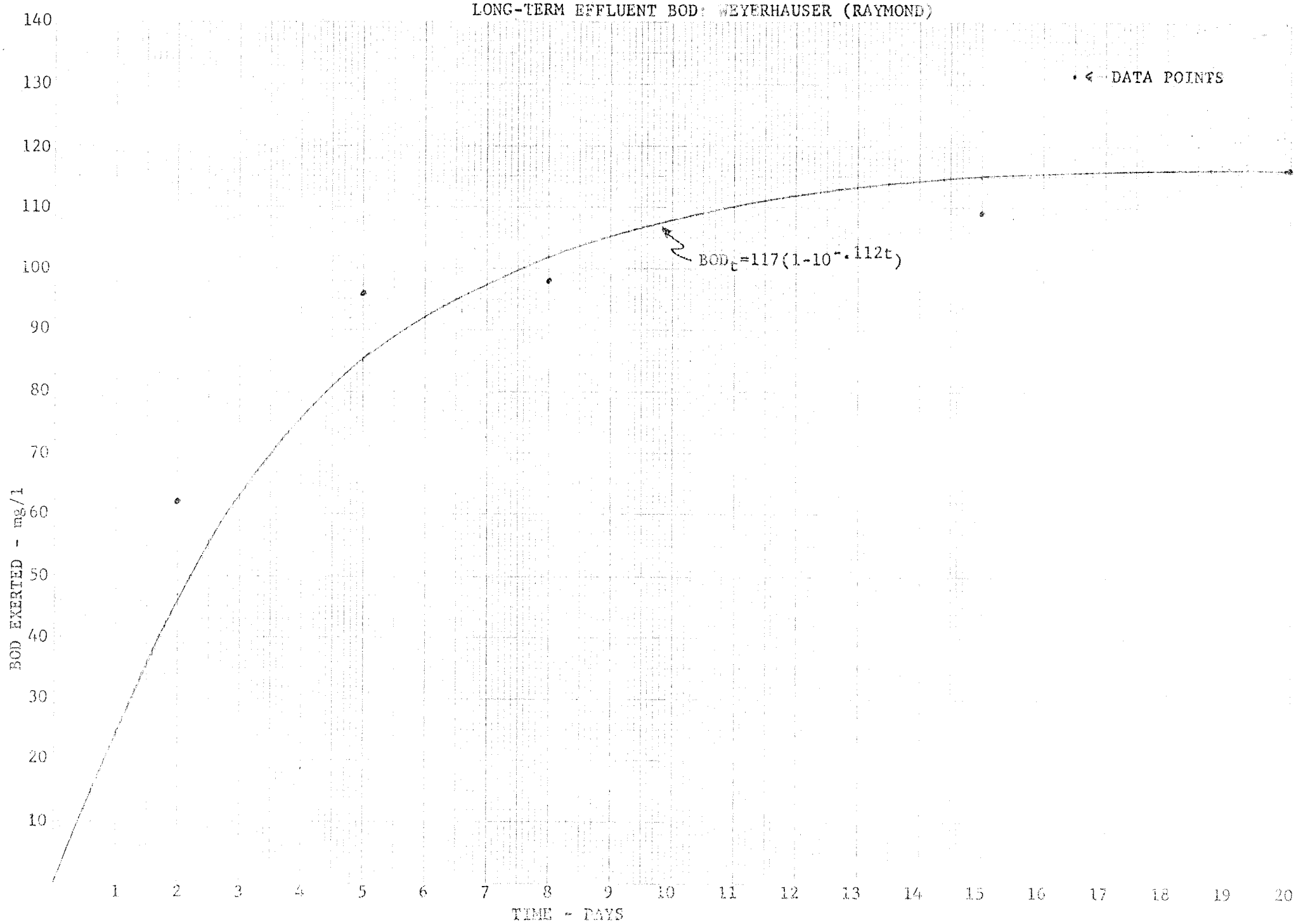
A = .0132
B = .308
k = .112
BOD_u = 117

The equation for the idealized BOD curve is thus:

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

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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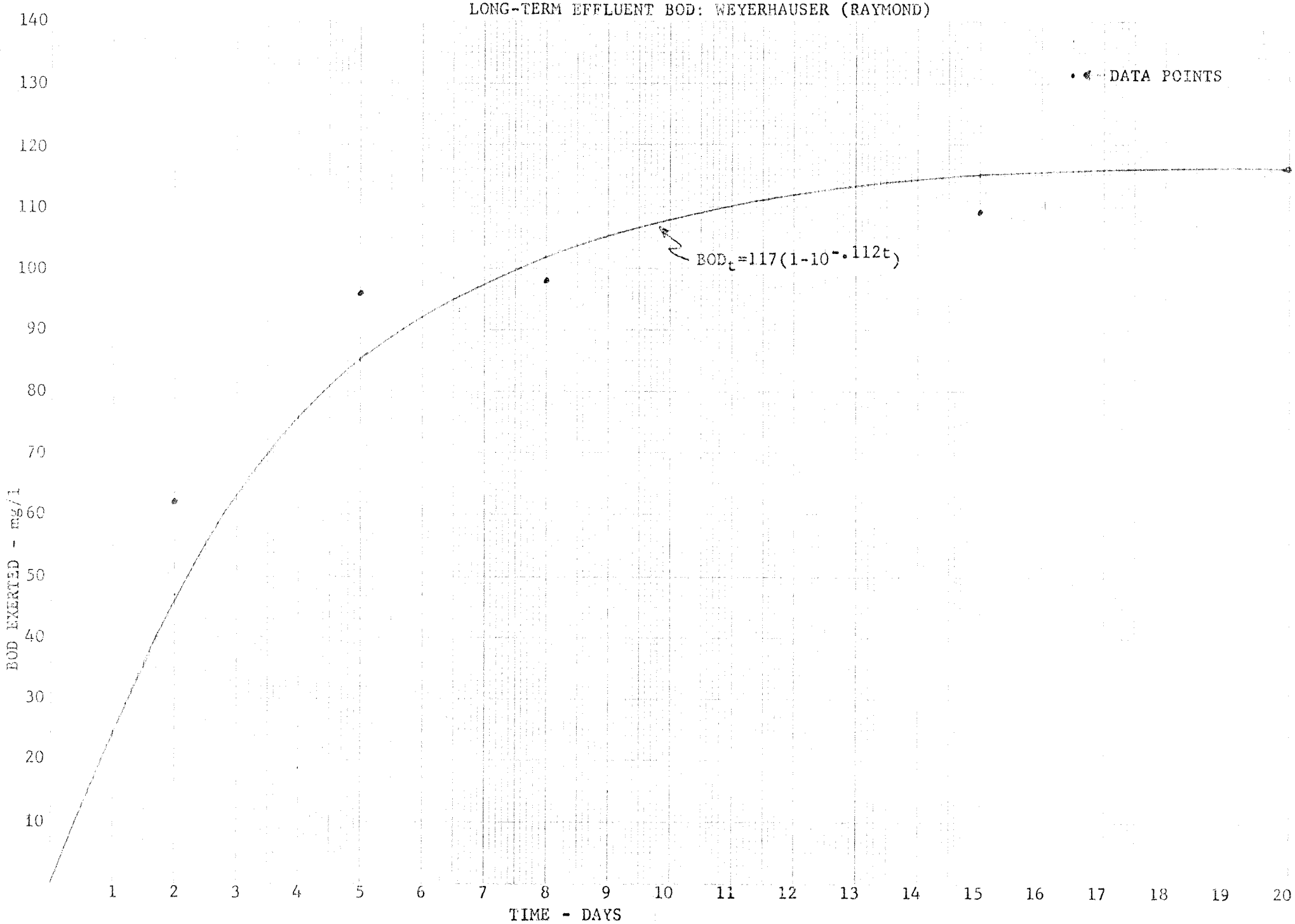

STATE OF WASHINGTON

WATER POLLUTION CONTROL COMMISSION

ANALYTICAL REPORT SHEET

Routing

Original to LAB.

Copies to: RON LEE

To: RON LEE

The following are the analytical results from survey conducted at:

WILLAPA RIVER

Collected 6-2-70

TOTAL COLIFORM PER:

LAB. NO.	STATION NO.		100 ml.					
70-2502	0830		860	headwaters				

Notes:

Summarized by EU DENKE

Date 6-4-70

STATE OF WASHINGTON

WATER POLLUTION CONTROL COMMISSION

Original to LAB.
Copies to: RON LEE

ANALYTICAL REPORT SHEET

To: RON LEE

The following are the analytical results from survey conducted at:

Willapa River

Collected 5-5-70

TOTAL COLIFORM PER:

LAB. NO.	STATION NO.	100 ml.						
70-2064	A	590	ELK PRARIE RD. E. OF FRANCIS 1st BRIDGE					
2065	B	620	"	"	"	"	"	" 2nd BRIDGE
2066	C	460	HWY. 6 BRIDGE NEAR HOLCOMB RD.					

Notes:

Summarized by ED. DENIKE

Date 5-8-70