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STATE OF WASHINGTON

Dixy Lee Ray
Governor

DEPARTMENT OF ECOLOC

7272 Cleanwater Lane, Olympia, Washington 98504

WA-25-5010

MEMORANDUM
December 11, 1980

To: George Houck

From: Bill Yake

Subject: Weyerhaeuser, Longview - 9/23/80 · Class II Inspection

Introduction:

On September 23 and 24, 1980 a Class II inspection was conducted at the Weyerhaeuser facility at Longview. Personnel involved included Sharon Chase and Bill Yake (Department of Ecology [DOE], Water and Wastewater Monitoring Section), Roger Stanley (DOE, Industrial Section), and Jim Yount (Weyerhaeuser, Water and Wastewater Project Engineer).

The Weyerhaeuser facility is a Kraft and thermo-mechanical pulp/paperboard mill which includes a chlor-alkali plant, a water treatment plant, and a small sanitary wastewater treatment plant. Major wastewater treatment facilities include an activated sludge (deep tank) system for the pulping process wastewaters and a small lagoon for treatment of sanitary wastes. Figure 1 is a simplified schematic of wastewater units and flows at the Weyerhaeuser facility.

Wastewaters are discharged to the Columbia River (Segment 26-00-01) 2.1 miles downstream from its confluence with the Cowlitz River.

Determination of compliance status was based on the pertinent portions of National Pollution Discharge Elimination System (NPDES) waste discharge permit WA 000012-4 (September 29 revision). Roger Stanley reviewed laboratory procedures.

Sampling Procedure:

Automatic composite samplers were used to obtain 24-hour composite samples at five locations (see Figure 1 and Table 6). Grab composites were obtained at three locations (see Figure 1 and Table 1) while portions of Weyerhaeuser composite samples were obtained for the number one secondary clarifier effluent and filter plant waste flow. The flows and DOE laboratory and field test results are presented in Table 2. Samples were split with Weyerhaeuser for both analysis at the Longview plant laboratory and at their headquarters' research and development (R & D) laboratory. These results are given in Tables 3 and 4, respectively. Flows were, in most cases, obtained from Weyerhaeuser flow totalizers. The flow meter at the sanitary plant appeared to be out of calibration

based on an instantaneous check of head height behind the V-notch weir. Because the strip chart indicated a relatively constant effluent flow, the totalized 24-hour flow from the ITT meter was corrected by multiplying it by the instantaneous flow determined by head measurement and dividing by the flow simultaneously recorded on the flow meter strip chart. The flow reported in Table 2 reflects this correction. Later checks by Weyco personnel confirmed the flow meter inaccuracy and it has been corrected. Although the Parshall flume at the primary clarifier influent has been recently calibrated, it is prone to surging. Widely fluctuating flows and the lack of a long, straight approach may compromise the accuracy of this device.

Weyco samplers are not iced (a problem addressed in the last Class II) although they are collected each shift (8 hours) and stored in a refrigerator.

A sample of dried secondary sludge was obtained for metals analyses. These samples were split and also analyzed at Weyco R & D labs. The results are given in Table 5.

Results:

Analytical results are compared against permit requirements in Tables 2, 3, and 4. These results and comparisons are summarized in Table 6. In general, the facility was easily meeting permit limitations. Two exceptions to this compliance were the flows for cooling water (8.97 MGD recorded; daily average permit limitation 1.0 MGD) and sanitary effluent (0.348 MGD recorded; daily average permit limitation 0.3 MGD).

In the case of the cooling water (003) the plant has evidently separated "clean water" flows from the pulping wastewater flow (001 & 002) and routed them to the cooling water. This re-routing evidently has not been reflected in the permit either as a decrease in permitted 001 and 002 flows, or as an increase in permitted 003 flows.

The sanitary plant wastewater strength is very weak (note nutrient concentrations in effluent, Table 2). It appears that the plant is receiving substantial flow from sources not containing human wastes.

One constituent attained only borderline compliance. This constituent was the total chlorine residual (TCR) in the sanitary effluent. The permit allows 0.5 to 5.0 mg TCR/l. Two on-site analyses revealed 4.5 and 5.0 mg/l. There is no reason to keep chlorine levels this high. The chlorine contact structure is well designed and concentrations of 1.0 mg TCR/l should be more than sufficient to provide adequate disinfection. Field analyses of samples of Columbia River water obtained near (5 to 25 yards) the sanitary outfall revealed concentrations of 0.25 to 4.5 mg TCR/l. The federal criterion established for the protection of aquatic life is .002 mg TCR/l. This problem was noted in the last Class II report (1978) and has not been addressed.

Two effluent streams were not under permit conditions at the time of the inspection; however, results of samples from these streams appear to contain some important information. The results for the chlor/alkali discharge and the water plant waste flow are therefore discussed below.

The comparison of laboratory results and permit limitations (effective September 29, 1980) for the chlor/alkali plant are given below:

Table 8. Chlor/Alkali Results

	DOE Results	Weyco Results	Sept. 29, 1980 Daily Average Permit Limitations
Flow (MGD)		3.1	
TSS (mg/l)	<1	--	--
(lbs/day)	<26	--	189
Lead (mg/l)	<.08	<.01	--
(lbs/day)	<2.07	<.26	1.5
Mercury (mg/l)	.0006	--	--
(lbs/day)	.016	--	.083
Total Chlorine Residual (mg/l)	1.0	--	1.5
pH (S.U.)	6.5	--	--
Specific Conductivity (μmhos/cm)	194	--	--
Turbidity	1	--	--
Silver (mg/l)	<.01	--	--
Cadmium (mg/l)	<.01	--	--
Chromium (mg/l)	<.01	--	--
Copper (mg/l)	<.01	--	--
Iron (mg/l)	.07	--	--
Manganese (mg/l)	.21	--	--
Nickel (mg/l)	<.07	--	--
Zinc (mg/l)	.01	--	--

This discharge was meeting all current permit limitations. Only the chlorine residual concentration (1.0 mg/l) approached permit levels (1.5 mg/l).

Although the wastewater flow from the water treatment plant is not currently under permit limitations, the effluent suspended solids loading from this source (20,500 lbs/day) was about 1-1/2 times the loading from all other plant sources combined. The suspended solids concentration in the water plant waste flow sample was 360 mg/l.

These values were characterized by Jim Yount as "not unusual." They should, however, be considered in light of the recent St. Helen's eruption and the design and operation of the water treatment plant. Water

is drawn from the north side of the Columbia River below its confluence with the Cowlitz River. Suspended solids concentrations in the Cowlitz River have been generally high since the May 18 eruption and subsequent dredging activities in the Cowlitz. Although this would result in elevated intake solids, it is probable that during the inspection the intake of volcanic solids was minimal due to low flow in the Cowlitz.

Treatment at the water plant consists of clarification in settling basins, followed by alum addition and sand filtration. Wastewater from the plant consists of filter backwash and solids removal from the clarifiers. Solids discharged from the plant can vary substantially from day to day because three of the five clarifiers are flushed of solids infrequently while solids discharge from the sand filters and other two clarifiers proceeds on a more or less continuous basis.

Because both alum and essentially all intake solids are eventually discharged to the wastewater stream, and because this wastewater flow is about 10 percent of the intake flow, one would expect a waste stream solids concentration at least 10 times the raw water suspended solids concentration.

Solids from three of the five clarifiers were not being discharged during the inspection. Because of this and the low Cowlitz River flow, the suspended solids load reported here in the water plant waste flow probably represents best-case, post-eruption conditions.

Comparision of Laboratory Results

Split samples were analyzed by DOE Tumwater, Wwyerhaeuser Longview, and Weyerhaeuser R & D laboratories. A summary of the comparisions of analyses for constituents addressed in the permit is shown in Table 7. Laboratory procedures were reviewed by Roger Stanley and are not addressed here.

Based on the comparison of split sample results, the Weyco, Longview lab appears to do an excellent job of anlaysis on BOD, TSS, and pH tests. The Weyco R & D lab did not fare well in the suspended solids and pH tests. Jim Yount noted that the two extreme TSS values reported by R & D were noted to be unusual but no further explanation was offered.

Conclusions:

1. Weyerhaeuser, Longview, was generally meeting permit limitations and split sample results indicate accurate analysis at the Longview laboratories.

2. The permit has not been updated to reflect the shift of flows from the treatment plant flow (001 and 002) to the cooling water discharge (003).

3. Maximum residual chlorine concentrations permitted in the sanitary effluent should be reduced. We believe that adequate disinfection can be achieved with 1.0 mg/l residual chlorine. Present concentrations (4.5 to 5.0 mg/l) are resulting in substantial excursions of federal receiving water criteria.

4. During the inspection the major source of effluent suspended solids loading was the water treatment waste flow. This stream accounted for about 60 percent of the total suspended solids discharged from the plant during this time period.

BY:cp

Attachments

FIGURE 1

FLOW DIAGRAM - WEYERHAUSER, LONGVIEW

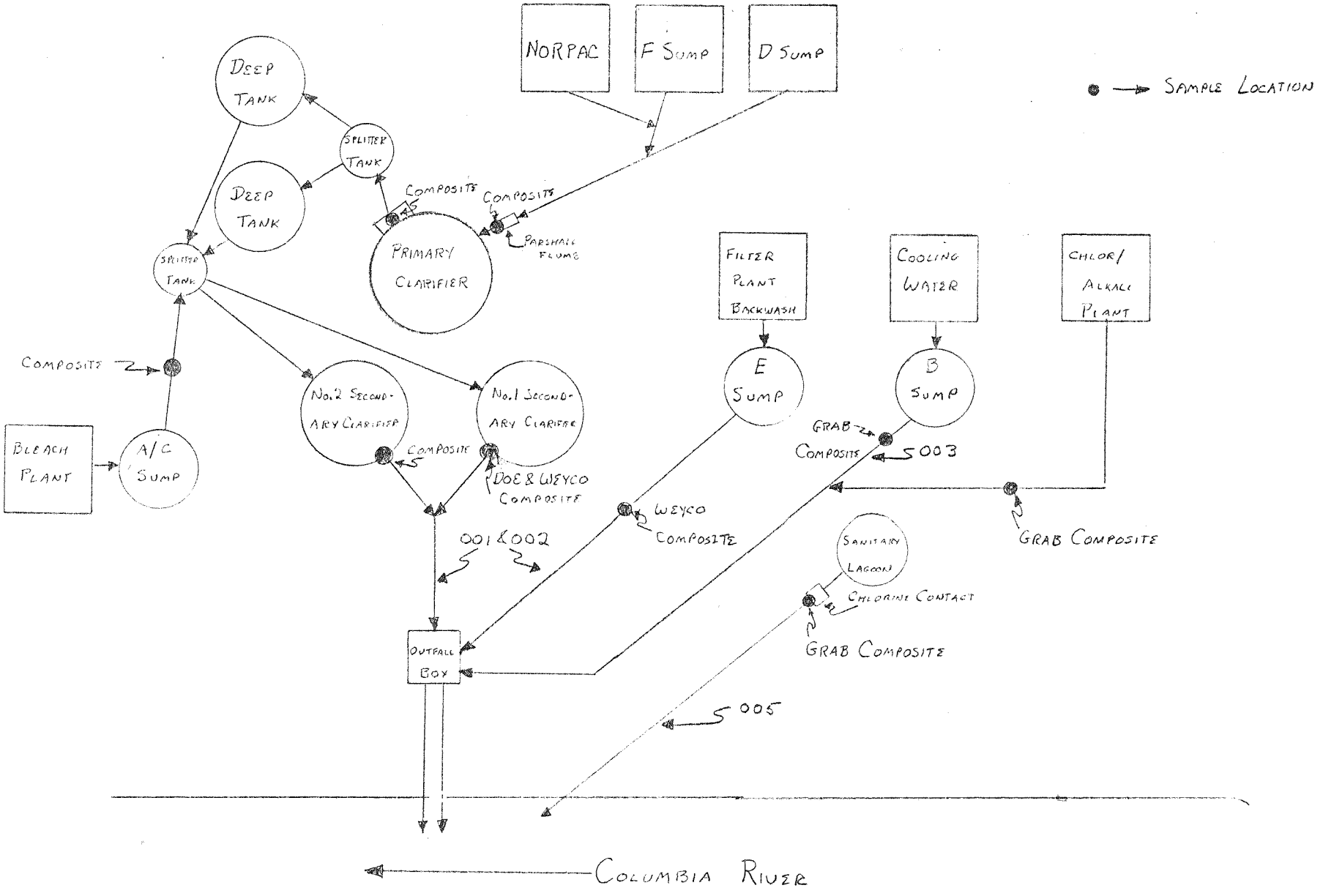

Table 1. Sampling Locations - Composite and Grab Composite

Sample/Rate	Date/Time In	Location
Primary Influent 250 ml/30 min.	9/23/80 - 1000	Downstream from Parshall flume, prior to primary clarifier inf.
Primary Effluent 250 ml/30 min.	9/23/80 - 0935	Outfall plunge pool, primary clarifier
A/C Sump 250 ml/30 min.	9/23/80 - 1130	From tap in A/C line, same as Weyco sample location
#1 Secondary Clar. Eff. 250 ml/30 min.	9/23/80 - 0910	Outfall of #1 secondary clar. - same as Weyco sampler location
#2 Secondary Clar. Eff. 250 ml/30 min.	9/23/80 - 0915	Outfall of #2 secondary clar. - same as Weyco sampler location
Cooling Water Grab composite	9/23/80 - grab comp.	Directly from B sump
Sanitary Effluent Grab composite	9/23/80 - grab comp.	From discharge end of chlorine contact chamber
Chlor. Alkali Effluent Grab composite	9/23/80 - Grab comp.	Tap in chlor/alkali discharge line
#1 Secondary Clar. Eff. Weyerhaeuser Sampler	9/24/80 - 8-hour comp. only w/Weyco sampler	Same as #1, secondary eff. above
Filter Plant Waste Flow Weyerhaeuser sampler	9/23/80 - Approx. 18 hr. comp. w/Weyco Sample	Fixed Weyco site in backwash discharge point

Grab Samples and Field Analyses

Location	Date/Time	Analyses
#1 Sec. Clar. Eff.	9/23/80 - 0925	Fecal coliform, Klebsiella sp.
#2 Sec. Clar. Eff.	9/23/80 - 0925 9/24/08 - 0915	Fecal coliform, Klebsiella sp. Fecal coliform
Sanitary Effluent	9/23/80 - 1430	Fecal coliform, Total Cl_2 res., pH, Cond., Dissolved oxygen
Primary Clarifier Inf.	9/23/80 - 1000 9/24/80 - 0950	pH, Cond. pH, Cond.
Primary Clar. Eff.	9/23/80 - 0935 9/24/80 - 0925	pH, Cond. pH, Cond.
A/C Sump	9/23/80 - 1130 9/24/80 - 1105	pH, Cond. pH, Cond.
#1 Sec. Clar. Eff.	9/23/80 - 0910 9/24/80 - 0900	pH, Cond., Dissolved oxygen pH, Cond., Dissolved oxygen
#2 Sec. Clar. Eff.	9/23/80 - 0915 9/24/80 - 0855	pH, Cond., Dissolved oxygen pH, Cond., Dissolved oxygen
Chlor/Alkali Eff.	9/23/80 - 1415	Temp., Total Chl. Res., pH
Filter Plant Waste Flow	9/23/80 - 1130	pH, Cond.
Cooling Water	9/23/80 - 1140	pH, Cond.
Sanitary Effluent	9/23/80 - 1430	pH, Cond., Total Chl. Res., D.O., temp.

Table 2. Comparison of DOE Results with NPDES Permit Limitations.

	Primary Influent	Primary Effluent	A/C Sump	#1 Sec. Clar. (DOE)	#1 Sec. Clar. (WEYCO)	#2 Sec. Clar. (DOE)	001 and 002	Permit Cond. Daily Avg. 001 and 002	Cooling[1] Water	Permit Cond. Daily Avg. 003	Sanitary[1] Effluent	Permit Cond. Daily Avg. 005	Chlor/ Alkali[1] Effluent	Filter Plant Waste Flow
Flow (MGD)	22.92	(22.92)	(30.45)	26.33	--	27.04	53.37	90	8.97(?)	1.0	(.348)[2]	0.3	3.1	6.84
BOD_5 (mg/l)	290	240	170	15	20	13	--	--	--		5	30		--
(lbs/day)	55,400	43,900	43,200	3,290	--	2,930	6,220	28,000	--		14.5	75	<1	--
TSS (mg/l)	--	65	58	37	27	20	--	--	<1		10	30		360
(lbs/day)	--	12,400	14,700	8,120	--	4,510	12,600	45,000			29	75		20,500
COD (mg/l)	720	670	940	550	480	480					39			--
Fecal Coliform (#/100 ml)	--	--	--	35 est.	--	10 est/<10	--		--		<1	200		--
Klebsiella (#/100 ml)	--	--	--	35 est.	--	0/-	--		--		--			--
pH (S.U.)	9.7	9.9	4.4	7.0	7.0	7.2	6.6-7.2	5.0-9.0	7.4	6.0-8.5	6.9		6.5	7.1
	7.4*	10.4*	5.9*	6.8*	--	6.8*			7.0*		6.8*			6.9*
	6.5*	9.9*	4.1*	6.6*	--	6.6*								--
	9.9**	9.9**	--	7.0**	--	7.1**								--
Sp. Conductivity	1,520	1,810	4,280	3,170	3,170	3,360			170		322		194	182
(umhos/cm)	1,900*	2,400*	4,650*	3,150*	--	2,950*			152*		315*			170*
	930*	1,500*	4,280*	2,700*	--	2,770*								--
	1,590**	1,950**	--	3,200**	--	3,400**								--
Color (S.U.)	1,200	1,300	2,200	2,200	2,200	2,200								--
Turbidity (NTU)	360	120	30	40	32	35			1		9		1	140
Total Solids (mg/l)	--	1,600	3,100	2,200	2,100	2,200								--
TNVS (mg/l)	--	1,100	2,400	1,900	1,700	1,900								--
TSS (mg/l)	--	65	58	37	27	20			<1		10		<1	360
TNVSS (mg/l)	--	16	<1	<1	<1	<1								--
NH_3-N (mg/l)	--	--	--	0.06	0.09	0.05					3.7			--
NO_2-N (mg/l)	--	--	--	<0.1	<0.1	<0.1					<0.1			--
NO_3-N (mg/l)	--	--	--	<0.1	<0.1	<0.1					0.16			--
O-PO_4-P (mg/l)	--	--	--	0.50	0.60	0.60					0.40			--
T-P (mg/l)	--	--	--	0.86	0.60	0.76					1.0			--
PBI (mg/l)	3,000	2,700	1,100	1,100	950	1,100								--
Dis. Oxygen (mg/l)			--	<1*	--	0.4*					8.6			--
T. Chl. Resid. (mg/l)	--	--	--	--	--	--					4.5*	0.5-	1.0*	--
						--					5.0*	5.0		--
Temperature (°C)	--	--	--	--	--	--			--	32.2	19.6		29.6	--

[1]Grab composite.

[2]Based on on-site measurement of head behind 45° V-notch weir.

"<" = "less than"

*Field Test - Grab sample.

**Field Test - Composite sample.

Table 3. Comparison of WEYCO Longview Laboratory Results with NPDES Permit Limitations.

	Primary Influent	Primary Effluent	A/C Sump	#1 Sec. Clar. (DOE)	#1 Sec. Clar. (WEYCO)	#2 Sec. Clar. (DOE)	001 and 002	Permit Cond. Daily Avg. 001 and 002	Cooling Water	Permit Cond. Daily Avg. 003	Sanitary Effluent	Permit Cond. Daily Avg. 005	Filter Plant Waste Flow
Flow (MGD)	22.92	(22.92)	(30.45)	26.33	--	27.04	53.37	90	8.97	1.0	(.405)*	0.30	6.84
BOD (mg/l)	319	287	228	16	--	16	--	--	--		7	30	--
(lbs/day)	61,000	54,900	57,900	3,510	--	3,610	7,120	28,000	--		23	75	--
TSS (mg/l)	1,080	71	80	50	48	31	--	--	--		7.9	30	401
(lbs/day)	206,000	13,600	20,300	11,000	--	6,990	18,000	45,000	--		27	75	22,900
COD (mg/l)	685	741	950	513	456	456	--	--	--		--		--
pH (mg/l)	9.4	9.5	4.4	7.1	7.2	7.3	7.1-7.3	5.0-9.0	6.9	6.0-8.5	--		--
Spec. Cond. (μmhos/cm)	1,400	1,700	1,100	3,000	2,900	3,100	--	--	160		--	--	--
TSS (mg/l)	1,080	71	80	50	48	31	--	--	--		7.9	30	401
TNVSS (mg/l)	486	19	26	11	--	10	--	--	--		0.7	--	--

*Flow meter subsequently found out of calibration - value probably too high, see Table 2.

Table 4. Comparison of Analytical Results - WEYCO Headquarters (R & D) Laboratory with NPDES Permit Limitations.

	Primary Influent	Primary Effluent	A/C Sump	#1 Sec. Clar. (DOE)	#1 Sec. Clar. (WEYCO)	#2 Sec. Clar. (DOE)	001 and C02	Permit Cond. Daily Avg. 001 and 002	Cooling Water	Permit Cond. Daily Avg. 003	Sanitary Effluent	Permit Cond. Daily Avg. 005	Filter Plant Waste Flow
Flow (MGD)	22.92	(22.92)	(30.45)	26.33	--	27.04	53.37	90	8.97	1.0	(.405)**	(.300)	6.84
BOD (mg/l)	308	276	191	11	15	15	--	--	--	--	--	30	--
(lbs/day)	58,900	52,800	48,500	2,420	--	3,380	5,800	28,000	--	--	--	75	--
TSS (mg/l)	1,170	120	22	46	48	64	--	--	5,390*	--	--	30	5,800*
(lbs/day)	224,000	22,900	5,590	10,100	--	14,400	14,500	45,000	*	--	--	75	*
COD (mg/l)	1,280	560	890	406	401	377	--	--	--	--	--	--	--
Fecal Coli. (#/100 mls)	--	--	--	--	--	5	--	--	--	--	<2	200	--
pH (S.U.)	7.2	7.3	7.8	7.3	7.1	7.3	7.1-7.3	5.0-9.0	7.5	6.0-8.5	--	--	6.8
Spec. Cond. (μmhos/cm)	1,300	1,700	3,500	3,500	2,500	2,500	--	--	140	--	--	--	150
Color (S.U.)	410	48	800	1,100	1,200	1,200	--	--	--	--	--	--	--
Turb. (NTUs)	108	180	54	77	71	63	--	--	1.4	--	--	--	200
Tot. Solids (mg/l)	2,263	1,503	2,517	2,236	2,109	2,233	--	--	--	--	--	--	--
TNVS (mg/l)	1,415	1,138	1,954	1,888	1,769	1,900	--	--	--	--	--	--	--
TSS (mg/l)	1,170	120	22	46	48	64	--	--	5,390*	--	--	--	5,800*
NVSS (mg/l)	510	25	4	10	12	22	--	--	--	--	--	--	--
NH_3-N (mg/l)	--	--	--	.029	--	.03	--	--	--	--	--	--	--
NO_2-N (mg/l)	--	--	--	.01	--	.01	--	--	--	--	--	--	--
NO_3-N (mg/l)	--	--	--	.03	--	<.01	--	--	--	--	--	--	--
Tot.-P (mg/l)	--	--	--	1.18	--	1.18	--	--	--	--	--	--	--

*Apparent laboratory error. "<" = "less than"

**Flow meter subsequently found out of calibration; value probably too high, see Table 2.

Table 5. Sludge Metals Results.

Element	WEYCO mg/kg wet wt.	DOE mg/kg wet wt.	mg/kg dry wt.
Al	2,500		
B	3		
Ba	44		
Ca	57,000		
Cd	0.2	0.43	1.3
Co	0.6		
Cr	12	8.3	25
Cu	11	14	43
Fe	765		
Hg	0.17	0.21	0.62
K	225	--	--
Mg	960	--	--
Mn	180	--	--
Na	2,050	--	--
Ni	8	20	61
P	335	--	--
Pb	44	60	180
Sn	<1	--	--
Zn	26	35	105

% Solids = 33%

"<" = "less than"

Table 6. Permit Compliance.

	001 and 002				003				005			
	DOE Results	WEYCO, Longview	WEYCO, R & D	Permit Daily Avg.	DOE Results	WEYCO, Longview	WEYCO, R & D	Permit Daily Avg.	DOE Results	WEYCO, Longview	WEYCO, R & D	Permit Daily Avg.
Flow (MGD)	53.4	(53.4)	(53.4)	90	8.97	--	--	1.0	0.348	.405	--	0.3
BOD_5 (mg/l)	--	--	--	--	--	--	--	--	5	7	--	30
(lbs/day)	6,220	7,120	5,800	28,000	--	--	--	--	14.5	23	--	75
TSS (mg/l)	--	--	--	--	--	--	--	--	10	7.9	--	30
(lbs/day)	12,600	18,000	14,500	45,000	--	--	--	--	29	27	--	75
pH (S.U.)	6.6-7.2	7.1-7.3	6.8-7.3	5.0-9.0	7.0-7.4	6.9	7.5	6.0-8.5	--	--	--	
Fecal Coli. (#/100 ml)	--	--	--	--	--	--	--	--	<1	--	<2	200
T. Chl.,Res. (mg/l)	--	--	--	--	--	--	--	--	4.5	--	--	0.5-5.0

"<" = "less than"

Table 7. A Summary of the Comparisons of Laboratory Results - Composite Sample, Permit Parameters.

Constituent	Location	DOE	WEYCO, Longview	WEYCO, R & D
BOD_5 (mg/l)	Primary Influent	290	319	308
	Primary Effluent	240	287	276
	A/C Sump	170	228	191
	#1 Sec. Clar. Eff. DOE	15	16	11
	#1 Sec. Clar. Eff. WEYCO	20	--	15
	#2 Sec. Clar. Eff. DOE	13	16	15
	Sanitary Effluent	5	7	--
TSS	Primary Influent	--	1,080	1,170
	Primary Effluent	65	71	120**
	A/C Sump.	58	80	22**
	#1 Sec. Clar. Eff. DOE	37	50	46
	#1 Sec. Clar. Eff. WEYCO	27**	48	48
	#2 Sec. Clar. Eff. DOE	20	31	64**
	Filter Backwash	360	401	5,800*
	Cooling Water	<1	--	5,390*
	Sanitary Effluent	10	7.9	--
pH	Primary Influent	9.7	9.4	7.2*
	Primary Effluent	9.9	9.5	7.3*
	A/C Sump	4.4	4.4	3.8
	#1 Sec. Clar. Eff. DOE	7.0	7.1	7.3
	#1 Sec. Clar. Eff. WEYCO	7.0	7.2	7.1
	#2 Sec. Clar. Eff. DOE	7.2	7.3	7.3
	Filter Backwash	7.1	--	6.8
	Cooling Water	7.4	6.9	7.5
	Sanitary Effluent	6.9	--	--

*Probable laboratory errors.
**Possible laboratory errors.
"<" = "less than"