Publication No. 73-e57

WA-07-1100

State of Washington
Department of Ecology

Memo to: Bill Burwell

From: Ron Devitt

Subject: Weyerhaeuser Company - Snoqualmie

Re: Bill Burwell's Request Memo Dated April 11, 1973

Date: June 21, 1973

OBJECTIVES

1. To characterize the various process discharges
2. To determine the degree of treatment occurring in the settling ditch
3. To evaluate the water quality of the log pond
4. To characterize the effluent from the log pond

INTRODUCTION

On May 7, 1973, Jim Armstrong and I met Weyerhaeuser (Weyco) representatives Roy Reinersten and Bruce Martinell at their Snoqualmie mill to discuss the proposed survey.

On May 8 the survey was conducted as requested, but it was impossible to determine flow at several locations and the depth of sludge build-up in the pond was not determined.

STATION LOCATIONS AND OBSERVATIONS

#1 Effluent from long pond. A composite sample was obtained from the discharge over and through the weir at the outfall. The weir was leaking badly; the traditional method of measuring the head height could not be use to determine the flow.

#2 Settling ditch effluent from 5-foot culvert below syvacel discharge.

#3 Syvacel discharge 10 yards upstream from confluence with settling ditch. Oil was observed on the surface.

#4A Combined storm water and truck wash. Oil was observed on the surface. The flow increased tremendously while truck washer was in use.

#5 Storm water upstream of confluence with 4A. No flow was determined. The culvert was partially obstructed with debris and water was backed up to the north.

#6 Plywood lay-up glue waste.

#7 Discharge from log soaking vats.

#8 Discharge from phenolic glue cooking.

#9 Barker effluent. Samples were obtained from the ditch in the boil from the discharge.

#10 Discharge from powerhouse. This station was not sampled; there was no discharge during the survey period.

#10A Log pond near powerhouse. Coliform samples were taken from catwalk at midchannel.

#11 Combined discharge southwest of "mill" area.

#12 Sewage treatment plant discharge. This station was not sampled because arrangements are being made to connect to the city lagoons.

#13 Intake water from pond.

TABLE II

LAB DATA - WEYCO SNOQUALMIE

STA.	pH	Turb. JTU	COD ppm	BOD ppm	TS pp	TNVS ppm	TSS ppm	TNVSS ppm	NO_3-N filtered ppm	NH_3-N unfilt. ppm	TOTAL-P unfilt. ppm	O-P04P filtered ppm	Phenols ppm	Hexane extracts ppm	Settleable solids ml/l
1-Comp.	6.5	60	164	26	222	111	95	41	.01	.11	.04	ND	---	<.1	.05
1-Grab	6.5	60	---	---	---	---	--	---	---	---	---	--	---	----	---
2-Comp.	6.5	250	419	86	519	277	355	---	.01	.15	1.74	ND	.058	ND	.05
2-Grab	6.5	110	---	---	---	---	--	--	---	---	---	--	---	----	---
3	---	----	---	--	---	---	--	--	---	---	---	--	---	8.	---
4	6.8	350	239	21	795	610	662	576	---	---	---	--	---	----	1.0
4A	6.9	300	---	--	---	---	--	--	---	---	---	--	---	----	---
6	7.0	25	150	12	---	---	--	--	---	---	---	--	---	----	---
7	6.8	10	179	12	---	---	--	--	---	---	---	--	---	----	---
8	6.6	---	172	---	215	105	76	22	---	---	---	--	.016	----	0.1
9-Comp.	6.5	90	910	115	---	---	--	--	.01	.12	---	ND	---	1.	.6
11	6.8	70	163	20	216	110	82	28	---	---	---	--	---	----	0.1
13	6.6	70	167	23	216	107	95	41	---	---	---	--	---	----	---

TABLE I

FIELD DATA

	Temp	pH	Settleable Solids (mg/l)	Flow (estimated cfs)
1	14.4	5.4	---	.15
2	21.4	5.6	.3	2.02
3	14.9	5.9	---	.07
4A	----	---	---	.12 +200%
5	----	---	---	.06
6	11.2	5.5	---	.07
7	34.	---	---	---
8	----	5.9	---	.02
9	----	6.0	4.5	1.74
10	----	----	---	---
11	20.8	---	.05	---
12	----	---	---	---
13	13.7	6.1	---	---

Discussion of Field Data

There is a discrepency between reported field settleable solids and laboratory data. This difference is explained by the fact that on stations 1, 2, and 9, the lab solids were run on the composite and the field solids were determined on grab samples. Station 11 settleable solids are different, but tests were run on two different grab samples.

The pH values obtained in the field were consistently lower than lab values. This is possibly explained by biological and chemical changes which occurred during storage and transport even though the samples were iced.

The flow values were computed by measuring the dimensions of a channel and multiplying by the velocity. Although they are rough estimates, flows are reported to two places to give better comparisons. Intermittent rain fell on the day of the survey.

TABLE III

Sampling Point and Time	Coliform Colonies/100mls Total	Fecal	Fecal Strep
Log pond effluent 945 hrs	55,000	3,000	<400
Log Pond at effluent weir-surface 1510 hrs	50,000	1,900	<400
Log pond at effluent weir-bottom 1510 hrs	60,000	3,500	<400
From catwalk south of powerhouse - mid channel-surface 1450 hrs	80,000	6,000	1300
From catwalk south of powerhouse - mid channel - bottom (4 meters) 1450 hrs	70,000	6,000	1200

Discussion of Lab Data

The values reported characterize the individual discharges.

The treatment ditch appears to reduce settleable solids, BOD, and COD.

The effluent from the log pond is characterized by the data for Station #1.

The coliform data presented in Table III reflect the water "quality" of the log pond.

PERSONAL COMMENTS

Background

June 6, 197

Pat Lee and I did a survey on the sewage treatment plant and composited the log pond effluent at the weir. Additional stations were established in the log pond and grab samples were taken.

The results of this survey indicated that the efficiency of the STP was marginal and that disinfection was inadequate.

The following field data were reported on the log pond effluent from 1100 hours to 1900 hours.

	Max	Min	Mean	Median
Temp (C°)	19.8	19.1	19.6	19.8
pH	7.1	6.2	6.7	6.7
Conductivity (μmhos/cm)	140	125	130	130
Settleable Solids (ml/l)	.3	.1	.1	.1

Laboratory data on the effluent composite from 1300 hours to 1900 hours were:

BOD -	13 ppm	Sp. Conductivity -	112μmhos/cm
COD -	100 ppm	Turbidity -	36 JTU
TS -	183 ppm	pH -	7.1
TNVS -	97 ppm		
TSS -	86 ppm		
NVSS -	40 ppm		

Total coliform samples taken from the outfall were run in the motel using the Millipore Field Kit. Values are reported in colonies/100mls.

TIME		TIME	
1130 -	<20,000	1430 -	22,000
1230 -	26,000	1730 -	<20,000
1330 -	31,000	1830 -	<20,000

The overall quality of the log pond effluent was better during this previous survey. The BOD, COD, Solids, Turbidity, and coliform were all lower. The pH was also within the acceptable range for discharge, contrary to field data obtained in 1973.

Flow Estimation

Flow estimates are rough. The area of water was measured with a tape measure and/or yardstick. The velocity was computed by timing a floating object (cigarette filter) dropped in midstream, and measuring the length of travel. Time was doubled in each case, because the velocity of the general waterway was obviously slower than at the surface midstream.

Although the method was crude, the estimates are somewhat relative and better than an eyeball guess. The use of a 90° "V" notch weir pipe inserts was not possible because the culverts all had flows exceeding the capacity of the weirs. The use of a gurley meter was impossible in shallow depth flows. Also in the settling ditch, the amount of sludge build-up made wading difficult and would have also biased gurley meter readings.

Methods use in calculation are attached.

Coliform

The exceeding high numbers of coliform present a potential health hazard to the employees working in and around the log pond.

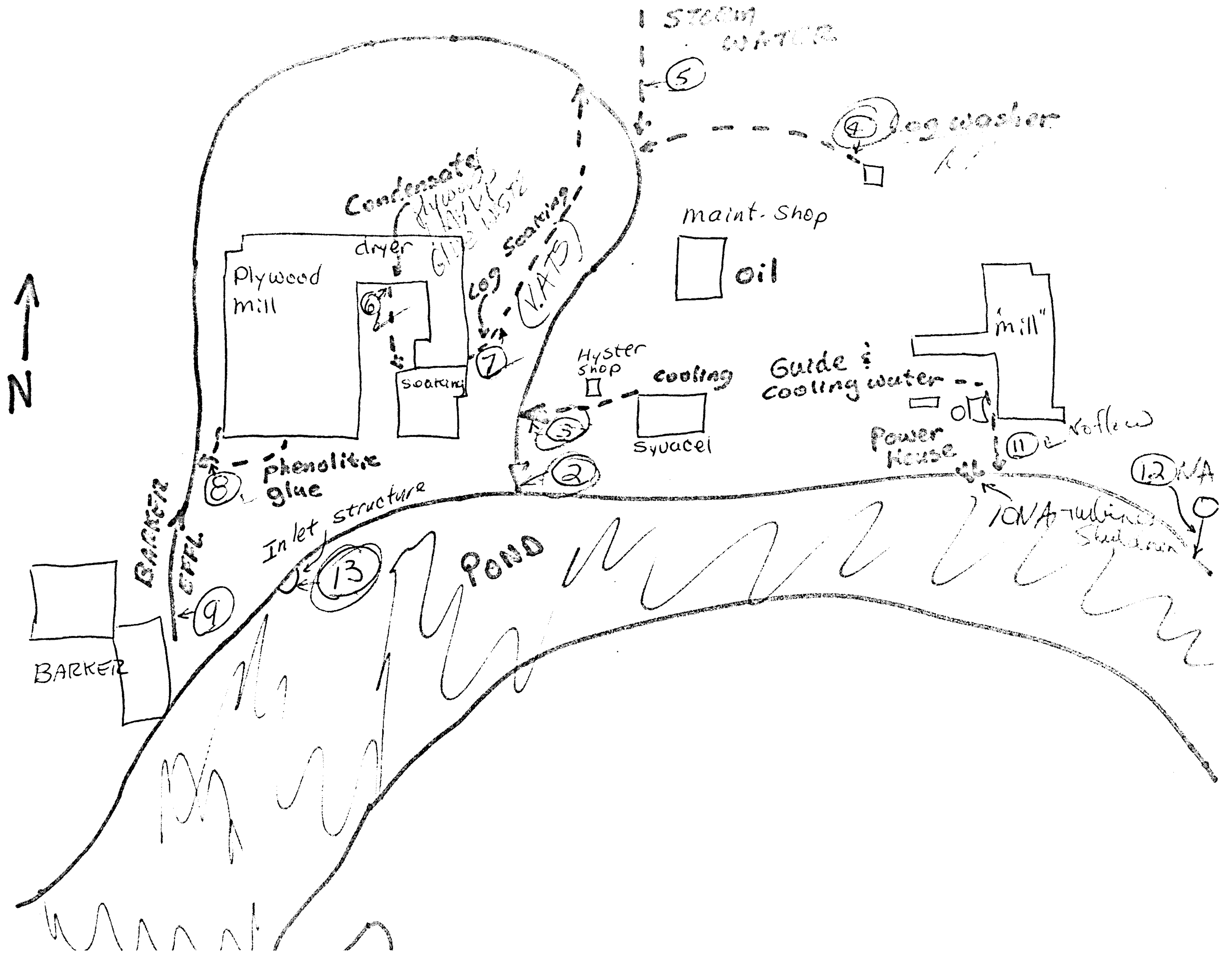
Comparing these numbers to the effluent from the White River operation, the values are gross; this is due to the discharge of inadequately disinfected domestic sewage.

A ratio of fecal to fecal streptococci of greater than 4.4 indicates that the source of bacterial contamination is of human origin. The ratios obtained from Station 10A surface and bottom are 4.6 and 5.0 respectively.

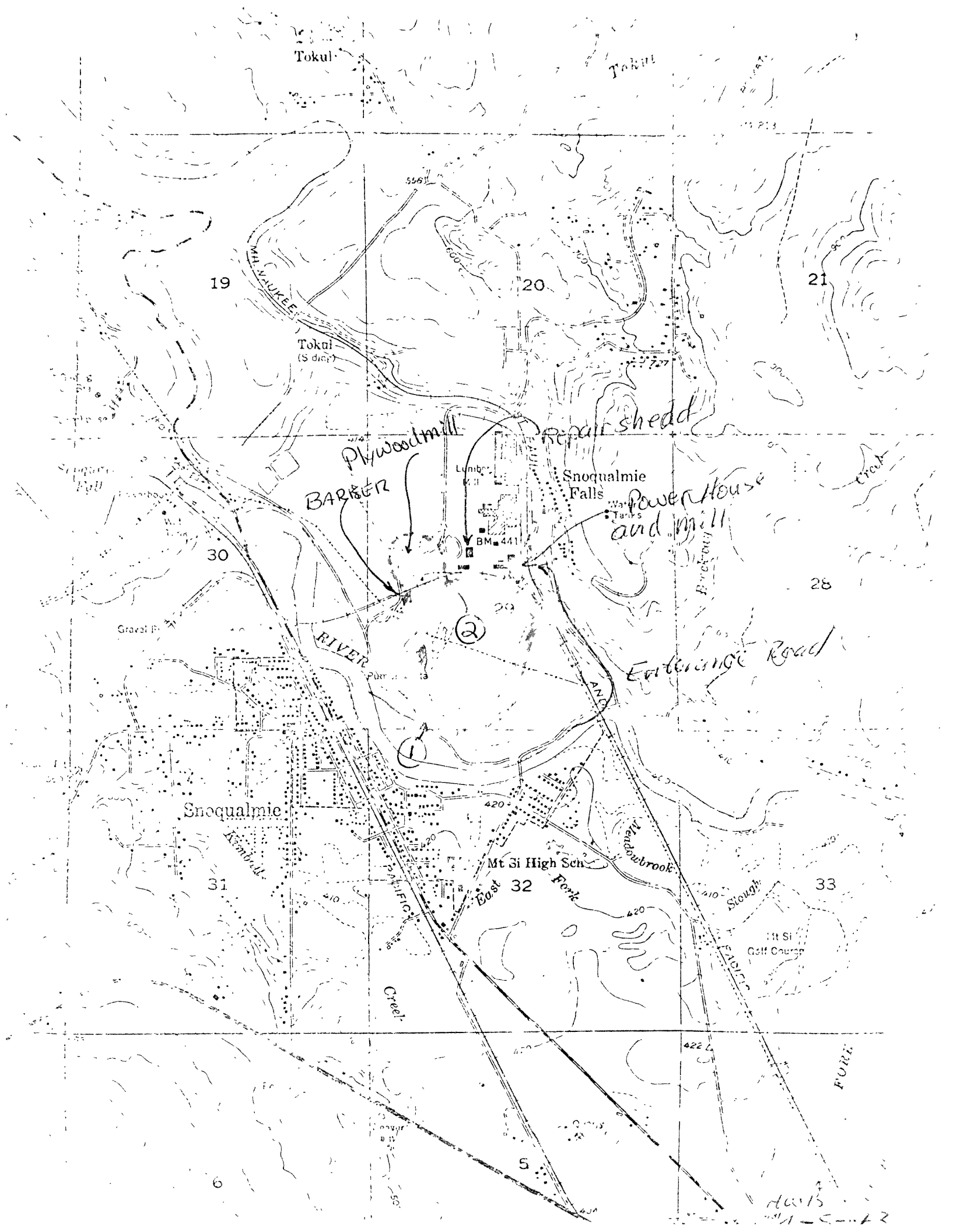
Considering that fecal streptococci do not multiply in water, the values obtained near the powerhouse are very high. An apparent die-off is observed before discharge from the log pond, but the numbers of total coliform (55,000; 50,000; 60,000 colonies/100 mls) are still gross.

The proposal of connecting the domestic sewerage to the city treatment system will improve the bacterial quality of the pond considerably; but, in the interim, the chlorine addition rate on the STP should be increased. There is little danger of damaging any biota of the pond by adding excessive chlorine.

An effort should be made to encourage the industry to inform their employees who have potential contact with the long pond waters of the health hazard which exists.



STORM WATER
5
4
Log washer
Condensate
dryer
Plywood mill
6
Log soaking
VATS
7
soaking
maint. Shop
oil
"mill"
Hyster shop
cooling
Guide & cooling water
3
2
Power House
11
No flow
12 NA
8
Phenolitic glue
Inlet structure
13
POND
BARKER EFFL
9
BARKER
N


Tokul
Tokul
MIL NAUKEE
19
20
21
Tokul
(S dist)
Plywoodmill
Repair shedd
BARBER
Lumber Mill
Snoqualmie Falls
Power House and Mill
Water Tanks
BM 441
30
28
29
Gravel Pit
RIVER
Entrance Road
ANC
Snoqualmie
Kimball
31
32
33
PACIFIC
East Fork
Meadowbrook
Slough
Mt Si High Sch
Mt Si Golf Course
Creek
FORE
5
6

Flow estimates — Wayne Arboretum

STA #1 — concrete channel

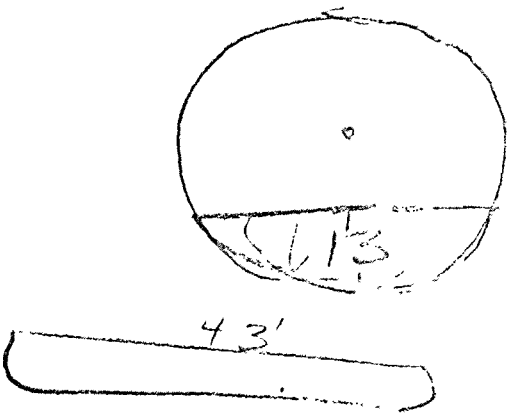
$w = 3'$
$d = 9.5''$
$L = 5'$
$t = 48$ seconds

$A = 3\ ft \times \frac{9.5\ ft}{12} = 7.13\ ft^3$

$\frac{7.13\ ft^3}{48\ sec} = ft^3/sec = cfs$

CFS = .15 cfs

STA #2 average $D = 13'' =$
$L = 43'$
$w = 5'$
$d = 60''$
$t = 68$



If $\frac{D}{d} = \frac{13}{60} = .22$

$C = .128$

Then $area = C\,d^2$

$.1\,(3600) = 360$ $\quad .128 \times (60)^2 = 460\ in^2$

$460\ in^2 \div 144\ in^2/ft^2 = 3.2\ ft^2$

$3.2\ ft^2 \times 43\ ft = 139.5\ ft^3$

$\frac{140\ ft^3}{68\ sec} = 2.02\ ft^3/sec$

3 channel

$w = 8'' = \frac{2}{3}'$

$l = 8'$

$d = 2'' = \frac{1}{6}'$

$t = 12$

$\frac{2}{3} \times 8 \times \frac{1}{6} \div 12 =$ .074 cf

4A

$w = 2.5'$

$l = 8'$

$d = \frac{1}{12}'$

$t = 14$

actual measurement

$2.5 \times 8 \times \frac{1}{12} \div 14 =$ .12 cf

5. no ~~exact~~ actual measurement about $\frac{1}{2}$ of 4A = N.06

6. no actual measurement about equivalent to 3 = N.07

plywood plant Pipe

$\frac{24}{6} = 2\frac{1}{2}$

$\frac{8.5}{30} = .28$

.1800

$C = .1623$

$a = .18(2.5)^2$

$a = .16(6.25)$

$a = .11 \text{ ft}^2$

$.11 \text{ ft}^2 \times$

(1.76 cf

8. $w = 2'$, $d = \frac{2}{3}'$, $l = 3'$, $t = 20$

$2 \times \frac{2}{3} \times 3 / 20 : 102 \text{ cc}$

$\frac{4}{20}$

MEMORANDUM
Department of Ecology

	Check
Information	
For Action	
Permit	
Other	

TO: Ron Pine & Pete Hildebrandt

DATE: April 17, 1973

FROM: H. W. Burwell HWB

SUBJECT: Industrial Waste survey, Weyerhaeuser, Snoqualmie

RON
LOG POND IS A NATURAL POND. WEYCO HAS AN OK TO MODIFY IT - THEY WILL BE AVAILABLE FOR PUBLIC ACCESS. WEYCO CLAIMS 90% BOD REDUCTION IN DITCH BUT BILL SUSPECTS PINESOL - MAY BE OK FOR ALL GRADES - WANTS TO ESTABLISH BOD/COD RATIO IN DITCH.

SCOPING

OBJECTIVE:

1. To characterize the wastes being discharges at the unit process level.
2. To determine the degree of treatment, if any, is being achieved by the current settling ditch.
3. To characterize the effluent from the Snoqualmie Log Pond.
4. To evaluate the water quality in the Log Pond.

BACKGROUND:

In terms of industrial waste water disposal, the Weyerhaeuser Mill at Snoqualmie, until now, has been all but ignored by this Department. The process effluents have not been adequately analyzed nor has the treatment system been evaluated.

The operation consists of a saw mill and power house, a plywood mill, a hydraulic barker and a wood fiber processing operation. The power house has a thermal discharge at times, a blow down discharge and small quantities of bearing water. The saw mill discharges saw guide water and cooling water. The plywood operation has phenolitic glue wastes associated with it along with dryer condensate, log conditioning discharges, and small amounts of cooling water. The most significant discharge is associated with the hydraulic barker, the discharge being treated by means of a settling ditch. The "sylvacel" or wood fiber plant produces small quantities of cooling water. In addition to these effluents, a discharge occurs from the log washer and oil problems are associated with a number of the processes.

Station	Location	Analysis
1	Along Mill Pond Road, Effluent	Composit Sample: BOD_5, COD, suspended solids, settleable solids, volitale solids, hexane extraction Grab Sample: pH, temp., flow, ammonia, nitrate, orthophosphate, total phosphate, turbidity, total and fecal coliform
2	Settling Ditch Effluent	Composit Sample: BOD_5*, COD, suspended solids, settleable solids, volitale

*BOD_5 for ditch effluent should be run after phenol analysis. Toxic conditions may be present (Freeze Sample).

Station	Location	Analysis
		solids, hexane extraction, phenols Grab Samples: pH, temp, flow, turbidity, ammonia, orthophosphate
3	Drainage from Hyster Shop and "Syvacel"	Grab: pH, temp, hexane extraction, estimate flow
4	Log Washer	Grab: BOD_5, COD, suspended solids, settleable solids, flow, turbidity
5	Storm Water ditch	Estimate flow
6	Condensate from drier from ditch	Grab: BOD_5, COD, flow, temp, pH
7	Peeler log soaking effluent	Grab: BOD_5, COD, turbidity, temp
8	Phenolitic glue & cooling	Grab: COD, flow, phenols, pH, settleable solids, suspended solids, total solids
9	Hydraulic Barking	Composit: BOD_5, COD, turbidity, flow, pH, ammonia, total phosphates, hexane extraction
10 NA	Power House Discharge	Grab: Flow, temp, pH
11	Guide water & cooling	Grab: Settleable solids, suspended solids, BOD_5, COD, flow, pH
13	Intake	Grab: Suspended solids, BOD_5, COD, flow, pH, temp

Sample Log Pond bottom and at the surface for total coliform, fecal coliform, and depth of sludge build up.

ENTITY TO CONTACT

825-3581 White River 888-2511 Snoqualmie

1. Bob Hammerly, Weyerhaeuser, ~~888-2511~~
2. Northwest Regional Office, Attn: H. W. Burwell

EXPECTED RESULTS

The most important parameters involve charterization of discharges from the various operations and characterizing the effluent from the log pond.

The results should be in two formats. The first should include all the data and observations taken at the time of sampling. The second should be any comments, statements as to corrective action and reflective observations. Such a division

in the report allows for the data portion only to be transmitted to the industry.

STUDY COMPLETION DATE

By May 15, 1973, so as to insure pond overflow. Due not sample on a Monday or a day following a holiday.

HWB:dw

4-16-73 dd
4-17-73 dt

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: .....

COPIES TO: .....

.....

LAB FILES .....

DATA SUMMARY

Source Weyco @ Snoqualmie

PAGE 2 OF 2

Collected By _____

Date Collected _____

Goal, Pro./Obj. _____

Log Number: 73-1691	92	93	94	95	96	97	98			STORET
Station: 9	11	13	0945 1	1510 SURF. 1	1510 BOTT. 1	SURF. 10A	BOTT. 10A			
pH 6.5	6.8	6.6								00403
Turbidity (JTU) 90	70	70								00070
Conductivity (umhos/cm)@25°C 6.0 (field pH)	—	6.1								00095
COD 910	163	167								00340
BOD (5 day) 115	20	23								00310
Total Coliform (Col./100ml) (temp)	20.8	13.7	55,000	50,000	60,000	80,000	70,000	F	4	31504
Fecal Coliform (Col./100ml) 4.5 (Sett. Solids)	.05	—	3,000	1,900	3,500	6,000	6,000	F	4	31616
NO3-N (Filtered) .01*										00620
NO2-N (Filtered)										00615
NH3-N (Unfiltered) .12										00610
T. Kjeldahl-N (Unfiltered)										00625
O-PO4-P (Filtered) ND										00671
Total Phos.-P (Unfiltered)										00665
Total Solids	216	216								00500
Total Non Vol. Solids	110	107								
Total Suspended Solids	82	95								00530
Total Sus. Non Vol. Solids	28	41								
Fecal Strep (colilert)			<400	<400	<400	1300	1200			
Settleable Solids .2	0.1									
Hexane Extractables 1.										
FC : FS						4.6	5.0			

Note: All results are in PPM unless otherwise specified. ND is "None Detected"
Convert those marked with a * to PPB (PPM X 10^3) prior to entry into STORET

* NOT REQUESTED

Summary By Stephen D. Nott Date 5-22-73

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: R. Devitt

COPIES TO:

LAB FILES

DATA SUMMARY

Source: Weyco @ Snoqualmie (NW)

Collected By: RCD

Date Collected: 5-8-73

PAGE 1 of 2

Goal, Pro./Obj.: 3.2.23

Log Number: 73-	1681	82	83	84	85	86	87	88	89	90	STORET
Station:	Comp #1	Grab #1	Comp #2	Grab #2	3	4	4A	6	7	8	
pH	6.5	6.5	6.5	6.5	-	6.8	6.9	7.0	6.8	6.6	00403
Turbidity (JTU)	60	60	250	110	-	350	300	25	10	-	00070
~~Conductivity (umhos/cm)@25°C~~ Field pH	-	5.4	-	5.6	5.9	—	-	5.5	—	5.9	00095
COD	164		419			239		150	179	172	00340
BOD (5 day)	26		86			21		12	12		00310
~~Total Coliform (Col./100ml)~~ TEMP	-	14.4	-	21.4	14.9			11.2	34		31504
~~Fecal Coliform (Col./100ml)~~ Sett. Solids	—	[illegible]	-	.3				—			31616
NO3-N (Filtered)	.01*		.01*								00620
NO2-N (Filtered)											00615
NH3-N (Unfiltered)	.11		.15								00610
T. Kjeldahl-N (Unfiltered)											00625
O-PO4-P (Filtered)	ND		ND								00671
Total Phos.-P (Unfiltered)	.04		1.74								00665
Total Solids	222		519			795				215	00500
Total Non Vol. Solids	111		277			610				105	
Total Suspended Solids	95		355			~~883~~ 662				76	00530
Total Sus. Non Vol. Solids	41		215			261 576				22	
Phenols			.058							.016	
Settleable Solids	~~.005~~ 1.5		.05			1				0.1	
Hexane Extractables	<1.		ND		8.						

Solids changed by phone 5-31-73 she used 100ml instead of 75ml as recorded.

Settleable Solids changed in person w/ SR & CB 5-25

Note: All results are in PPM unless otherwise specified. ND is "None Detected"
Convert those marked with a * to PPB (PPM X 10^3) prior to entry into STORET
* NOT REQUESTED

Summary By: Stephen D. Roll

Date: 5-22-73