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STATE OF WASHINGTON

Dixy Lee Ray
Governor

DEPARTMENT OF ECOLOGY

7272 Cleanwater Lane, Olympia, Washington 98504

MEMORANDUM

May 8, 1980

To: Bruce Johnson, Roger Stanley

From: Bill Yake

Subject: Class II Compliance Monitoring Inspection, Scott Paper Company, Everett, Washington

Introduction:

A Class II compliance inspection was conducted at Scott Paper Company's pulp and paper mill (Everett) on March 10-12, 1980. The inspection was conducted by Roger Stanley and Bob Bishop (DOE, Industrial Section) and Bill Yake (DOE, Water and Wastewater Monitoring Section). Scott paper was represented by Cecil Baldwin. Also in attendance was Dan Tangerone (USEPA).

The Scott facility is a sulfite pulp and paper mill which has four separate outfalls discharging to the East Waterway of Everett Harbor and Port Gardner. The numbers, names, typical flows, and general discharge location of these outfalls are listed below.

Table 1. Outfall Identification

Number	Name	Typical Flow (MGD)	Discharge Location
001	"Deep water outfall"	5	Port Gardner
003	"Main outfall"	5	Dock-side diffuser, outer east waterway
004	"Tissue mill outfall"	5	Middle east waterway
008	"Secondary"	15	Inner East waterway

The location of the mill and the three shallow water outfalls is shown in Figure 1. Scott completed construction of a new activated sludge secondary treatment system in November 1979. Full operation was achieved in January 1980. This monitoring inspection was scheduled to coincide with operation of the new secondary facilities.

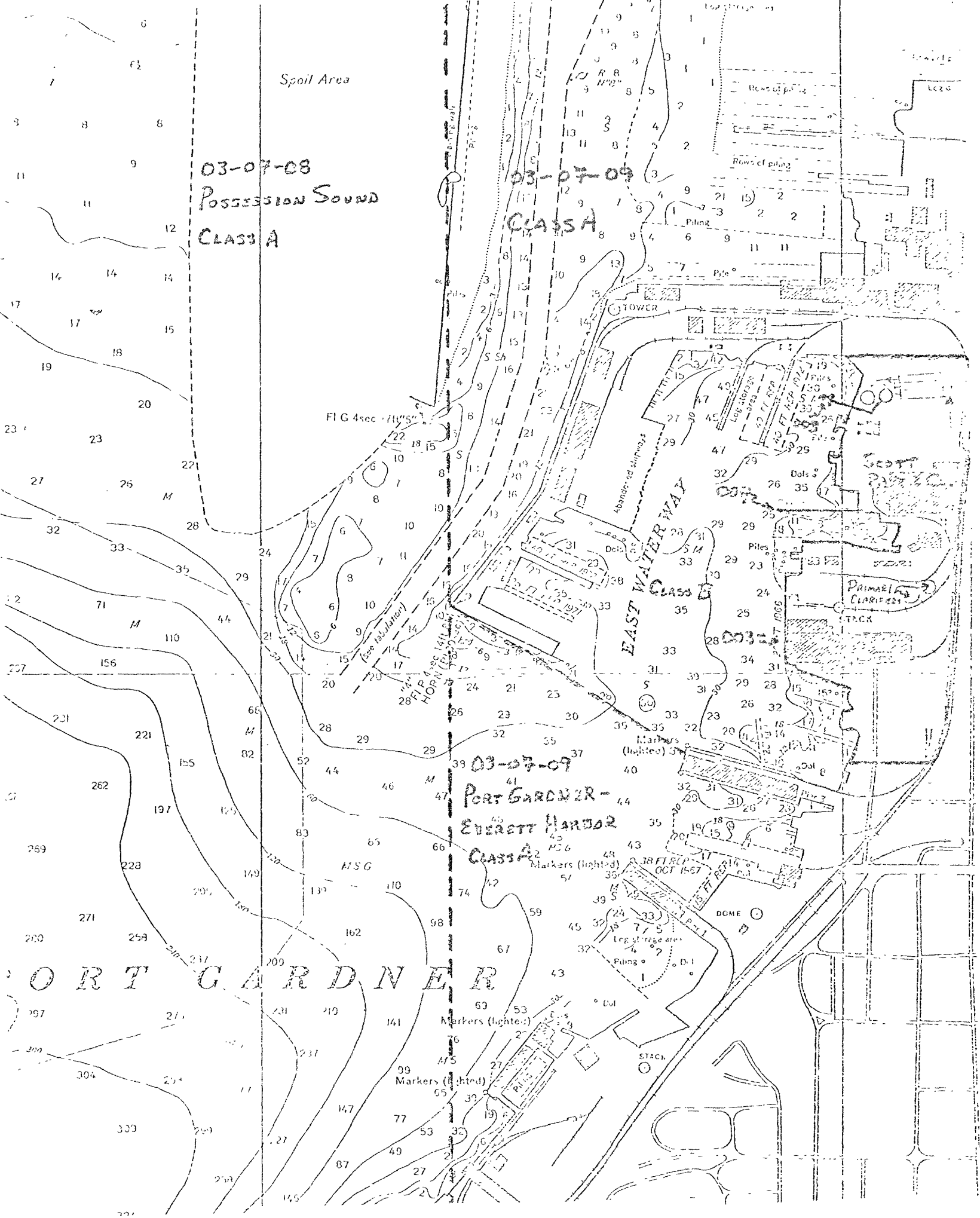

Figure 1. Scott Paper Co. & Receiving Waters

As depicted in Figure 1, three outfalls discharge into the Class B portion of waterway segment 03-07-09 (Everett Harbor, East Waterway). The deep water outfall (001) discharges to the Class A waters of Possession Sound (03-07-08) by way of a line shared with the Weyerhaeuser, TM pulp mill.

The Five-Year Strategy identifies Possession Sound (03-07-08) as a segment meeting state and federal water quality goals. Segment 03-07-09 (Port Gardner/Everett Harbor) is identified as a segment which does not meet dissolved oxygen and fecal coliform standards due primarily to combined sewer overflows and the Weyerhaeuser and Scott pulp mill discharges. On-going receiving water studies conducted by DOE (ECOBAM) have identified dissolved oxygen and pH problems in Everett Harbor. Fecal coliform concentrations in Everett Harbor have not been well documented, although future sampling should provide better definition of this potential problem.

Improvements in effluent quality at the Weyerhaeuser and Scott mills have substantially reduced pH problems in the harbor. Both mills now provide secondary treatment and have relocated their outfalls. The effect of these changes on dissolved oxygen concentrations and fecal coliform counts in Everett Harbor is not yet clear. Hopefully, data collected this summer will help to clarify these issues.

During this inspection, composite samples were obtained from each of the four discharges. Due to equipment malfunction, only single composite samples were obtained from 001 (Scott composite only) and 003 (DOE composite only). Samples from both DOE and Scott composite samplers were obtained from the 004 and 008 discharges. Each of these samples was split and analyzed by DOE (Tumwater laboratory), USEPA (Manchester laboratory) and Scott Paper (Everett laboratory). The results are given in Tables 2, 3, and 4.

Findings and Conclusions

As noted in Table 5, the facility was meeting permit limitations for BOD_5. Although the plant was below daily maximum limitations for suspended solids, it was exceeding daily average limitations.

Table 5. Permit Compliance

Parameter	DOE Laboratory		EPA Laboratory		Scott Laboratory		Permit Limits	
	DOE Samples	Scott Samples	DOE Samples	Scott Samples	DOE Samples	Scott Samples	Daily Avg.	Daily Avg.
BOD_5 (lbs/day)	10,110	>8,280	>11,390	>14,440	11,590	9,730	26,300	39,400
Suspended Solids (lbs/day)	25,180	25,730	24,490	26,320	23,040	24,160	16,000	32,000

">" = "greater than"

Table 2. Results of DOE Analyses

Parameter	DOE Samples 001	003	004	008	Total	Scott Samples 001	003	004	008	Total	Daily Average NPDES Permit Limit
Flow (MGD)	(5.3)[1]	4.74	4.09	14.89		5.3	(4.74)[2]	4.45	15.2		
BOD_5 (mg/l)	(45)[1]	60	96	20		45	(60)[2]	?	31		
(lbs/day)	(1,990)[1]	2,370	3,270	2,480	10,110	1,930	(2,370)[2]		3,930	8,290	26,300
Total Sus. Solids (mg/l)	(64)[1]	44	59	150		64	(44)[2]	69	150		
(lbs/day)	(2,830)	1,740	2,010	18,600	25,180	2,830	(1,740)[2]	2,560	18,600	25,730	16,000
COD (mg/l)	(270)[1]	270	600	1,100		270	(270)[2]	?	1,100		
Total Solids (mg/l)	(330)[1]	390	690	2,600		330	(330)[2]	690	2,500		
T.N.V.S. (mg/l)	(150)[1]	200	290	1,400		150	(200)[2]	280	1,500		
TSS (mg/l)	(64)[1]	44	59	150		64	(44)[2]	69	154		
NVSS (mg/l)	(18)[1]	16	16	30		18	(16)[2]	11	28		
NH_3-N (mg/l)	(1.0)[1]	2.7	0.4	3.4		1.0	(2.7)[2]	0.2	6.5		
NO_2-N (mg/l)	(<.1)[1]	<.1	<.1	0.1		<.1	(<.1)[2]	<.1	0.1		
NO_3-N (mg/l)	(<.1)[1]	0.1	0.2	<.1		<.1	(0.1)[2]	0.1	<.1		
O-PO_4-P (mg/l)	(0.4)[1]	0.8	1.2	2.2		0.4	(0.8)[2]	1.1	2.7		
T-PO_4-P (mg/l)	(0.9)[1]	1.3	1.4	4.6		0.9	(1.3)[2]	1.1	4.4		
PBI (mg/l)	(68)[1]	99	18	230		68	(99)[2]	9	280		
Color (S.U.)	(170)[1]	210	34	3,500		170	(210)[2]	43	3,500		
Turbidity (NTU)	(26)[1]	24	20	25		26	(24)[2]	22	25		
Specific Conductivity	(288)[1]	382	653	2,320		288	(382)[2]	689	2,440		
(μmhos/cm)	(245)[1†]	380†	570†			245†	(380)[2†]	570†			
	266**	370**	550**								
	220**	300**	450**								
pH (S.U.)	(6.5)[1]	6.9	6.5	7.4		6.5	(6.9)[2]	6.2	7.6		5 - 9
	--	6.8†	6.6†	7.7†				6.3†			
	6.8**	7.5**	6.3**	6.6**							
	7.0**	7.6**	6.5**	7.3**							
Temperature (°C)**	27.5	30	33	24							
	26.0	27.4	35.4	24							
Total Chloride Res. (mg/l)**	<.1	<.1	2.2 2.7 1.8† 1.8								
Diss. Oxygen (mg/l)**	--	6.0	4.7	5.6							
Fecal Coliform (#/100 ml)*				40,000 43,000							
Percent *Klebsiella**				27% 48%							
Cadmium (mg/l)*	<.01	<.01	<.01	<.01							
Chromium (mg/l)*	<.01	<.01	<.01	.01							
Copper (mg/l)*	.05	.02	.04	.06							
Nickel (mg/l)*	<.05	<.05	<.05	<.05							
Lead (mg/l)*	<.1	<.1	<.1	<.1							
Zinc (mg/l)*	.085	.085	<.035	.10							

">" is "greater than" "<" is "less than"

[1] = Field analysis, composite sample
* = Grab sample
** = Grab sample, field analysis
( )[1] = Scott composite sample
( )[2] = DOE composite sample
? = Sample apparently contaminated

Table 3. Results of Scott Paper Company Analysis

Parameter	DOE Samples 001	DOE Samples 003	DOE Samples 004	DOE Samples 008	DOE Samples Total	Scott Samples 001	Scott Samples 003	Scott Samples 004	Scott Samples 008	Scott Samples Total	Daily Average NPDES Permit Limit
Flow (MGD)	(5.3)[1]	4.74	4.09	14.89		5.3	(4.74)[2]	4.45	15.2		
BOD_5 (mg/l)	(67)[1]	66	118	16		67	(66)[2]	71	12		
(lbs/day)	(2,960)[1]	2,610	4,030	1,990	11,590	2,960	(2,610)[2]	2,640	1,520	9,730	26,300
Total Sus. Solids (mg/l)	(58)[1]	45.5	55	135.5		58	(45.5)[2]	74	134.5		
(lbs/day)	(2,560)[1]	1,800	1,880	16,800	23,040	2,560	(1,800)[2]	2,750	17,050	24,160	16,000
COD (mg/l)	(270)[1]	311	369	949		270	(311)[2]	351	970		
NH_3-N (mg/l)	(1.06)[1]	3.08	.454	7.1		1.06	(3.08)[2]	.37	6.5		
NO_2-N (mg/l)	(.01)[1]	.01	<.01	<.01		.01	(.01)[2]	<.01	<.01		
NO_3-N (mg/l)	(.71)[1]	.73	.86	.19		.71	(.73)[2]	.77	.19		
O-PO_4-P (mg/l)	(.77)[1]	1.1	1.6	3.1		.77	(1.1)[2]	1.5	3.2		
T-PO_4-P (mg/l)	(.86)[1]	1.4	--	3.8		.86	(1.4)[2]	--	4.5		
Color (S.U.) visual	(40)[1]	50	7	1,800		40	(50)[2]	8	1,900		
Turbidity (NTU)	(28.5)[1]	24	23	22		28.5	(24)[2]	28	24		
Specific Conductivity (μmhos/cm)	(276)[1]	372	590	2,130		276	(372)[2]	581	2,110		

">" is "greater than" "<" is "less than"

( )[1] = Scott composite sample
( )[2] = DOE composite sample

Table 4. Results of U.S. EPA Analyses

Parameter	DOE Samples 001	003	004	008	Total	Scott Samples 001	003	004	008	Total	Daily Average NPDES Permit Limit
Flow (MGD)	(5.3)[1]	4.74	4.09	14.89		5.3	(4.74)[2]	4.45	15.2		
BOD_5 (mg/l)	(65)[1]	65	>65	30		65	(65)[2]	>65	52		
(lbs/day)	(2,870)[1]	2,570	>2,220	3,730	>11,390	2,870	(2,570)[2]	>2,410	6,590	>14,440	26,300
Total Sus. Solids (mg/l)	(68)[1]	56	55	140		68	(56)[2]	56	150		
(lbs/day)	(3,010)[1]	2,210	1,880	17,390	24,490	3,010	2,210	2,080	19,020	26,320	16,000
COD (mg/l)	(226)[1]	260	311	899		226	(260)[2]	303	916		
Total Solids (mg/l)	(346)[1]	399	622	2,249		346	(399)[2]	631	2,210		
TNVS (mg/l)	(107)[1]	170	274	1,296		107	(170)[2]	264	1,341		
TSS (mg/l)	(68)[1]	56	55	140		68	(56)[2]	56	150		
TNVSS (mg/l)	(10)[1]	2	6	12		10	(2)[2]	6	16		
T. Kjeldahl-N (mg/l)	(15)[1]	16	39	21		15	(16)[2]	39	21		
NH_3-N (mg/l)	(1.2)[1]	2.9	.55	7.3		1.2	(2.9)[2]	.35	6.8		
NO_2+NO_3-N (mg/l)	(.08)[1]	.16	.38	<.01		.08	(.16)[2]	.16	<.01		
O-PO_4-P (mg/l)	(.70)[1]	.90	1.4	2.5		.70	(.90)[2]	1.3	2.6		
T-PO_4-P (mg/l)	(.80)[1]	1.4	1.7	4.2		.80	(1.4)[2]	1.7	4.5		
Specific Conductivity (umhos/cm)	(260)[1]	376	647	2,286		260	(376)[2]	631	2,206		
pH	(6.4)[1]	6.8	6.7	7.7		6.4	(6.8)[2]	6.2	7.8		5 - 9
Cadmium (μg/l)	(2.0)[1]	2.1	1.0	5.1		2.0	(2.1)[2]	0.9	4.7		
Copper (μg/l)	(13)[1]	17	22	17		13	(17)[2]	17	11		
Chromium (μg/l)	(4)[1]	10	3	13		4	(10)[2]	4	13		
Iron (μg/l)	(560)[1]	730	200	820		560	(730)[2]	220	850		
Lead (μg/l)	(83)[1]	94	78	50		83	(94)[2]	35	64		
Nickel (μg/l)	(9)[1]	14	18	56		9	(14)[2]	22	53		
Silver (μg/l)	(<.2)[1]	<.2	<.2	<.2		<.2	(<.2)[2]	<.2	<.2		
Zinc (μg/l)	(102)[1]	82	30	92		102	(82)[2]	20	60		

">" is "greater than" "<" is "less than"

( )[1] = Scott composite sample
( )[2] = DOE composite sample

Effluent pH's were between the permit limits of 5 to 9. Between August 1 and November 30, the 008 discharge must maintain a dissolved oxygen concentration of not less than 5.0 mg/l. Although this inspection was not performed between August 1 to November 30, the secondary effluent oxygen concentration was measured at 5.6 mg/l. Depending on the extent to which the organic constituents in this effluent settle (either as discharged solids or by way of flocculation after contact with sea water) and the flushing characteristics of the East Waterway, the present permit limitations may or may not be adequate to maintain the water quality standard (5.0 mg oxygen/l) or the water quality goal (6.0 mg oxygen/l). The discharge location of the Scott secondary effluent (at the blind end of the waterway) does not promote good dilution and dispersion. One goal of continuing studies should be determination of the adequacy of current permit limitations on this discharge.

Substantial fecal coliform counts (40,000 and 43,000/100 mls) were also detected. Based on the bacteriological identification provided by DOE laboratories, it is reasonable to assume that the fecal coliform genera in these samples are approximated by Table 6.

Table 6. Fecal Coliform Bacteria, Secondary Effluent

	Fecal Coliform Genus						Total
	Escherichi		*Enterobacter*		*Klebsiella*		
	%	#/100 ml	%	#/100 ml	%	#/100 ml	#/100 ml
Sample 1	62%	24,800	11%	4,400	27%	10,800	40,000
Sample 2	47%	20,200	5%	2,200	48%	20,600	43,000

The Scott activated sludge system was seeded with municipal sludges. The significance of this discharge on the bacterial quality of the receiving water should be better defined by on-going receiving water studies.

The presence of 1.8 to 2.7 mg total residual chlorine per liter in the tissue mill effluent (004) was also noted.

Laboratory procedures were reviewed to determine the changes employed over the past year. Roger Stanley had recommended improvements in techniques last year and these had been, for the most part, employed. Two further recommendations were made with regard to the suspended solids test:

1. Where necessary, decrease the present 333 ml sample size if filtering this much sample requires excessive (greater than 15-minute) filtering times. Current filtering times can run up to 6 hours.

2. Discontinue use of the fan in the convection drying oven. It appears that air velocities in this oven could easily result in solids loss from the filters.

In general, laboratory techniques were good and split sample results generally confirmed this. The only exceptions were the BOD results on the secondary effluent (see Table 7).

Table 7. Secondary Effluent BOD Results

	DOE Laboratories	U.S. EPA Laboratories	Scott Laboratories
DOE Sample	20	30	16
Scott Sample	31	52	12

All laboratories were contacted and no clear reason for the discrepancies could be determined.

WEY:cp

Attachments

cc: Dale Clark

Table 8. Secondary Treatment Plant Results, DOE Laboratory Results

Parameter	DOE Samples		Scott Samples
	Secondary Influent*	Secondary Effluent	Secondary Effluent
BOD_5 (mg/l)	800*	20	31
COD (mg/l)	1,500*	1,100	1,100
Total Solids (mg/l)	1,200*	2,600	2,500
TNVS (mg/l)	720*	1,400	1,500
TSS (mg/l)	64*	150	150
NVSS (mg/l)	11*	30	28
Turbidity (NTU)	32*	25	25
Color (S.U.)	580*	3,500	3,500
NH_3-N (mg/l)	18*	3.4	6.5
NO_2-N (mg/l)	<0.1*	0.1	0.1
NO_3-N (mg/l)	0.2*	<0.1	<0.1
O-PO_4-P (mg/l)	0.7*	2.2	2.7
T-PO_4-P (mg/l)	1.2*	4.6	4.4
pH (S.U.)	2.2** 4.0** 4.7*	6.6** 7.3** 7.7† 7.4	 7.6
Specific Conductivity (μmhos/cm)	1,320*	2,320	2,440
Dissolved Oxygen (mg/l)		5.6**	
PBI	340*	230	280
Temperature (°C)	28.6** 22.6**	24.0**	

">" is "greater than" "<" is "less than"

* = Grab sample, lab analysis

** = Grab sample, field analysis

† = Composite sample, field analysis

Composite sample, lab analysis

Class II Field Review and Sample Collection

24-hour Composite Sampler Installations

Sampler	Date and Time Installed	Location
1. 003 "Main" outfall	3/11/80 - 0848	Through manhole immediately upstream of Plant ISCO sampler
sample aliquot: 250 ml/30 min.		
2. 004 - Tissue Mill	3/11/80 - 1010	In North Filter effluent
sample aliquot: 250 ml/30 min.		
3. 008 - Secondary Eff.	3/11/80 - 1040	Through grating above Parshall flume
sample aliquot: 250 ml/30 min.		
4.		
sample aliquot:		
5.		
sample aliquot:		

Field Data

Parameter(s)	Date and Time	Sample Location
Total chlorine residual	3/11/80 - 1010,1610 3/12/80 - 0815	Tissue mill effluent (004)
pH, Temp. TCR, Cond.	3/11/80 - 0950 3/12/80 - 0845	Deep water outfall (001)
pH, Temp., TCR, Cond., D.O.	3/11/80 - 0848 3/12/80 - 0820	"Main" outfall (003)
pH, Temp., Cond., D.O.	3/11/80 - 1010 3/12/80 - 0845	Tissue mill eff. (004)
pH, Temp.	3/11/80 - 1120 3/12/80 - 0940	Secondary influent
pH, Temp., D.O.	3/11/80 - 1040 3/12/80 - 1005	Secondary effluent (008)

Grab Samples

Lab Analysis	Date and Time	Sample Location
BOD, COD, Solids, Nutr., pH, Cond. Color, Turb., PBI	3/12/80 - 0950	Secondary influent
Metals	3/11/80 - 0930	Primary clar. eff. (001)
Metals	3/11/80 - 0850	Primary clar. eff. (003)
Metals	3/11/80 - 1010	Tissue mill eff. (004)
Metals	3/11/80 - 1040	Secondary eff. (008)
Fecal Coli., % *Klebsiella*	3/12/80 - 1005	Landward secondary clar. ring (008)
Fecal Coli., % *Klebsiella*	3/12/80 - 1005	Seaward secondary clar. ring (008)