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CHARACTERISTICS OF MUNICIPAL WASTEWATER DISCHARGES, 1976

Municipal wastewater discharges are the principal source of most pollutants entering the southern California waters as a result of human activity. The 1976 flow from the five major dischargers averaged 1,027 million gallons per day (3,886 million liters/day) containing 790 metric tons of solids per day. In this annual tabulation of the kind and quantity of material discharged, the Project uses the monitoring data that each discharger submits to the State of California. Except for a yearly analysis of chlorinated hydrocarbons in the effluents that the Project performs as part of a laboratory intercalibration effort, we do not attempt to check the dischargers' data. In the main, we believe that these data fairly reflect the concentrations and mass emissions of the materials discharged.

The data for 1976 are summarized in three tables. The flow of various kinds of effluent is itemized in Table 1. Table 2 gives 1976 annual average concentrations of important waste constituents, and the calculated 1976 mass emission rates for the same constituents are listed in Table 3. Finally, in Table 4, the 1971-76 total annual mass emissions of constituents of particular interest are given. This summary indicates that, although the flow of municipal wastewater has increased by approximately 10 percent in the last 5 years, the mass emissions of several of the waste constituents have been reduced. Most notable is the significant decline in the discharge of DDT and PCB chlorinated hydrocarbons.

Notable changes between 1975 and 1976 include the following:

- The data show a 4 percent increase in flow, and a 1 percent increase in the amount of suspended solids discharged. As a group, the dischargers appear to have decreased their suspended solids emissions; however, Los Angeles County Sanitation Districts' Joint Water Pollution Control Plant (JWPCP) showed a 6 percent increase.
- The Hyperion 7-mile outfall selenium mass emission rate is twice the amount of any previous year. There has been considerable variation between past years' concentrations, but this new data may indicate a true increase in inputs.
- Silver showed a 17 percent increase between 1974 and 1975, but the 1976 mass emission rate was lower than for any year since 1971.
- Arsenic, cadmium, copper, lead, and zinc values showed some increase.

- All dischargers reporting DDT and PCB values registered decreases. We note that there may be significant differences in the analytical precision of the various laboratories.
- JWPCP's second stage dewatering system was activated in late 1976. There were initial difficulties in operations; however, when the new system operated properly (as in December 1976 and January 1977), suspended solid and settleable solid concentrations were about one-third lower than in the months prior to the system's activation.

In the past year, several errors in the data reported in last year's report have come to light. First, the 1975 mass emission rates for Hyperion's 7-mile outfall were 14 percent too high. Second, the average concentration of total PCB in JWPCP effluent (discharger value) should be 2.73 pg/liter (this number is based on analysis of 52 weekly composite samples rather than regular monitoring data—analysis of one grab sample per month). Finally, the value reported for total phosphate in this effluent should be three times higher.

Table 1. Municipal wastewater discharged to southern California coastal waters, 1975.

Discharger	Agency	Flow (mgd)	Nature of Effluent	% of Total Flow
Joint Water Pollution Control Plant (JWPCP)	Los Angeles County Sanitation Districts	351	Primary	32.5
		1.9	Digested Sludge	0.16
			Centrate	
Hyperion Plant	City of Los Angeles Bureau of Sanitation	261	Primary	24.5
		100	Secondary	9.3
		1.4	Digested Sludge	0.14
Orange County Plants	Orange County Sanitation Districts	162	Primary	15.0
		20	Secondary	1.9
Point Loma Plant	City of San Diego	117	Primary	10.8
Oxnard Plant	City of Oxnard	12	Primary	1.1
Other (about 20)	Various	20	Primary	1.9
		20	Secondary	1.9
Total		1,066		100

Table 2. Average concentrations of general constituents, trace metals, and chlorinated hydrocarbons in the final effluent of municipal waste dischargers, 1976 (ND means "no data").

	JWPCP	Hyperion 5-mile	7-mile	Orange County	Point Loma	Oxnard
Flow						
mgd	353	359	4.1	182	117	11.6
liters/day x 10 ⁶	1,336	1,359	15.5	689	443	43.9
General constituents						
(mg/liter)						
Total suspended solids	284	77	9,900 ^a	128	127.6	91
5-day BOD	230.7	125	ND	199	189	225
Oil and grease	62.5	20	679	41	25.4	18.7
Ammonia nitrogen	36.3	14.6	ND	32.0	24.1	19.7
Total phosphate	39.2	5.7	141	ND	ND	ND
Detergent (MBAS)	6.5	4.3	ND	ND	4.72	5.8
Cyanide (CN)	0.32	0.11	0.44	0.71	0.05	0.0292
Phenols	3.48	0.05	0.61	0.24	0.249	0.1925
Trace metals						
(mg/liter)						
Silver	0.013	0.01	0.86	0.01	0.0073	0.0155
Arsenic	0.007	0.01	0.28	ND	0.001	0.014
Cadmium	0.026	0.02	1.31	0.04	0.0266	0.017
Chromium	0.750	0.19	11.66	0.19	0.104	0.028
Copper	0.41	0.17	16.80	0.36	0.216	0.086
Mercury	0.0014	0.0015	0.098	ND	0.0034	0.00092
Nickel	0.320	0.18	3.60	0.14	ND	0.276
Lead	0.220	0.03	1.65	0.11	0.184	0.054
Selenium	0.011	0.02	1.16	ND	ND	ND
Zinc	1.320	0.22	21.10	0.54	0.311	0.1666
Chlorinated hydrocarbons						
(µg/liter)						
Discharger values^b						
Total DDT	1.92	1.3	7.08	0.036	ND	ND
Total PCB	2.34	3.3	7.66	2.63	ND	ND
Total identifiable	—	—	—	—	2.75	0.18
chlorinated hydrocarbons						
Project values^c						
Total DDT	2.6	0.5	3.2	0.12	0.06	0.10
Total PCB	2.7	0.23	21	3.9	1.6	0.31

a. Total solids.

b. Based on analysis of one grab sample per month, except for JWPCP total PCB value, which was based on analysis of 52 weekly composite samples.

c. Based on analysis of two 1-week composite samples.

Table 3. Mass emission rates of general constituents, trace metals, and chlorinated hydrocarbons in final effluent of municipal wastewater dischargers, 1976 (ND means “no data”).

	JWPCP	Hyperion 5-mile	7-mile	Orange County	Point Loma	Oxnard
Flow						
gallons/yr x 10 ⁹	128.8	131.0	1.5	66.4	42.7	4.2
liters/yr x 10 ⁹	487.7	496.0	5.6	251.4	161.6	16.0
General constituents (metric tons/year)						
Total suspended solids	138,900	38,290	56,200 ^a	32,300	20,700	1,465
5-day BOD	112,800	62,200	ND	50,200	30,600	3,620
Oil and grease	30,600	9,950	3,860	10,300	4,100	300
Ammonia nitrogen	17,800	7,260	ND	8,070	3,900	320
Total phosphate	19,200	2,830	790	ND	ND	ND
Detergent (MBAS)	3,200	2,140	ND	ND	765	93.4
Cyanide (CN)	157	54.7	2.50	27.7	8.10	0.47
Phenols	1,700	24.9	3.46	60.5	40.3	3.10
Trace metals (metric tons/year)						
Silver	6.31	4.97	4.88	2.52	1.18	0.25
Arsenic	3.49	4.97	1.59	ND	0.162	0.225
Cadmium	12.8	9.95	7.44	10.1	4.31	0.274
Chromium	367	94.5	66.2	47.9	16.9	0.451
Copper	200	84.5	95.4	90.8	35.0	1.38
Mercury	0.67	0.746	0.557	ND	0.55	0.015
Nickel	157	89.5	20.5	35.3	ND	4.44
Lead	108	14.9	9.37	27.7	29.8	0.869
Selenium	5.38	9.95	6.59	ND	ND	ND
Zinc	646	109	119.9	136	50.4	2.68
Chlorinated hydrocarbons (kg/yr)						
Discharger values ^b						
Total DDT	936	646	40.2	9.1	ND	ND
Total PCB	1,140	1,640	43.5	663.0	ND	ND
Total identifiable chlorinated hydrocarbons	—	—	—	—	446	0.296
Project values ^c						
Total DDT	1,243	25	18.1	31.4	9.7	1.7
Total PCB	1,316	110	118	991	267	5

a. Total solids.

b. Based on analysis of one grab sample per month, except for JWPCP total PCB value, which was based on analysis of 52 weekly composite samples.

c. Based on analysis of two 1-week composite samples.

Table 4. Combined annual mass emission rates of southern California's five largest municipal waste dischargers, 1971-76 (ND means "no data").

Year	1971	1972	1973	1974	1975 ^a	1976 ^a
Flow						
mgd	931	922	955	967	985	1,027
liters/day x 10 ⁶	3,524	3,490	3,615	3,360	3,728	3,889
General constituents (metric tons/yr)						
Total suspended solids	288,000	279,000	270,000	264,000	287,000	288,000
5-day BOD	283,000	250,000	217,000	222,000	237,000 ^b	259,000 ^b
Oil and grease	62,500	60,600	57,400	54,700	57,420	59,100
Ammonia nitrogen	56,600	39,900	45,900	37,000	36,620	37,350 ^b
Trace metals (metric tons/yr)						
Silver	17.7	21.1	29.0	21.7	25.7	20.2
Arsenic	ND	ND	ND	20.9 ^c	11.9 ^c	10.5 ^c
Cadmium	57.3	33.8	49.3	55.4	50.0	45.0
Chromium	676	673	695	690	580	593.0
Copper	559	485	509	575	511	507
Mercury	ND	ND	ND	3.09 ^c	2.24 ^c	2.55 ^c
Nickel	339	273	318	314	234	307 ^b
Lead	243	226	180	199	198	191
Selenium	ND	ND	ND	17.75 ^d	16.9 ^d	22.0 ^d
Zinc	1,880	1,210	1,360	1,320	1,142	1,064
Chlorinated hydrocarbons (kg/yr)						
Discharger values						
Total DDT	21,700	6,600	4,120	2,120	1,989	1,673
Total PCB	8,730	9,830	4,620	9,390	6,011	4,310
Project values ^e						
Total DDT	21,600 ^f	6,540	3,827	1,580	1,274	1,331
Total PCB	ND	19,490	3,441	5,322	3,084	2,807

a. Oxnard included only in 1975 and 1976 data.
b. Hyperion 7-mile effluent excluded.
c. Orange County data not included.
d. Total for Hyperion and JWPCP only.
e. 1976 data based on analysis of 1-week composites; 1971-75 data taken from Final report to EPA for Grants R801153 and R803707.
f. JWPCP only.