STATE OF WASHINGTON
Dixy Lee Ray
Governor

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

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MEMORANDUM

To: Ron Devitt

From: Bill Yake

Re: Weyerhaeuser Sawmill
Class II Inspection

Date: May 16, 1978

Findings and Conclusions:

A Class II inspection of the Weyco Mill located on Boise Creek near Enumclaw was carried out on April 10-11, 1978. Bill Yake and Mike Morhous of Source Monitoring; and Ron Devitt of the Northwest Region represented the Department of Ecology. K. M. Karch (Manager, Environmental Affairs), Joe Lavallee (Wood Products Manager) and Howard Maxfield (Operator) represented Weyerhaeuser Company.

The sawmill produces rough dimension, green lumber. The primary source of pollutant discharge is a hydraulic debarker. Water from this process is routed to a wet well served by two pumps rated at 1150 gpm against 22 feet of head. This wet well is equipped with an overflow bypass, which according to mill personnel discharges to Boise Creek at a point beneath the mill where the creek is routed through culverts. When the wet well was inspected at 11:00 A.M. on April 10, 1978 neither pump was operating and the full debarker discharge was bypassing the treatment system. Pumps were restarted and operated 13.7 and 16.0 hours respectively during the 16 hour operating period to 11:00 A.M. April 11, 1978. It is apparent that the wet well pumping configuration is inadequate. Although the cause of pumping failure was not determined, a minimum of one additional pump is necessary to provide system backup should one pump fail. In addition, a bypass alarm should be installed to alert operators of pump failure. Routing the bypass to a holding tank with pumping capability would further reduce the likelihood of untreated wastewater reaching Boise Creek.

Under normal operating conditions the wastewater is pumped from the wet well to a primary clarifier. The clarifier effluent passes to an aerated lagoon, then in turn to an adjacent large pond which originally served as a log pond. The intake pumps for the hydraulic debarker withdraw water from the log pond. The system is thus partially closed and a large portion of the process water is recycled. However, the log pond

receives ground water discharge and thus the log pond has a discharge (approximately 0.5 MGD at the time of inspection) to Boise Creek. This configuration provides a unique opportunity for zero discharge. The addition of a settling (polishing) pond after the aerated lagoon with debarker intake from this pond would create a closed system.

Although old log pond effluent would continue to carry some pollutants, the log pond would eventually be flushed of accumulated organic wastes.

If, however, the present configuration is to remain intact for any substantial period of time the log pond effluent weir should be replaced. The present weir is neither level nor sharp-crested. In addition, head generated under normal flows is too small to allow accurate flow estimation. Replacement with a sharp-crested V-notch weir with an automatic flow recorder would substantially improve the accuracy of reported flows. It should also be noted that mill personnel were measuring head heights at the weir, rather than at the critical transition point upstream from the weir. This results in reported flows substnatially less than actual flows.

Grab samples were obtained from Boise Creek above and below the mill. In addition, flows were measured on April 10, 1977, and macroinvertebrate samples were taken. Mill effluent appears to raise COD, turbidity, suspended and total solids in Boise Creek. Conversely, pH and dissolved oxygen are decreased. The flow and fecal coliform concentration at the downstream station suggest that there may be additional wastewaters reaching Boise Creek on mill premises. Both of these parameters are higher than expected increases contributed by the log pond.

Macroinvertebrate counts are attached. Log pond effluent contained only a single species of fly (Diptera) larvae. Depressed dissolved oxygen concentrations were probably largely responsible for this. Although a wide range of organisms were present in Boise Creek both above and below the mill, the Pearl Benson Diversity Index was higher (3.53) above the mill than below (1.76) the mill effluent. This suggests a stress on invertebrate communities created by the effects of the mill effluent.

WY:ee

cc: Dick Cunningham
Central Files

24 Hour Composite Sampler Installations

Sampler	Date and Time Installed	Location
1.	Primary influent 4/11/78 (1130, 1305), 4/12/78 (0950, 1120) aliquot - Hand composite 500 ml/4 times in 24 hrs.	In-well of primary clarifier.
2.	Aerated lagoon eff. 4/11/78 - 1125 aliquot - 250 ml/30 min.	In aerated lagoon immediately above effluent line to log pond.
3.	Log pond effluent. 4/11/78 - 1045 aliquot - 250 ml/30 min.	One foot upstream from log pond effluent weir.

Grab Samples

	Date and Time	Analysis	Sample Location
1.	4/11/78 - 1140	Nut., BOD, COD, Solids, pH, Cond., Turb.	Influent flow at aeration pond.
2.	4/11/78 - 1045	Total & Fecal Coliforms	Log pond effluent.
3.	4/10/78 - 1415	COD, Solids, pH, Nut., Cond., Turb.	Upstream Boise Cr. at Weyco Sta. #1
4.	4/10/78 - 1500	" " " " " "	Boise Cr. below mill, 50' above hwy
5.	4/11/78 - 1130	" " " " " "	Upstream Boise Cr.
6.	4/11/78 - 1145	" " " " " "	Downstream Boise Cr.

Flow Measuring Device

1. Type - Broad crested, contracted rectangular weir
2. Dimensions - 3.99' width, lip 1.5" wide.

a. Meets standard criteria ☐ Yes

☒ No Explain: Neither level, nor sharp-crested.

b. Accuracy check

	Actual Instan. Flow	Personnel ~~Recorder~~ Reading	Recorder Accuracy (% of inst. flow)
1.	0.544 mgd	.38 mgd	70%
2.	0.544 mgd	.28 mgd	52%
3.			

☐ is within accepted 15% error limitations

☒ is in need of ~~calibration~~ replacement; a sharp-edged V-notch weir with a continuous flow recorder and totalizer would be ideal.

Field Data

Parameter	Date and Time	Sample Location	Result
Temp., Cond., pH, DO	4/11/78 (1045)	Log pond effluent	See Results
Settleable Solids	4/11/78 (1140)	Aerated lagoon effluent	" "
Temp., Cond., pH, DO	4/11/78 (1130)	Primary influent	" "
Temp., Cond., pH, DO	4/11/78 (1140)	Aerated lagoon influent	" "
Temp., Cond., pH, DO	4/11/78 (1200)	Aerated lagoon effluent	" "
Temp., Cond., pH (Composite)	4/12/78 (0950)	Log pond effluent	" "
Temp., Cond., pH (Composite)	4/12/78 (1025)	Aeration pond effluent	" "

Review of Laboratory Procedures and Techniques

Parameters reported by the inspected facility are BOD_5, suspended solids and flow. Flow measurement is addressed in 'Findings and Conclusions'. Water (grab) samples are typically taken on Wednesday, packed in dry ice and shipped to Weyerhaeuser's Longview laboratory where the BOD_5 analyses are set up on Friday. Because this method of shipment and storage runs counter to Standard Methods (14th Edition) and the Department of Ecology's August 1977 BOD procedures manual admonishes against freezing samplings and holding samples longer than 24 hours prior to set-up, samples sent to the Longview laboratory were split into frozen and iced portions. Both samples were set up on Friday as usual. Samples were seeded at the Longview laboratories. The results indicate that there was some discrepancy on the log pond effluent BOD samples. A Class II inspection at Weyco Raymond (1/25-26/78) revealed the same problems. When dealing with low level BOD samples, it is particularly important to keep storage time at a minimum. Because samples are collected infrequently (monthly) at this facility it appears reasonable to require that samples be iced (not frozen) and set up within 24 hours.

The BOD discrepancies noted in a previous inspection (Memorandum from Ron Devitt to Dave Nunnallee, Steve Robb and Bill Yake, 5/3/78) appear to have been anomalies created by excessive dilutions and insufficient oxygen depletions in the samples run in the April 17, 1973 survey. There was no indication of toxicity in the BOD analyses.

NPDES permit limitations were met in all cases.

There were rather substantial suspended solids discrepancies. Calculations were rechecked in both labs; no obvious errors were found. Weyco samples were run in duplicate and a standard was processed simultaneously. Additionally, aliquots were of sufficient volume. All analyses met NPDES permit limitations.

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.

	1304 Prim. Inf.	1303 DOE Aeration Lagoon Eff.	1302 Log Pond Effluent	Aeration Lagoon Prim. Inf.	Effluent Frozen Ref.[3]		Effluent Frozen Ref.		NPDES (Monthly average)
BOD_5 mg/l	43	25	9		22	25	4	6	10 mg/l
lbs/day	735	427	40.8		376	427	18.1	27.2	135 lbs/d
TSS mg/l	250	120	40		90		89		300 mg/l
lbs/day	4270	2050	182		1540		404		4050 lbs/ day
Total Plant Flow MGD	2.05[1]	2.05[1]	.544 mgd[2]						
pH	6.8 7.0*	7.1 6.9* 7.2**	7.0 6.7* 7.0**						6-9
Total Coliforms (#/100 ml)	2000 est. 5800	2000 est. 2900	360 est. 180						
Fecal Coliforms (#/100 ml)	< 5 < 5	10 est. 5 est.	< 5 < 5						
COD (mg/l)	339	207	94						
NH_3-N (mg/l)	0.2	0.2	0.2						
NO_2-N (mg/l)	< .02	< .02	< .02						
NO_3-N (mg/l)	< 0.2	< .02	< .02						
O-PO_4-P (mg/l)	0.4	0.3	.4						
T-PO_4-P (mg/l)	0.3	0.23	.17						
Turbidity (NTU)	52	35	30						
Spec. Cond. (µmhos/cm)	46 50*	42 48* 49**	50 71 65**						
PBI	1400	1400	1000						
Total Solids (mg/l)	386	236	154						
Tot. N.Vol. Sol.(mg/l)	122	83	71						
Tot. Sus. Sol. (mg/l)	250	120	40						
Diss. Oxygen (mg/l)	7.0	5.6	1.35						
Temp. (°C)	9.8°C*	10.6°C*	12.2°C*						

* Field Analysis -grab "<" is "less than" and ">" is "greater than"

** Field Analysis - composite

1) Based on pump time on 2 pumps rated at 1150 gpm aginst 22 ft of head (Influent wet well pumps)

2) Based on 3 measurements at effluent weir.

3) Samples stored on ice and refrigerated prior to analysis.

	Aeration Pond Influent	DOE 1301 Boise Creek Upstream	1300 Boise Creek Downstream	NPDES (Monthly Average)
BOD_5 (mg/l)	20'			
#/day	234'			
TSS (mg/l)	180'			
#/day	3080			
Flow (mgd)	2.05	9.04[3]	11.3[3]	
T. Coli. (#/100 ml)		83[1] est. 160[2] est.	400[1] est. 350[2]	
Fec. Coli. (#/100 ml)		<2[1] 1[2] est.	100[1] 140[2] est.	
Total Solids (mg/l)	288[1]	40[1] 42[1]	59[1] 58[2]	
Total N.V. Sol. (mg/l)	114[1]	26[1] 24[2]	34[1] 32[2]	
Tot. Sus. Sol. (mg/l)	180[1]	3[1] 3[2]	5[1] 6[2]	
Tot. N.V. Sus. Sol. (mg/l)	87[1]	2[1] 2[2]	3[1] 4[2]	
pH	6.7[1] 6.7*	7.6[1] 7.6[2]	7.0[1] 7.0[2]	
Turbidity (NTU's)	38	1[1] 1[2]	4[1] 5[2]	
Cond. (mhos/cm)	51[1]	41[1] 41[2]	55[1] 55[2]	
PBI	1400[1]	63[1] 14[2]	54[1] 54[2]	
COD	234[1]	4.0[1] 4.0[2]	8.0[1] 8.0[2]	
NH_3-N (mg/l)	0.70[1]	<0.02[1] <0.02[2]	<0.02[1] 0.04[2]	
NO_2-N (mg/l)	0.10[1]	<0.02[1] <0.02[2]	<0.02[1] <0.02[2]	

* Field Analysis
1) Grab, 4/11/78
"<" is "less than" and ">" is "greater than"
2) Grab, 4/12/78
3) Based on flows established with magnetic flowmeter.

	Aeration Pond Influent	DOE 1301 Boise Creek Upstream	1300 Boise Creek Downstream	NPDES (Monthl Averag
NO_3-N (mg/l)	0.10[1]	0.35[1] 0.36[2]	0.30[1] 0.30[2]	
O-PO_4-P (mg/l)	0.40[1]	<0.02[1] <0.02[2]	<0.02[1] <0.02[2]	
T-PO_4-P (mg/l)	0.22[1]	0.02[1] <0.02[2]	0.03[1] 0.03[2]	
Dissolved O_2 (mg/l)	6.8[1]	11.6[1]	10.8[1]	
Temp. °C	11.0°C*	7.6°C*	8.3°C*	

* Field Analysis
1) Grab, 4/11/78
2) Grab, 4/12/78
"<" is "less than" and ">" is "greater than"
3) Based on flows established with magnetic flow meter

Phylum Family Genus species	Station 1		Log Pond Eff.		Above Hwy. Bridge	
	Count	d *	Count	d	Count	d
Diptera						
Tenipedidae						
unidentified species (larval)			4			
Tipulidae						
unidentified species 1	3	1.82				
unidentified species 2	3	1.82				
Unidentified species 1	2	1.22				
Unidentified species 2	2	1.22				
Ephemeroptera						
Heptageniidae						
Ironodes sp.	3	1.82				
Rhithrogena decora	17	10.34			1	0.49
Arthroplea sp.	2	1.22				
unidentified species	12	7.30			1	0.49
Ephemeridae						
Ephemerella walkerii	8	4.86			1	0.49
unidentified species	5	3.04			1	0.49
Baetidae						
Baetis baetis	24	14.59			31	15.16
unidentified species					1	0.49
Plecoptera						
Pteronarcidae						
unidentified species	1	0.61				
Nemouridae						
unidentified species					1	0.49
Tricoptera						
Rhyacophilidae						
Rhycophila sp.	2	1.22			1	0.49
Glossosoma sp.	18	10.94			77	37.65
Hydropsychidae						
unidentified sp.	14	8.51			3	1.47
unidentified sp.	1	0.61			1	0.49
Coleoptera						
Elmidae						
unidentified species	1	0.61				
Oligochaeta						
unidentified species	7	4.26			4	1.96
Mollusca						
Planorbidae						
Planorbis operacularis planulatus					2	0.98
Total Count	125		4		125	
Total Density		75.40				61.14
Species Diversity	3.53		0		1.76	

* density per square foot