

TABLES

Table 1 INVENTORY OF SEWERAGE AND PURIFICATION SYSTEM

City	Sewerage System	Purification System	Ultimate Effluent Receiving Watercourse
Kuala Lumpur (1974) (including Petaling Jaya and Shah Alam)	o 150,000 people served by the sewerage system	o Pantai Sewage Treatment Works	Sg. Kelang
	o 300,000 to 350,000 are served by septic or Imhoff tanks	. Primary Settlement Tanks	
	o 580,000 to 630,000 use mainly night soil buckets and pit latrines	. Sludge Digestion Tanks	Sg. Bunus
		o Wardieburn Waste Stabilisation Ponds	
		. One Deep Settlement Cell	
		. Two Stabilisation Ponds	
		o Leper Settlement Waste Stabilisation Ponds	Sg. Buloh
		. Three Waster Stabilisation Ponds	
		o MARA Sewage Treatment Plant	
		. Package, Diffused Air, Extended Aeration, Activated Sludge Treatment Plant	
		o Shah Alam Sewage Treatment Plant	
		The Treatment Plant is similar to the MARA Plant	
		o Sungei Besi Military Camp Treatment Plant	Sg. Kuyoh
		. Two Primary Settlement Tanks	
		. Six Surface Aeration Activated Sludge Units	
		. Three Final Settlement Tanks	
		. Sludge Digesters	
		. Air Drying Sludge Beds	
Pulau Pinang (1979) o Georgetown	o 25,000 premises served = 217,000 people use the sewerage system 195 km of gravity sewers and interceptors 13 pump stations 11 km of force mains 366 m of outfall	o No Purification System (marine disposal without treatment)	The Western Channel
	o about 96,000 people (10,000 premises) rely on septic tank		
	o about 121,000 people (10,000 premises) use the conservancy system		
	o about 48,000 people are without any form of sanitary waste disposal facilities other than use of open pits, privies, drains and the sea		
o Bandar Bayan Baru	o 5,000 persons served by sewerage system 3 km of gravity sewers 1 pump station 805 m force mains	o Two Stabilisation Ponds (one of which is mechanically aerated)	The Mouth of the nearby Kluang river.
	o 13,000 people rely on septic tanks, night-soil collection service and pit privies		

Source; Refs. 1 & 2.

Table 2 CHARACTERISTICS OF RUBBER PROCESSING
FACTORY EFFLUENT

Unit: mg/l except pH

Parameter	P r o d u c t	
	SMR & Conventional Grade	Latex Concentrate
pH	5.6	4.6
BOD ₅	1,500	2,340
COD	2,300	6,980
SS	345	6,690
NH ₄ -N	118	622
Total Nitrogen	161	858

Source; Ref. 39

Table 3 SUMMARY OF EFFLUENT FROM RUBBER
PROCESSING FACTORIES

Type of Factory	Origin of Major Wastes	Major Treatment and Disposal Methods
SMR	Washings, serum from coagulation	Biological treatment using stabilisation ponds; land disposal *
Latex Concentrate	Washings, serum from centrifuging	Biological treatment using stabilisation ponds; Oxidation ditch * Land Disposal *
Conventional Grade	Washings	Biological treatment using stabilisation ponds

Remarks; * Under experimentation

Source; Ref. 5

Table 4 INVENTORY OF PURIFICATION SYSTEM
FOR RUBBER PROCESSING (1/8)

Code No.	Name of Factory	State	Type of Production	Actual Production mt/day	Purification System	Quantity of Effluent 10 ³ m ³ /year	BOD ₅ & SS of Treated or Raw Effluent	
							BOD ₅ (mg/l)	SS(mg/l)
1	Ban Seng Co. Sdn. Bhd.	Kedah	Conventional (RSS)	6.6	No Treatment	65.5	168	68
2	Syarikat Eng Joo Seng	Kedah	Conventional (RSS)	12.0	Sedimentation Trap	5.2	48	16
3	Plantation Latex (M) Sdn. Bhd.	Kedah	Conventional	7.5	Anaerobic & Aerobic Pond	65.7	200	250
4	Ladang Perbadanan Kedah	Kedah	SMR	7.5	Anaerobic, Aerobic	60.0	200	600
5	Lam Eng Rubber Factory	Kedah	Conventional (Crepe)	2.5	No Treatment	45.8	200	250
6	Uniroyal M'sia Sdn. Bhd.	Kedah	Mixed (LC/SMR)	48.0	Data Not Available	203.0	2,350	275
7	Lean Hoe Sdn. Bhd.	Kedah	SMR	25.0	Anaerobic/ Facultative Pond	31.7	53.8	24
8	Lee Latex (Pte) Ltd.	Kedah	Mixed (LC/SMR)	50.0	Proposed Oxidation Pond	231.0	520	84
9	Tapah Baru Estate	Kedah	SMR	24.0	Anaerobic/ Facultative Pond	162.0	200	200
10	Lubuk Segintah Estate	Kedah	SMR	3.5	Anaerobic & Aerobic Pond	30.0	200	250
11	Tiong Huat Rubber Factory Sdn. Bhd.	Kedah	SMR	20.0	Data Not Available	43.2	589	353
12	Badenoch Estate, Kuala Ketil	Kedah	Latex Concentration	10.6	Land Disposal	54.0	-	-
13	Lee Rubber Co. (Pte) Ltd.	Kedah	Conventional (RSS)	30.0	Proposed Aeration Pond	13.5	874	315
14	Kuala Ketil Estate Factory	Kedah	Conventional (Crepe/RSS)	18.0	Anaerobic/Aerobic Pond	121.0	88	60
15	Sungei Tawar Latex Co. Sdn. Bhd.	Kedah	Mixed (SMR/LC/Crepe)	18.0	No Treatment	16.4	315	96
16	Jeniang Estate (MARDEL)	Kedah	SMR	43.0	Treatment System to be in Commission	324.0	382	840
17	Baling Estate (MARDEL)	Kedah	SMR	25.0	No Treatment	355.0	97	207
18	Batu Pekaka Estate	Kedah	Mixed (LC/Skim/Crepe Drain Rubber)	18.0	Data Not Available	77.0	500	1,000
19	Thye Group Estate	Kedah	Mixed (SMR/Sheet Rubber)	10.2	Anaerobic/Aerobic Pond	64.8	63.3	114
20	Kuala Muda Estate	Kedah	Conventional (ADS)	9.0	No Treatment	57.6	963	114
21	Pinang Tunggal Estate	Kedah	SMR	5.45	Anaerobic/Aerobic Pond	41.8	200	250
22	Bertam Consolidated Rubber Co., Ltd.	Penang	SMR	15.0	Anaerobic/ Stabilization Pond	39.3	68	64
23	Tong Teik Co. Sdn. Bhd.	Penang	Conventional (RSS/Crepe)	27.8	Anaerobic/ Facultative Pond	54.6	7	65
24	Tai Teong Rubber Factory Sdn. Bhd.	Penang	SMR	24.0	Land Disposal	197.0	470	124
25	Lee Rubber Co. (Pte) Ltd.	Penang	Mixed (SMR/RSS)	65.0	No Treatment	154.0	685	309

Table 5 INVENTORY OF PURIFICATION SYSTEM
FOR RUBBER PROCESSING (2/8)

Code No.	Name of Factory	State	Type of Production	Actual Production mt/day	Purification System	Quantity of Effluent 10 ³ m ³ /year	BOD ₅ & SS of Treated or Raw effluent	
							BOD ₅ (mg/l)	SS(mg/l)
26	Hock Heng Co. Sdn. Bhd.	Kedah	SMR	26.0	Anaerobic/ Stabilization Complete Recycling	-	40	53
27	Nanyang Co. (Pte) Ltd.	Penang	SMR	18.0	Anaerobic/Aerobic Pond	23.5	200	250
28	Anak Kulim Estate	Kedah	Conventional (RSS/ADS)	4.4	Anaerobic/ Facultative Pond	47.0	19	80
29	Ladang Malakoff Bhd.	Penang	Mixed (SMR/LC)	14.4	Anaerobic/Aerobic	84.9	40.6	-
30	Henrielta Rubber Estate Ltd.	Kedah	SMR	11.0	Anaerobic/Aerobic Pond	81.9	46.8	-
31	Padang Meika Factory	Kedah	Concentrate	100.0	Anaerobic/ Facultative Pond	106.0	450	1,000
32	Alma Rubber Estate Sdn. Bhd.	Penang	Mixed (Crepe/SMR)	17.0	No Treatment	163.0	74	6
33	Bukit Selarong Estate	Kedah	Conventional (RSS/ADS)	5.0	Anaerobic/ Facultative Pond	22.5	300	250
34	Ladang Victoria	Kedah	Conventional (SMR/RSS)	2.92	No Treatment	23.4	1,850	850
35	Sungei Ular Estate	Kedah	Mixed (ADS/SMR etc.)	2.1	Anaerobic/Aerobic Pond	57.0	80	91
36	Pelam Estate Sdn. Bhd.	Kedah	Conventional (RSS/ADS)	5.49	Anaerobic/Aerobic Pond	9.52	200	250
37	Lee Rubber Co. (Pte) Ltd.	Penang	SMR	100.0	No Treatment	1,430.0	119	188
38	Selama Estate Factory	Kedah	Mixed (SMR/OENR)	16.0	Anaerobic/Aerobic Pond, Aeration	74.7	100	120
39	Batu Lintang Rubber Co. Bhd.	Kedah	SMR	16.0	Anaerobic/Aerobic Pond	132.0	58	120
40	Southern Rubber Works Sdn. Bhd.	Penang	SMR	35.0	No Treatment	45.5	241	49.7
41	Raybould	Perak	SMR	5.0	No Treatment System Proposed Anaerobic/ Aerobic Pond	32.7	138	200
42	Sungei Wangi Estate	Perak	Mixed (RSS/SMR/ Crepe)	24.0	Anaerobic/Aerobic Pond	214.0	39	250
43	Syn Seng Co. Sdn. Bhd.	Perak	Conventional (RSS)	16.0	No Treatment Plant	21.0	500	250
44	Tropical Produce Co. (Pte) Ltd.	Perak	Mixed (LC/Crepe)	40.6	Proposed Anaerotation Pond or Oxidation Ditch	366.0	1,070	89
45	Lee Rubber Godowns & Swoke House	Perak	Conventional (RSS)	10.9	Treatment System in Operation	2.56	200	250
46	Taiping Rubber Factory Co.	Perak	Conventional (Crepe)	9.4	No Treatment	42.2	32	180
47	The Windsor Rubber Estate Ltd.	Perak	SMR	6.0	Anaerobic/ Facultative Pond	34.5	200	250
48	Syn Seng Co. Sdn. Bhd.	Perak	Conventional (RSS)	16.0	No Treatment	2.1	500	250
49	Synn Lee & Co. Sdn. Bhd.	Perak	SMR	8.0	No Treatment	45.5	94	400

Table 6 INVENTORY OF PURIFICATION SYSTEM FOR RUBBER PROCESSING (3/8)

Code No.	Name of Factory	State	Type of Production	Actual Production mt/day	Purification System	Quantity of Effluent 10 ³ m ³ /year	BOD ₅ & SS of Treated or Raw Effluent	
							BOD ₅ (mg/l)	SS(mg/l)
50	Batu Kawan Estate (MARDEL)	Perak	SMR	29.1	Data Not Available	303.0	133	104
51	Teik Seng Co.	Perak	Conventional (RSS)	8.0	No Treatment	2.3	320	138
52	Lee Rubber Co. (Pte) Ltd.	Perak	Conventional (RSS)	20.0	No Treatment Plant	300.0	316	484
53	Lee Rubber Co. (Pte) Ltd.	Perak	SMR	28.0	Proposed Ponding	1,300.0	203	236
54	United Gee Seng Co. Sdn. Bhd.	Perak	SMR	20.0	Proposed Oxidation Ditch	180.0	316	323
55	Lee Rubber Co. (Pte) Ltd.	Perak	Mixed (SMR/RSS)	20.0	No Treatment	432.0	153	-
56	Malay Rubber Plantation Pinji Factory	Perak	SMR	15.0	Anaerobic/Aerobic Pond	150.0	46	48
57	Joo Seng Co. Sdn. Bhd.	Perak	SMR	40.0	No Treatment	319.0	99.3	73
58	Bota Karam Estate (MARDEL)	Perak	SMR	27.0	No Treatment	310.0	320	338
59	Kinta Killas Estate	Perak	SMR	3.74	Anaerobic/Aerobic Pond	409.0	33	-
60	Changkat Salak Factory	Perak	SMR	13.0	Anaerobic/Facultative Pond	94.8	126	392
61	Kati Estate	Perak	Conventional (ADS)	2.46	Anaerobic/Aerobic Pond	18.6	43.8	126
62	Kamuning Estate	Perak	SMR	12.0	Land Disposal	49.7	4,330	900
63	Tapah Estate (MARDEL)	Perak	Mixed (I.C/SMR/SLCM)	34.5	No Treatment	328.0	1,960	970
64	Kilang Getah Trolak	Perak	Latex Concentration	13.0	Anaerobic/Aerobic Pond	111.0	1,490	450
65	Kota Bahroe Estate	Perak	Mixed (ADS/SMR)	6.0	No Treatment	40.8	1,440	460
66	Ladang Sungai Chinoh	Perak	SMR	4.0	Anaerobic/Aerobic Pond	59.0	115	117
67	Tanjong Malim Factory	Perak	SMR	11.0	Anaerobic/Aerobic Pond	187.0	130	320
68	Niqel Gardner Estate	Selangor	Mixed	8.8	Ponding System	45.6	64	105
69	Sungei Tinggi Estate	Selangor	Mixed	16.4	Biological Ponding System	88.4	45	163
70	Sg. Choh Estate	Selangor	SMR	7.0	Biological Ponding System	57.3	127	80
71	Java Selangor Estate	Selangor	Latex Concentrate	1.72	Land Disposal	6.8	625	720
72	Pusat Penyelidikan Getah Malaysia	Selangor	Mixed	5.86	Ponding System	59.3	300	224
73	Hock Lee Enterprises Sdn. Bhd.	Selangor	SMR	38.0	Biological Ponding - Anaerobic & Aerobic	306.0	103	150
74	Guthrie Rubber Processing Sdn. Bhd. Haron Factory	Selangor	SMR	2.5	Land Disposal	13.1	2,860	1,300

Table 7 INVENTORY OF PURIFICATION SYSTEM
FOR RUBBER PROCESSING (4/8)

Code No.	Name of Factory	State	Type of Production	Actual Production mt/day	Purification System	Quantity of Effluent $10^3 m^3/year$	BOD ₅ & SS of Treated or Raw Effluent	
							BOD ₅ (mg/l)	SS(mg/l)
75	Chong Hin Rubber	Selangor	SMR	10.0	Complete Recycle	-	-	-
76	Lee Latex	Selangor	Latex	29.3	Oxidation Ditch	118.0	47	101
77	Lian Hin Rubber Factory	Selangor	SMR	80.0	Proposing	785.0	182	221
78	Ebor Division Seafield Estate	Selangor	TPC (Conventional Grade)	5.0	Biological Ponding - Anaerobic & Aerobic	29.8	71	260
79	Lee Rubber (S'gor) Sdn. Bhd.	Selangor	SMR	26.0	Chemical & Ponding	300.0	170	452
80	San Lee Sdn. Bhd.	Federal Territory	SMR	14.0	No Treatment	60.3	101	250
81	Wilkinson Process Rubber Co. Bhd.	Selangor	Conventional Grade	12.0	Chemical Flocculation, Sedimentation Trap	360.0	150	100
82	Lee Rubber (Sel) Sdn. Bhd.	Selangor	SMR	80.0	Chemical System & Oxidation Ditch	708.0	265	464
83	H&C Latex Petaling	Selangor	Latex Concentrate	28.0	No Treatment	86.3	3,390	208
84	Yee Seng Amalgamated Sdn. Bhd.	Selangor	SMR	23.0	Rotary Drum Filter & Aerobic Ponding	48.0	50	100
85	Bukit Rajah SMR Factory	Selangor	SMR	10.8	Treatment System	16.2	599	1,490
86	MARDEC Ulu Langat	Selangor	SMR	22.0	Mechanical System Completed in Feb. 1981	233.0	239	80
87	West Country Estate	Selangor	Conventional Grade	9.44	Biological Ponding System	261.0	200	250
88	Prang Besar Estate	Selangor	Mixed	24.0	Biological Ponding System	210.0	200	118
89	Brookland Estate Latex Factory	Selangor	Latex Concentrate	8.0	No Treatment	70.6	800	300
90	Lee Yan Kee SMR Factory	Selangor	SMR	10.0	No Treatment	34.1	250	648
91	Ladang Sg. Rinching	Selangor	SMR	2.43	Biological Ponding System	22.9	200	250
92	Sg. Mahang Estate Rubber Factory	Negeri Sembilan	SMR	13.5	Biological Ponding System	114.0	38	200
93	Pajam Estate	Negeri Sembilan	Conventional Grade	4.8	Biological Ponding System	28.6	21	86
94	New Labu SMR Factory	Negeri Sembilan	SMR	7.0	Biological Ponding - Anaerobic & Aerobic	41.7	343	240
95	Sepang Estate	Selangor	SMR	21.0	Biological Ponding System	64.2	44	250
96	Jemina Estate	Negeri Sembilan	SMR	5.5	No Treatment	27.3	302	250
97	MARDEC Ulu Ara	Negeri Sembilan	Latex Concentrate	11.5	No Treatment	42.4	3,380	420
98	Senawang Estate (Factory)	Negeri Sembilan	Latex Concentrate	15.0	Biological Ponding System	68.4	450	1,000
99	GRP Sdn. Bhd.	Negeri Sembilan	Latex Concentrate	68.3	Land Disposal	214.0	2,400	1,100

Table 8 INVENTORY OF PURIFICATION SYSTEM
FOR RUBBER PROCESSING (5/8)

Code No.	Name of Factory	State	Type of Production	Actual Production mt/day	Purification System	Quantity of Effluent 10 ³ m ³ /year	BOD ₃ & SS of Treated or Raw Effluent			
							BOD ₃ (mg/l)	SS(mg/l)		
100	Chembong Estate	Negeri Sembilan		20.6	Biological Ponding	21.3	21	73		
101	Lee Rubber Co. (Pte) Ltd.	Negeri Sembilan	Mixed	24.0	No Treatment	213.0	170	288		
102	Leang Hin San Sdn. Bhd.	Negeri Sembilan	SMR	5.0	Ponding System	34.1	200	250		
103	Siliau Estate Lower Grades Factory	Negeri Sembilan	Conventional Grade	5.0	Aerators and Sedimentation Ponding	85.7	18	200		
104	Lam Seng Manufacturing Enterprise Sdn. Bhd.	Negeri Sembilan		32.0	No Treatment	52.4	180	185		
105	Nam Hong Trading Co. Sdn. Bhd.	Negeri Sembilan		30.0	No Treatment	328.0	67	200		
106	Sheet Rubber Factory	Negeri Sembilan	Conventional Grade	4.0	Biological Ponding System	60.0	68	200		
107	Bradwall Estate	Negeri Sembilan	Conventional Grade	7.9	Biological Ponding System	53.8	200	250		
108	Gan Teng Siew Realty Sdn. Bhd.	Negeri Sembilan	SMR	7.0	Biological Ponding System	42.0	26	200		
109	Ladang Seremban	Negeri Sembilan	SMR	6.5	Biological Ponding System	22.4	300	250		
110	Atherton Estate	Negeri Sembilan	Mixed	10.0	Land Disposal	66.0	28	10		
111	SMR Factory, Sg. Bahru Estate	Melaka	SMR	5.0	Anaerobic/Aerobic Pond	42.0	70	175		
112	Lee Rubber Co. (Pte) Ltd.	Melaka	Mixed	55.0	No Treatment	489.0	275	412		
113	Jasin Division, Merlimau Estate	Melaka	Conventional Grade	6.12	Biological Ponding System	9.0	28	140		
114	Regent Skim Factory	Negeri Sembilan	Skim	This factory will function only if Dunlop Bahau & Paya Lang factory is not functioning						
115	Kota Trading Co. Sdn. Bhd.	Negeri Sembilan	SMR	44.0	Biological Ponding System	213.0	79	136		
116	Regent Latex Conc. Factory	Negeri Sembilan	Latex Concentrate	This factory will function only if Bahau & Paya Lang factory is not function						
117	Kilang Cetah Rembau Latex Factory	Negeri Sembilan	Latex Concentrate	17.9	Oxidation Ditch	95.4	11	52		
118	Tian Teck Sdn. Bhd.	Melaka	SMR	20.0	100% in use again	-	-	-		
119	MARDEC Durian Tunggal	Melaka	Latex Concentrate	22.0	Biological Ponding System	90.1	288	616		
120	Yee Hoch Rubber Malacca Sdn. Bhd.	Melaka	Conventional Grade	5.0	Data Not Available	13.6	450	400		
121	Chabau Estate	Melaka	Conventional Grade	4.41	Biological Ponding System	13.1	200	250		
122	Melaka Tang Bee	Melaka	Mixed	75.0	Biological Ponding System	210.0	88	100		
123	Rubber Trust Plantation SMR Factory	Melaka	SMR	15.4	Biological Ponding System	135.0	300	250		

Table 9 INVENTORY OF PURIFICATION SYSTEM
FOR RUBBER PROCESSING (6/8)

Code No.	Name of Factory	State	Type of Production	Actual Production mt/day	Purification System	Quantity of Effluent 10 ³ m ³ /year	BOD ₃ & SS of Treated or Raw Effluent	
							BOD ₃ (mg/l)	SS(mg/l)
124	GRP Sdn. Bhd. Tebong Factory	Melaka	Mixed	64.9	Land Disposal	254.0	3,150	450
125	Tanah Merah Estate	Johor	Mixed	9.25	Biological Ponding	90.0	200	300
126	Sagil Estate Tangkak	Johor	SMR	6.0	Biological Ponding	47.6	60	174
127	Tangkak Estate	Johor	SMR	-	Biological Ponding	491.0	126	60.7
128	Devan SMR Factory	Melaka	SMR	22.0	Anaerobic & Aerobic Ponding	129.0	79	210
129	Seng Fong	Johor	Remiller Crepe	5.0	Biological Ponding	3.14	22	-
130	Ban Seng Hong	Johor	SMR	-	Biological Ponding	14.4	200	122
131	Lee Rubber Co. Ltd.	Johor	SMR	22.0	Ponding System Completed by March 1981	207.0	198	342
132	Lee Rubber Sungai Mati	Johor	SMR	10.0	No Treatment	4.22	403	137
133	Yam Joo Hong	Johor	SMR	-	Biological Ponding	52.8	312	298
134	Eversharp Rubber Industries	Johor	SMR	-	Biological Ponding	60.4	359	210
135	H&C Latex Sdn. Bhd.	Johor	Latex	25.2	Biological Ponding	98.2	155	-
136	Paya Lang Factory	Johor	Latex	26.0	Biological Ponding	94.4	100	360
137	MARDEC Grisek	Johor	SMR	28.0	No Treatment	329.0	102	248
138	Lee Rubber Co. (Pte) Ltd.	Johor	SMR	36.0	No Treatment	480.0	200	-
139	MARDEC Kuala Pilah	Negeri Sembilan	SMR	31.5	No Treatment	189.0	331	396
140	Voules Concentrate Factory	Johor	Latex Concentrate	-	No Treatment	52.4	2,350	587
141	Johol Estate SMR Factory	Negeri Sembilan	SMR	11.8	Biological Ponding System	27.8	140	113
142	Kian Lee SMR Factory	Johor	SMR	43.0	No Treatment	96.0	96	85
143	Tong Let Chan	Johor	Conventional Grade	-	No Treatment	6.82	198	114
144	North Labis Estate	Johor	SMR	-	Biological Ponding	107.0	100	150
145	Seng Guan	Johor	SMR	8.0	Biological Ponding	3.55	165	283
146	Yee Hua Trading Co. Sdn. Bhd.	Negeri Sembilan	Conventional Grade	5.0	No Treatment	655.0	668	608
147	Lee Rubber	Johor	SMR	15.0	Biological Ponding	9.98	200	-
148	FELDA Pasir Besar	Negeri Sembilan	Mixed	30.7	No Treatment	396.0	816	379
149	Kota Trading	Johor	SMR	20.0	No Treatment	72.0	278	188
150	Kota Trading	Johor	SMR	18.0	Proposed Ponding System	150.0	230	-
151	Tawakal Co. Sdn. Bhd.	Johor	SMR	7.0	Biological Ponding System	46.8	182	66
152	Claire Estate	Johor	SMR	-	Biological Ponding	37.7	38	80
153	Ladang Seri Gading	Johor	SMR	-	Biological Ponding	100.0	400	413
154	Eastern Rubber Factory	Johor	SMR	-	Biological Ponding System	60.0	63	46

Table 10 INVENTORY OF PURIFICATION SYSTEM
FOR RUBBER PROCESSING (7/8)

Code No.	Name of Factory	State	Type of Production	Actual Production mt/day	Purification System	Quantity of Effluent 10 ³ m ³ /year	BOD ₃ & SS of Treated or Raw Effluent	
							BOD ₃ (mg/l)	SS(mg/l)
155	Hoe Hock	Johor	SMR	15.0	Charcoal Filter Bed	22.3	172	70
156	Chan Wing SMR Factory	Johor	SMR	-	Biological Ponding	54.0	48	80
157	Lee Rubber Co. Ltd.	Johor	SMR	12.0	Biological Ponding	2.09	821	408
158	Tropical Produce	Johor	SMR	27.0	Biological Ponding	168.0	200	-
159	Pontian Hiap Heng Trading Co. Sdn. Bhd.	Johor	Compu Crepe	5.0	No Treatment	35.0	75	300
160	Mount Austin Estate	Johor	SMR	-	Biological Ponding	71.8	109	82
161	Soon Cheong Rubber Co. Sdn. Bhd.	Johor	SMR	20.0	Anaerobic Pond	76.4	83	-
162	Mardec Kulai Factory	Johor	Latex	27.8	Biological Ponding	330.0	1,159	220
163	Lee Latex (Pte) Ltd.	Johor	Latex	30.0	No Treatment	81.0	1,953	220
164	Foh Cheong SMR Factory	Johor	SMR	4.0	Biological Ponding	19.6	84	-
165	Ladang Tebrau	Johor	SMR	-	Biological Ponding System	27.0	200	92
166	Kulai Besar Estate	Johor	Mixed	6.0	No Treatment	112.0	200	146
167	Lee Plantation Ltd.	Johor	Latex Concentrate	27.0	Biological Ponding System	154.0	75.2	-
168	Lee Rubber Co. (Pte) Ltd.	Johor	SMR	20.0	Ponding System to be ready by Jan. 1981	-	330	350
169	Teluk Senggat Estate	Johor	SMR	7.5	Biological Ponding	56.2	158	140
170	Keck Seng Ladang Tong Hin	Johor	SMR	12.0	Biological Ponding	273.0	200	250
171	Kebun Rengam	Johor	SMR	-	Biological Ponding	16.0	648	215
172	Guthries, Layang-Layang	Johor	Mixed	-	Land Disposal Anaerobic Lagoon	4.74	1,900	800
173	Tropical Produce	Johor	Latex Concentrate	38.0	No Treatment	190.0	1,580	196
174	Ladang Tai Tak	Johor	SMR	-	Biological Ponding	28.1	200	180
175	Seong Tai Plantation Bukit Pulai Estate	Johor	SMR	4.5	Biological Ponding System	60.0	145	112
176	Ulu Tiram Manufacturing Sdn. Bhd.	Johor	SMR	-	No Treatment	408.0	200	232
177	Ladang Mengkibol Rivertex	Johor	Latex Concentrate	74.6	Biological Ponding System	257.0	85	94
178	Ladang Bukit Paloh	Johor	SMR	-	Land Disposal	72.0	706	307
179	Tech Huat	Johor	SMR	-	Biological Ponding	15.3	200	250
180	Bukit Dinding SMR Factory	Pahang	Mixed	-	Biological Ponding	78.0	34	40
181	Kilang Getah Felda, Kg. Awah	Pahang	SMR	-	Data Not Available	389.0	169	146
182	Budu Estate	Pahang	Conventional Grade	4.2	Biological Ponding	37.9	59	85

Table 11 INVENTORY OF PURIFICATION SYSTEM
FOR RUBBER PROCESSING (8/8)

Code No.	Name of Factory	State	Type of Production	Actual Production mt/day	Purification System	Quantity of Effluent or Raw Effluent 10 ³ m ³ /year	BOD ₃ & SS of Treated or Raw Effluent	
							BOD ₃ (mg/l)	SS(mg/l)
183	Ladang Karmen	Pahang	SMR	4.5	Anaerobic & Facultative Ponds	2.36	217	127
184	Boontong Estate	Pahang	SMR	5.7	Biological Ponding	61.1	100 - 3,000	5 - 500
185	Tuan Factory KL-K	Pahang	SMR	12.0	Biological Ponding System	147.0	20	47
186	Cheroh Estate	Pahang	SMR	7.0	Biological Ponding	36.0	8	96
187	Kilang Getah SMR - Bilut Valley	Pahang	SMR	-	Biological Ponding System	97.2	65	40
188	Takau Estate	Pahang	SMR	-	Biological Ponding	23.1	200	-
189	LYL Rubber Sdn. Bhd.	Pahang	SMR	30.0	Biological Ponding	17.7	200	-
190	Temerloh Rubber Estate Bhd.	Pahang	SMR	-	Biological Ponding	27.2	72	108
191	Mentakab (MARDEC) Factory	Pahang	SMR	21.0	Treatment Under	154.0	203	500
192	Selbourne Estate	Pahang	SMR	-	Biological Ponding	54.6	50	80
193	Syarikat Perba Sdn. Bhd.	Pahang	SMR	15.0	No Treatment	95.8	300	-
194	Bahau Latex Concentrate	Negeri Sembilan	Latex Concentrate	20.1	Biological Ponding	70.6	100	1,000
195	Bahau SMR Factory	Negeri Sembilan	SMR	8.0	Biological Ponding System	63.9	31	101
196	Lee Rubber Co. (Pte) Ltd.	Pahang	SMR	25.0	No Treatment	192.0	205	420
197	Chuan Lee Rubber Factory Sdn. Bhd.	Pahang	SMR	-	Biological Ponding	43.6	30	10
198	MARDEC Gambang	Pahang	Mixed	25.5	Data Not Available	170.0	5,750	552
199	Kuala Brang (MARDEC) Factory	Trengganu	SMR	20.5	No Treatment	271.0	113	120
200	Lee Rubber Co. Ltd.	Kelantan	Conventional Grade	10.0	Ponding System	-	70	32
201	Seng Hin Rubber (M) Sdn. Bhd.	Kelantan	SMR	-	Biological Ponding	720.0	176	328
202	Pasir Cajah Estate	Kelantan	Mixed	-	Biological Ponding	72.7	200	17
203	Kuala Pahf Estate	Kelantan	SMR	2.34	Biological Ponding	34.4	28	38
204	Kerilla Estate	Kelantan	SMR	-	Biological Ponding System	75.0	82	162
205	Lee Rubber Co. (Pte) Ltd.	Kelantan	SMR	32.0	Proposed Biological Ponding System	300.0	200	452
206	Lapan Kabu SMR Factory	Kelantan	SMR	3.1	Biological Ponding System	21.1	200	54

Table 12 SUMMARY OF EXISTING PURIFICATION SYSTEMS
USED IN RUBBER PROCESSING FACTORIES IN
PENINSULAR MALAYSIA

Type of Purification System	North Region	Central Region	South Region	East Region	Total
o BIOLOGICAL PONDING					
. Anaerobic	-	-	1	-	1
. Anaerobic & Aerobic	19(2)	31	31(3)	17(1)	98(6)
. Anaerobic & Facultative	8	-	-	1	9
. Anaerobic & Stabilisation	2	-	-	-	2
Sub-total	29(2)	31	32(3)	18(1)	110(6)
o PONDING & MECHANICAL TREATMENT					
. Anaerobic, Aerobic & Aeration	1	-	-	-	1
. Aeration Pond	-(1)	-	-	-	-(1)
. Aeration & Sedimentation Pond	-	1(1)	-	-	1(1)
. Aerobic & Rotary Drum Filter	-	1	-	-	1
Sub-total	1(1)	2(1)	-	-	3(2)
o MECHANICAL TREATMENT					
. Oxidation Ditch	-(3)	2	-	-	2(3)
. Sedimentation Trap	1	-	-	-	1
Sub-total	1(3)	2	-	-	3(3)
o CHEMICAL TREATMENT					
. Ponding & Chemical	-	1	-	-	1
. Oxidation Ditch & Chemical	-	1	-	-	1
. Sedimentation Trap & Chemical	-	1	-	-	1
. Charcoal Filter Bed	-	-	1	-	1
Sub-total	-	3	1	-	4
o ANAEROBIC LAGOON & LAND DISPOSAL	-	-	1	-	1
o LAND DISPOSAL	3	5	1	-	9
o COMPLETE RECYCLE	1	2	-	-	3
o NO TREATMENT SYSTEM	20	13	12	3	48
o DATA NOT AVAILABLE	6	5	-	2	13
o TREATMENT SYSTEM UNDER CONSTRUCTION	-	-	-	1	1
Total	67	64	50	25	206

Remarks; Figures in brackets indicate the treatment system still
in proposal stage,
North Region; Perlis, Kedah, Penang, Perak; Central
Region: Selangor, Negeri Sembilan, Melaka; South
Region: Johor; East Region: Pahang, Trengganu, Kelantan.

Source; REF. 20

Table 13 CHARACTERISTICS OF PALM OIL
MILL EFFLUENT

Unit: mg/l except pH

Parameter	Steriliser Waste	Hydrocyclone Waste	Clarification Waste	Final Effluent
pH	5.0	-	4.5	4.7
Oil and Grease	4,000	300	7,000	6,000
BOD ₃	23,000	5,000	29,000	22,000
COD	47,000	15,000	64,000	61,000
Suspended Solids	5,000	7,000	23,000	18,000
Dissolved Solids	34,000	100	22,000	21,000
Total Nitrogen	600	100	1,200	800
Ammoniacal Nitrogen	20	-	40	35

Source; Refs. 4 & 21

Table 14 INVENTORY OF PURIFICATION SYSTEM
FOR PALM OIL PROCESSING (1/7)

Code No.	Name of Factory	State	Average Production of FFB mt/day	Purification System	Average Quantity of Effluent 10 ³ m ³ /year	BOD ₃ & SS of Treated or Raw Effluent	
						BOD ₃ (mg/l)	SS(mg/l)
1	* Kilang Kelapa Sawit, Bukit Mertajam	Kedah	160	Biological-Anaerobic Ponds	W: 33.4	W: 80	W: 180
2	* Kilang Kelapa Sawit Batu Kawan	Penang	130	Biological-Anaerobic & Aerobic, Land Disposal	W: 33.9	W: 43	
3	* United Oil Palm Industries Sdn. Bhd.	Province Wellesley	300	Oxidation Pond	W: 52.4	W: 500	W: 500
4	* Guan Palm Oil Mill Sdn. Bhd.	Penang	80	Oil Trap, Anaerobic Pond, Facultative Pond, Land Application, Land Disposal	L: 14.4	L: 5,000	L: 2,500
5	Kilang Sawit Dilot 1808	Penang	-	Data Not Available			
6	** Kilang Kelapa Sawit Tali Air	Perak	240	Data Not Available	W: 37.5	W: 0.36 mt/day	
7	* Kilang Kelapa Sawit Gula Estate	Perak	161	Floccultation Tank	W: 30.8	W: 145	W: 1,340
8	* Kilang Kelapa Sawit Kalumpung	Perak	322	As Like 1978's Submission	W: 64.0	W: <200	W: 630
9	* Temerloh Oil Mill Sdn. Bhd.	Perak	160	Biological-Anaerobic Pond		L: 5,000	
10	* Taiping Oil Industries Sdn. Bhd.	Perak	420	Anaerobic Digestion, Land Disposal	L: 82.1	L: 195	L: 110
11	* Kilang Kelapa Sawit Syon	Perak	240	Anaerobic Digestion Aeration Pond	W: 40.7	W: 500	W: 600
12	* Bukit Bersatu Palm Oil Industries Sdn. Bhd.	Perak	200	Biological-Chemical Treatment, Land Disposal	L: 36.0	L: 867	L: 116
13	* Anson Oil Industries Sdn. Bhd.	Perak	130	No Treatment Plant Presently - Completing in December, 1980	W: 18.9	W: 12,100	W: 26,900
14	** Kilang Kelapa Sawit Nova Scotia	Perak	415	Data Not Available	W: 72.0	W: 0.54 mt/day	
15	** Syarikat Peladang Perusahaan Minyak Sdn. Bhd.	Perak	48	Data Not Available	W: 7.2	W: 0.59 mt/day	
16	* Kilang Kelapa Sawit Selaba	Perak	172	Anaerobic Digestion Followed by Aeration	W: 32.3	W: 100	W: 400
17	* Jenderata Estate Palm Oil Mill	Perak	399	Biological Anaerobic	W: 68.9	W: 700	W: 90
18	* Kilang Kelapa Sawit Federal	Perak	208	Biological-Anaerobic & Aerobic Lagoons	W: 29.5	W: 103	W: 550
19	* Agriculture Palm Oil Mill Sdn. Bhd.	Perak	340	Anaerobic Biological Treatment, Aerobic Biological Treatment	W: 48.0	W: 1,000	W: 3,500

Remarks; W : Effluent into Watercourse
L : Effluent onto Land
* : Information carried out by DOE in 1980
** : Information carried out by DOE in 1978

Table 16 INVENTORY OF PURIFICATION SYSTEM
FOR PALM OIL PROCESSING (3/7)

Code No.	Name of Factory	State	Average Production of FFB mt/day	Purification System	Average Quantity of Effluent 10 ³ m ³ /year	BOD ₃ & SS of Treated or Raw Effluent	
						BOD ₃ (mg/l)	SS(mg/l)
39	** Kilang Minyak Jaya Sdn. Bhd.	Selangor	110	Data Not Available	W: 19.8	W: 1.23 mt/day	
40	** Kilang Kelapa Sawit Bukit Raja	Selangor	533	Data Not Available	W: 81.0	W: 0.01 mt/day	
41	** West Estate Palm Oil Mill	Selangor	452	Data Not Available	W: 67.8	W: 3.73 mt/day	
42	** Kilang Kelapa Sawit Brookland	Selangor	400	Data Not Available	W: 36.0	W: 2.1 mt/day	
43	* Kilang Kelapa Sawit Dusun Durian	Selangor	181	Anaerobic Digestion Aeration		W: <100	W: <400
44	* Kilang Kelapa Sawit Fermanagh (Banting)	Selangor	464	Anaerobic & Aerobic Digestion	W: 70.2	W: <1,000	
45	** Kilang Kelapa Sawit Lee Ching Cheng Dengkil	Selangor	76	Land Disposal	L: 11.4		
46	* Kilang Sawit Havy's	Selangor	300	Anaerobic Digestion, Land Disposal	L: 52.8	L: 1,730	L: 580
47	* Seri Langat Palm Oil Mill Sdn. Bhd.	Selangor	300	Biological-Anaerobic, Aerobic & Aeration	W: 24.0	W: 100	W: 100
48	** Kilang Kelapa Sawit Sungai Sedu	Selangor	203	Data Not Available	W: 54.0	W: 1.48 mt/day	
49	* Kilang Kelapa Sawit Morib Sdn. Bhd.	Selangor	350	Anaerobic Pond	W: 60.5	W: 500	W: 500
50	** Kilang Sawit Tumbuk	Selangor	64	Data Not Available	W: 9.6	W: 0.95 mt/day	
51	* Kilang Kelapa Sawit Sepang	Selangor	200	Biological Anaerobic Digestion & Aeration	W: 31.0	W: <100	W: <400
52	** Kilang Kelapa Sawit Telok Merbau	Selangor	270	Land Disposal	L: 48.0		
53	** Kilang Kelapa Sawit Ladang Tanah Merah	Negeri Sembilan	280	Land Disposal	L: 26.1		
54	* Rantau Palm Oil Factory	Negeri Sembilan	547	Anaerobic Digestion, Land Disposal	L: 107.0	L: 192	L: 1,700
55	** Kilang Sawit Rantau	Negeri Sembilan	60	Data Not Available	W: 12.0	W: 0.2 mt/day	
56	** Diomand Jublee Palm Oil Factory	Melaka	153	Land Disposal	L: 22.8		
57	* Sri Lingga Sdn. Bhd.	Melaka	160	Anaerobic, Aerated & Aerated Ponding		L: 500	
58	Nam Leong Development Sdn. Bhd.	Johore	-	Data Not Available			

Remarks; W : Effluent into Watercourse
L : Effluent onto Land
* : Information carried out by DOE in 1980
** : Information carried out by DOE in 1978

Table 17 INVENTORY OF PURIFICATION SYSTEM FOR PALM OIL PROCESSING (4/7)

Code No.	Name of Factory	State	Average Production of FFB mt/day	Purification System	Average Quantity of Effluent 10 ³ m ³ /year	BOD ₃ & SS of Treated or Raw Effluent	
						BOD ₃ (mg/l)	SS(mg/l)
59	* Nam Bee Company Sdn. Bhd.	Negeri Sembilan	500	Anaerobic, Aerated & Aerobic Ponding		L: <500	
60	* Gemas Oil Mill Sdn. Bhd.	Negeri Sembilan	320	Oxidation Pond	W: 57.6	W: 500	W: 600
61	** Kilang Kelapa Sawit Gomali	Johore	770	Data Not Available	W: 113.4		
62	* Kilang Kelapa Sawit Noordanol	Johore	217	Aerobic Pond with Aerator Hydrocyclone Sedimentation Tank	W: $\left. \begin{array}{l} 1/7 - 30/7 \\ 44.8 \text{ m}^3/\text{day} \\ 1/8 - 30/11 \\ \text{No Discharge} \\ 1/12 \text{ Onwards} \\ 98.4 \text{ m}^3/\text{day} \end{array} \right\}$	$\left. \begin{array}{l} 1/7 - 30/7 \\ \text{W: } 21,500 \\ 1/12 \text{ Onwards} \\ \text{W: } <100 \end{array} \right\}$	W: 20,400 W: <400
63	* Johore Labis Estate	Johore	420	Biological-Anaerobic Pond, Land Disposal	L: 78.6	L: <200	L <1,000
64	* Chan Wing Palm Oil	Johore	800	Biological-Anaerobic	L: 120.0	L: 524	L: 4,200
65	* Kilang Kelapa Sawit Yong Peng	Johore	350	Land Disposal	L: 68.3		
66	* Syarikat Perusahaan Kelapa Sawit Sdn. Bhd.	Johore	320	Biological-Anaerobic Pond, Land Disposal System	L: 47.1	L: 170	L: 140
67	* C.E.P. Rengam Palm Oil Mill	Johore	423	Anaerobic Treatment, Land Application, Land Disposal	L: 120.0	L: 1,990	L: 11,500
68	* Kilang Sawit Bukit Besar	Johore	392	Biological Treatment	W: 164.0	W: 26,900	W: 27,600
69	* Praser Palm Oil Factory	Johore	330	Biological-Anaerobic Ponds, Land Disposal	W: 78.0	W: 20,000	W: 18,000
70	* Kilang Kelapa Sawit Kulai Benta Plantation	Johore	473	Anaerobic Digestion	L: 54.0	W: 200	W: 1,050
71	* South Johore Processing Sdn. Bhd.	Johore	160	Chemical Biological Treatment Plant, Anaerobic Digestion Ponds, Land Disposal	L: 14.4	L: 35	W: 85
72	** Kilang Kelapa Sawit Sempoerna	Johore	180	Data Not Available	W: 24.3	W: 0.49 mt/day	
73	** Kilang Sawit Semencu	Johore	400	Biological Treatment	W: 45.7	W: 19,800 - 28,800	W: 6,770 - 7,930
74	* Kilang Kelapa Sawit Ulu Remis	Johore	868	Land Disposal	L: 134.0		
75	* Kilang Kelapa Sawit Kulai	Johore	400	Biological Treatment	W: 74.5	W: 26,700	W: 28,300
76	* Kilang Sawit Tai Tak	Johore	384	Biological-Anaerobic Ponds	W: 69.1	W: 3,700	W: 190
77	* Kilang Sawit Air Tawar	Johor	600	Biological Treatment	W: 113.0	W: 20,000 - 35,000	W: 5,000 - 30,000
78	** Kilang Kelapa Sawit Kok Seng (M) Sdn. Bhd.	Johor	320	Data Not Available	W: 58.0	W: 0.61 mt/day	

Remarks; W : Effluent into Watercourse
L : Effluent onto Land
* : Information carried out by DOE in 1980
** : Information carried out by DOE in 1978

Table 18 INVENTORY OF PURIFICATION SYSTEM FOR PALM OIL PROCESSING (5/7)

Code No.	Name of Factory	State	Average Production of FFB mt/day	Purification System	Average Quantity of Effluent 103m ³ /year	BOD ₅ & SS of Treated or Raw Effluent	
						BOD ₅ (mg/l)	SS(mg/l)
79	* Kilang Kelapa Sawit (Ulu Tiram)	Johore	450	Biological-Anaerobic, Land Disposal	L: 77.5	L: 5,000	
80	* Kilang Sawit Penggeli	Johore	400	Biological Treatment	W: 193.0	W: 21,200	W: 18,400
81	Kilang Sawit Felda Sening	Johore	-	Data Not Available			
82	Ulu Sebal Palm Oil Mill	Johore	-	Data Not Available			
83	* Kilang Kelapa Sawit Paloh	Johore	475	Aerobic & Anaerobic Pond, Land Disposal	L: 97.0	L: 31,000	L: 22,000
84	* Kilang Kelapa Sawit Pamol	Johore	80	Anaerobic & Aerobic Lagoon, Stabilisation Pond	W: 14.4	W: 500	
85	** Kilang Kelapa Sawit Ladang Pamol	Johore	336	Data Not Available	W: 72.0	W: 1.18 mt/day	
86	** Kilang Kelapa Sawit Paloh (Landak)	Johore	100	Land Disposal	L: 18.0		
87	* Kilang Kelapa Sawit Kahang	Johore	180	Biological-Anaerobic Pond	W: 31.4	W: 1,600	W: 12,400
88	* Kilang Kelapa Sawit Ladang Padang Kahang	Johore	200	Biological-Anaerobic Pond, Land Disposal	L: 21.2	W: 3,000	W: 1,290
89	* KSM Kahang Palm Oil Mill	Johore	100	Biological-Anaerobic & Aerobic, Land Disposal	L: 18.0	L: 5,500	L: 2,390
90	** Kluang Oil Palm Processing Sdn. Bhd.	Johore	150	Data Not Available	W: 7.73	W: 3.03 mt/day	
91	* Kilang Sawit Felda Kahang	Johore	100	Biological Treatment Anaerobic	W: 17.0	Jul.-Apr. 20,000± W: 5,000 After Apr. <500	25,000± W: 5,000 <400
92	* Bukit Benut Palm Oil Mill	Johore	160	Data Not Available			
93	* Ladang Tereh Palm Oil Mill	Johore	450	Sediment Traps & Oil/Grease Traps, Anaerobic Digestion	L: 64.6	L: 200	
94	** Suburban Palm Oil Mill	Pahang	250	Land Disposal	L: 37.5		
95	** Kilang Sawit Keratong 3	Pahang	125	Land Disposal	L: 23.7		
96	** Lian Hup Palm Oil Mill	Pahang	200	Land Disposal	L: 27.1		
97	* Kilang Kelapa Sawit Sg. Mengah	Pahang	233	Deoiling, Anaerobic Digestion & Facultative Process	W: 45.5		
98	* Kilang Kelapa Sawit Pasoh (FELDA)	Negeri Sembilan	500	Biological Treatment, Land Disposal	W: 74.5	W: 17,300	W: 13,700

Remarks; W : Effluent into Watercourse
 L : Effluent onto Land
 * : Information carried out by DOE in 1980
 ** : Information carried out by DOE in 1978

Table 19

INVENTORY OF PURIFICATION SYSTEM
FOR PALM OIL PROCESSING (6/7)

Code No.	Name of Factory	State	Average Production of FFB mt/day	Purification System	Average Quantity of Effluent 10 ³ m ³ /year	BOD ₅ & SS of Treated or Raw Effluent	
						BOD ₅ (mg/l)	SS(mg/l)
99	* Kok Foh Palm Oil Factory	Negeri Sembilan	-	Biological Anaerobic & Maturation		W: 21,700	W: 24,000
100	* Kilang Kelapa Sawit Senama	Negeri Sembilan	82	Anaerobic Digestion, Aeration, Land Disposal	L: 8.71	L: 4,000	
101	* Kemayan Palm Oil Factory	Pahang	156	Anaerobic & Aerobic Digestion, Land Disposal	W: 3.02 L: 17.3	W: 4,500 L: 20,800	W: 1,100 L: 18,500
102	* Kilang Sawit Bukit Mendu	Pahang	450	Biological Treatment Anaerobic	W: 74.5	W: 16,800 L: <500	W: 15,000 L: <400
103	* Kilang Kelapa Sawit Kepyang	Pahang	500	Biological-Anaerobic	W: 95.0	W: 4,000 - 27,000 L: <500	W: 18,000 - 23,000 L: <400
104	** Kilang Sawit Felda Jengka 4	Pahang	438	Land Disposal	L: 78.3		
105	** Timor Palm Oil Plantations	Pahang	105	Data Not Available	W: 15.8	W: 0.26 mt/day	
106	* Kilang Kelapa Sawit Ulu Sempol	Pahang	400	Biological Treatment Anaerobic	W: 74.5	W: <500	W: 15 - 20
107	* Kilang Kelapa Sawit Chenor	Pahang	150	Land Disposal	L: 29.3	L: 22,000	L: 24,000
108	* Kilang Kelapa Sawit Jengka 9	Pahang	500	Biological Treatment	W: 90.0	W: 17,000	W: 12,500
109	* Kilang Kelapa Sawit Sg. Mai	Pahang	200	Anaerobic & Aerobic Digestion	W: 45.0 L: 12.0	W: 25,500	W: 26,700
110	** Kilang Sawit Sungai Gelanggi	Pahang	356	Data Not Available	W: 59.7	W: 3.98 mt/day	
111	* Kilang Sawit Padang Pisol	Pahang	260	Biological Treatment Anaerobic	W: 46.0	W: 8,960	W: 7,310
112	* Kilang Sawit Sungai Koyan	Pahang	400	Biological Treatment	W: 70.0	W: 19,000	W: 15,000
113	* Kilang Penyelidikan Sawit Tun Razak	Pahang	120	Biological Treatment, Land Disposal	W: 25.6		
114	Kilang Sawit Benta Merapoh	Pahang	-	Data Not Available			
115	** Kilang Sawit Tementi	Pahang	70	Land Disposal	L: 12.6		
116	* Raub Oil Palm Mil Sdn. Bhd.	Pahang	70	Anaerobic	W: 12.0	W: 500	W: 3,900
117	** Kilang Sawit Chini	Pahang	47	Land Disposal	L: 8.7		
118	* Sykt. Penanaman Bukit Senarang Sdn. Bhd. Kemayan	Pahang	560	Sludge Oil Recovery Tank		L: 5,000	
119	* Ladang Juntai Sdn. Bhd. Kamayan	Pahang	480	Biological Anaerobic & Aerobic Pond		L: 5,000	L: 1,200
120	* Kilang Sawit Jengka 18A	Pahang	430	Biological Treatment	W: 96.7	W: 20,000± 5,000	W: 25,000± 5,000
121	* Kilang Sawit Felda Membaga	Pahang	180	Biological Treatment	W: 32.1	W: 20,000± 5,000	W: 25,000± 5,000

Remarks; W : Effluent into Watercourse
L : Effluent onto Land
* : Information carried out by DOE in 1980
** : Information carried out by DOE in 1978

Table 20 INVENTORY OF PURIFICATION SYSTEM
FOR PALM OIL PROCESSING (7/7)

Code No.	Name of Factory	State	Average Production of FFB mt/day	Purification System	Average Quantity of Effluent 10 ³ m ³ /year	BOD ₅ & SS of Treated or Raw Effluent	
						BOD ₅ (mg/l)	SS(mg/l)
122	* Kilang Sawit Felda Kemasul	Pahang	250	Biological Treatment	W: 36.0	W: 14,000	W: 15,000
123	* Kilang Sawit Bukit Goh	Pahang	400	Biological Treatment	W: 86.4	W: 25,000	W: 20,000
124	* Jabor Valley Palm Oil Mill	Pahang	263	Biological Ponding, Anaerobic & Facultative Ponding, Land Disposal	W: 51.3	W: <200	W: ±200
125	** Kilang Kelapa Sawit Neram	Trengganu	180	Data Not Available	W: 32.7	W: 2.18 mt/day	
126	** Kilang Kelapa Sawit TDMB Kemaman	Trengganu	960	Data Not Available	W: 88.5	W: 1.94 mt/day	
127	* Kilang Sawit Jerangau Barat	Kelantan	200	Biological Treatment, Anaerobic/Facultative Ponding	W: 45.0	W: <500	W: <400
128	* Kilang Kelapa Sawit Jerangau	Trengganu	210	Biological Treatment Anaerobic	W: 51.8	W: 14,100	W: 12,100
129	* Kilang Kelapa Sawit Sg. Tong	Trengganu	240	Biological-Anaerobic & Aerobic Lagoons	W: 39.7	W: <500	
130	* Kilang Kelapa Sawit Gua Musang	Kelantan	75	Biological Treatment Plant	W: 10.4	W: 1,000	W: 600
131	** Kilang Kelapa Sawit Kuala Gris	Kelantan	50	Data Not Available	L: 10.2		
132	** Kilang Kelapa Sawit Lapan Kabu	Kelantan	98	Data Not Available	W: 14.7	W: 0.90 mt/day	
133	* Kilang Sawit Kemahang	Kelantan	140	Biological Treatment	W: 22.3	W: <500	W: <400

Remarks; W : Effluent into Watercourse
L : Effluent onto Land
* : Information carried out by DOE in 1980
** : Information carried out by DOE in 1978

Table 21 SUMMARY OF EXISTING PURIFICATION SYSTEMS FOR PALM OIL WASTE TREATMENT IN PENINSULAR MALAYSIA

Purification System	State	Kedah	Penang	Perak	Selangor	N. Sembilan	Melaka	Johor	Pahang	Trengganu	Kelantan	Total
A. LAND DISPOSAL												
Using Raw Effluent	-	-	-	-	3	1	1	4	6	-	-	15
Using Partially Treated Effluent - Pretreated Ponding System:-	-	-	-	-	-	-	-	-	-	-	-	-
Anaerobic Digestion	-	-	1	1	2	-	6	1	-	-	-	11
Anaerobic & Facultative	-	1	-	-	-	-	-	2	-	-	-	3
Anaerobic & Aerobic	-	1	-	-	-	-	1	1	-	-	-	3
Anaerobic & Chemical Treatment	-	-	1	-	-	-	1	-	-	-	-	2
Anaerobic & Aeration	-	-	-	-	-	-	-	-	-	-	-	1
B. BIOLOGICAL TREATMENT/ OXIDATION PONDING SYSTEM												
Anaerobic	1	-	6	1	-	-	5	4	1	-	-	18
Anaerobic & Aeration	-	-	3	2	-	-	-	-	-	-	-	5
Anaerobic & Aerobic	-	-	4	1	-	-	-	3	1	-	-	9
Anaerobic, Aerobic & Aeration	-	-	-	1	1	1	-	-	-	-	-	3
Anaerobic, Aeration, Sedimentation	-	-	-	-	-	-	1	1	-	-	-	1
Anaerobic & Facultative	-	-	-	1	-	-	1	1	-	-	-	3
Facultative & Algae Ponding	-	-	-	-	-	-	-	-	-	1	1	1
Process Details Not Specified	-	1	1	-	1	-	5	6	-	2	-	16
C. CHEMICAL TREATMENT												
Sludge Oil Recovery Tank	-	-	-	-	-	-	-	1	-	-	-	1
Flocculation Tank	-	-	1	-	-	-	-	-	-	-	-	1
D. DATA NOT AVAILABLE												
	-	1	7	14	1	-	10	3	2	2	2	40
Total	1	4	24	23	8	2	34	28	4	5	5	133

Table 22

INVENTORY OF PURIFICATION SYSTEM FOR INDUSTRIAL EFFLUENT
IN PERAI & BUTTERWORTH INDUSTRIAL ESTATES (1/2)

de	Name of Factory	Type of Production	Production	Purification System	Quantity of Effluent 10 ³ m ³ /y	BOD ₅ & SS of Treated or Raw Effluent BOD ₅ (mg/l) SS(mg/l)	
1.	Palmex Industries Sdn. Bhd.	Refined Palm Oil/ Palm Olein, Crude Stearine, Fatty Acid Distillate	10,500 mt/month	Neutralisation Basin & API (American Petroleum Institute) Settling Tank	216	50-400	200-1800
2.	Salex Oil Bhd. Butterworth	Palm Kernel Oil, Palm Kernel Meal & Pellets	1,640 mt/month	Nil	21.8		
3.	Barkath Chemicos Foods Sdn. Bhd.	Oil Production	3,070 mt/month	Nil			
4.	Evercrisp Snack Products (M) Sdn. Bhd.	Cheese Twisties, Chicken Twisties	14,200 cartons/month	Nil	3.36	233	92
5.	Kwong Heng Hoe Kee	Tapioca Pellets	1,600 Plks/month	Nil	3.44		
6.	Penang Edible Oil Sdn. Bhd.	Cooking Oil, Vanaspati	350 mt/month	Nil	7.5		
7.	Yeo Hiap Seng (M) Sdn. Bhd.	Sea Food Processing	1,280,000 tins/month	Use Several Solid Traps	18.2		
8.	Weng Joo Hong Sdn. Bhd.	Tapioca Pearls, Tapioca Flour, Tapioca Waste	5,760 Plks/month	Sedimentation Tanks & Filter Tanks	3.55		
9.	Malaysian Sea Products Sdn. Bhd.	Sea Food Processing	66,100 lbs/month	Waste Traps & Waste Filters	576		
0.	Hong San Frozen Foods Sdn. Bhd.	Frozen Prawns	45 mt/month	Data Not Available	5.4		
1.	Sin Heng Chan Sdn. Bhd.	Food Manufacturing		Nil			
2.	Butterworth Iceworks Sdn. Bhd.	Frozen Prawns	696 Plks/month	Nil	65		
3.	Hacks Malaysia Sdn. Bhd.	Hacks Sweets in 6 Flavours	331,000 lbs/month	Purification System Not Necessary			
4.	Gold Coin (M) Sdn. Bhd.	Manufacture of Prepared Animal Feeds	2,390 t/month	Nil			
5.	Chin Soon Huat Kilang Sago	Tapioca Flour, Tapioca Pellets	233 mt/month	Nil	1460.0		
5.	A.K. Seenivasagam & Brothers	Synthetic Camphor Tablets, Curry Powder	1,570 Plks/y	Nil			
7.	Guan Seng Fruit Factory	Preserved Fruits	2,000 Kg/month	Nil			
3.	Hock Chuan Aerated Water Factory	Aerated Water, Non-Aerated Water	14,800 l/month	Data Not Available			
3.	Acme Canning Sdn. Bhd.	Food & Beverage Manufacturing	15,000 cartons/month & 8,100 crates/month	Nil			
0.	Chocolates Products (M) Sdn. Bhd.	Chocolate, Cocoa Powder	3,000 t/y	Data Not Available			
.	Soon Cheang Co. Sauce Factory	Soya Bean Sauce, Chillie Sauce	850 doz/month & 25 Plks/month	Data Not Available			
1.	Sih Ah Kilang Sago	Sago Powder, Sago Pellets	500 Plks/month	Nil	7.2		
1.	J & P Coats (M) Sdn. Bhd.	Cotton & Synthetic Sewing Thread	17,000 Kg/month	Waste Filter & Averaging Tank	61.4	50-100	700-2200
1.	Qualitex Sdn. Bhd.	Texturised Nylon Yarn	40,000 lbs/month	Data Not Available	5.49		

Table 23

INVENTORY OF PURIFICATION SYSTEM FOR INDUSTRIAL EFFLUENT
IN PERAI & BUTTERWORTH INDUSTRIAL ESTATES (2/2)

Code No.	Name of Factory	Type of Production	Production	Purification System	Quantity of Effluent 10 ³ m ³ /y	BOD ₅ & SS of Treated or Raw Effluent	
						BOD ₅ (mg/l)	SS(mg/l)
25.	Texsyn Fibre Industries Sdn. Bhd.	Yarn Fabric	25.6 mt/month & 323,000 yards	Sand Bed Filters & Oil/Grease Traps	102	26.8	38.8
26.	Chiao Kuang Knitting Factory (M) Sdn. Bhd.	Sweater	3,000 doz/month	Sedimentary Traps			
27.	Penfibre Sdn. Bhd.	Staple Fibre, Staple Fibre Waste, Tow Waste	9,090,000 Kg/y	Buffer Rank, Neutralisation Tank, Aeration Tank, Sedimentation Tank, Aerobic Digestion Tank	350.4	14,800	34,900
28.	Sharikat Eastern Powder Sdn. Bhd.	Knitted Underware, Towels	18,000 doz/month	Nil			
29.	Public Textile Bhd. Spinning Mill	Cotton Yarn	107,000 Kg/month	Nil	19.3		
30.	Allied Malayan Development Bhd.	Towel Products	100,000 lbs/month	Nil			
31.	Public Textile Bhd. Knitting Factory	Singlet, T-Shirt, Briefs	195,000 doz/yr	Nil	38.3		
32.	Qualinit Sdn. Bhd.	Nylon Socks, Panty Hose	8,000 doz/month	Purification System Not Necessary			
33.	Surgical Industries Sdn. Bhd.	Cotton and Wool		Data Not Available			
34.	Kan Thin Heong Factory	Joss-Sticks, Joss-Coils	660 Plks/month	Nil			
35.	Guan Huat Hang (Penang) Sdn. Bhd.	Chinese Playing Cards	2,000 sets/month	Data Not Available			
36.	Malakoff Estate Factory	Latex Concentrate SMR Grades	3,980,000 Kg/y	Rubber Trap, Anaerobic Digestion Pond	325	<50	240
37.	Allied Chemical Products Co. Sdn. Bhd.	Rubber Condom	4,000 gross/month	Purification System Not Necessary	0.409 m ³ /d		
38.	Coco Industry Sdn. Bhd.	Twisted Ropes, Twine Ropes	113 t/month	Nil	0.341		
39.	Nanleong Sdn. Bhd.	2xBrawn Crepe, Remilled Crepe Bark Crepe	368 Kt/month	Nil			
40.	Oriental Steel Industries	Mild Steel, Bright Polished Shafting Bars	150 t/month	Data Not Available	4.28		
41.	Fujisash (M) Metal Industries Sdn. Bhd.	Aluminium Extrusions	145 t/month	Neutralizing Tank, Settlement Tank	856 m ³ /d	5-20	60
42.	Syarikat Communico	Transformers	28,000 pieces/month	Nil			
43.	Armstrong Cycle Parts Sdn. Bhd.	Spokes, Nipples, Control Cables	16,400 gross/month	Data Not Available	2.8		
44.	Federal Cables Wires & Metal Mfg. Bhd.	Bare Copper Bars, Enamelled Wires	50,000 lbs/month	Nil	1.9 tons/y		
45.	Penang Pewter & Metal Arts Sdn. Bhd.	200 items		Nil			

Source; Ref. 23

Table 24 POLLUTANT LEVELS OF RIVERS IN 1978 (1/3)

Unit: mg/l except pH

River Name & Basin No.	WQMS No.	No. of Samples	pH			BOD ₅			COD			Suspended Solids			Ammoniacal Nitrogen		
			Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
Cedah 3	6103601	5	6.4	7.0	5.8	4.8	10	2	94	230	20	49	100	25	.50	.67	<.01
	6204620	5	6.0	7.3	3.7	5.6	13	<1	24.2	69	10	33	60	5	.042	.08	<.01
	6204603	5	6.7	7.3	6.3	5.2	10	2	26.4	60	10	41	70	5	.124	.44	<.01
	6206605	5	6.8	7.2	6.6	9.4	35	2	35.4	115	10	42	60	20	.112	.44	<.01
	6206606	4	6.8	7.2	6.5	16.8	56	1	64.8	185	10	42.5	75	15	.15	.52	<.01
	6206608	4	6.0	6.7	4.0	87.8	208	3	155	500	Nil	91.3	210	40	.225	.77	<.01
6306609	5	6.6	7.2	6.0	2.2	4	1	12.6	25	Nil	34	40	30	.018	.05	<.01	
Terbok 4	5604601	1	6.7				3			252			80				<.01
	5604602	1	6.5				14			131			90				<.01
	5704607	1	5.8				4			10			40				<.01
	5604603	1	6.5				6			223			65				<.01
	5705604	1	6.3				6			267			50				<.01
	5705605	1	6.3				23			44			50				<.01
5705606	1	6.5				188			447			85				13.9	
Luda 5	5503601	5	6.6	6.8	6.5	1.4	2	<1	16.4	<30	4	40	110	15	.218	1.0	<.01
	5504602	5	6.5	6.8	6.3	1.6	3	<1	14.8	<30	0	37	80	20	.028	.06	<.01
	5505603	4	6.3	6.7	6.0	2.8	6	1	11.5	18	8	41.3	50	35	.015	.03	<.01
	5505612	3	6.3	6.6	6.0	2.3	4	<1	16.7	40	0	36.7	60	5	.033	.06	<.01
	5606604	5	6.5	6.7	6.4	2.8	5	<1	19.6	51	<4	63	95	25	.026	.08	<.01
	5606605	4	6.5	6.7	6.3	4	8	<1	17.3	55	<4	58.8	80	20	.028	.04	<.01
	5806614	5	6.4	6.6	6.2	1.4	2	<1	20.2	37	<4	59	90	5	.018	.05	<.01
	5906607	5	6.4	6.8	6.0	2.2	4	<1	27.8	74	10	40	70	5	.072	.23	<.01
6007608	5	6.5	6.7	6.4	2	4	<1	22	56	4	46	80	20	.018	.03	<.01	
Luru 6	5304601	9	7.5	8.5	6.4	4.3	12	1	195.1	315	124	116.7	230	10	.46	1.94	<.01
	5304602	8	6.8	7.9	4.6	10.5	4.6	<1	152	264	10	63	120	5	.113	.3	<.05
	5304603	9	6	7.8	3.4	7.1	18	<1	126	260	19	130	420	10	1.49	4.25	.01
	5304604	9	5.5	7.3	3.1	4.9	10	<1	79.8	175	Nil	52.8	110	15	2.71	5.52	.56
	5304605	9	6.4	8.0	5.4	158	320	6	327	740	20	72.2	110	15	8.22	18.1	.43
	5304606	9	6.7	7.4	6.4	52.8	320	5	72.2	160	Nil	64.4	110	5	7.6	20.0	.80
	5304607	9	6.9	8.9	6.2	32	65	2	84.4	170	20	116	345	55	8.31	14.10	1.13
	5304608	9	6.5	7.1	5.8	12.2	25	2	26.2	48	10	66.1	110	10	1.49	3.84	<.01
	5304609	9	6.3	7.2	4.9	33	160	4	87.8	305	20	139	545	5	8.08	33	.03
Lerai 6	5403602	9	6.9	7.7	5.4	3.8	11	<1	135.3	300	38	26000	44700	7290	.26	.40	Nil
	5404601	9	7.0	7.3	6.9	2.4	5	<1	130	226	38	105	235	10	.272	.85	Nil
	5404603	9	6.8	7.2	6.5	2.8	6	<1	92.1	196	Nil	84.4	180	10	.112	.17	.06
	5404604	9	6.6	6.9	6.0	1.9	3	<1	58.1	120	Nil	58.3	150	10	.202	.52	<.01
	5404605	8	6.2	7.4	5.3	2	4	1	14.9	29	Nil	46.3	110	5	.073	.15	.03
	5404608	9	6.2	8.0	5.4	2.7	8	<.5	18.4	48	Nil	47.8	75	15	.36	.98	<.01
	5504609	9	6.3	7.0	5.7	2.9	9	1	20.1	30	5	53.3	115	10	.44	1.85	<.01
5505610	9	5.9	7.2	5.1	2.8	5	1	36	76	10	60.6	120	25	.38	1.89	<.01	
Lerjai 6	5204601	1	8.0				0.5			153			5				.01
	5204602	1	7.6				3			184			40				.02
	5205603	1	6.9				0.5			10			50				.06
	5205604	1	7.2				3			30			25				.32
Lerian 8	5104601	1	5.4				2			50			5				.12
	5104602	1	4.5				2			20			15				.10
	5104603	1	4.2				1			15			5				.06
	5105604	1	5.0				3			20			10				.08
	5105606	1	4.9				4			25			40				.05
	5307608	1	6.4				4			10			20				.14
Linta 10	4310601	3	7.4	7.9	6.3	3.0	4.4	2.10	34.7	68	12	1690	2690	1150	.24	.64	.03
	4410461	3	7.3	8.1	6.3	1.4	2.0	0.7	26.7	48	12	1890	4010	490	.32	.89	.02
	4510662	3	7.3	7.9	6.3	6.3	7.40	4.4	18	20	16	6.7	10	5	.46	1.28	.03
	4611663	3	6.8	7.5	5.5	2.2	4.4	0.7	10.7	16	4	16.7	25	5	.243	.59	.02

Table 25 POLLUTANT LEVELS OF RIVERS IN 1978 (2/3)

Unit: mg/l except pH

River Name & Basin No.	WQMS No.	No. of Samples	pH			BOD ₅			COD			Suspended Solids			Ammoniacal Nitrogen		
			Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
Bernam 11	3809601	1	7.8			1.1			52			1.5					.03
	3709602	1	7.5			1.5			45			20					.04
	3813603	1	7.1			0.5			16			15					.16
	3714604	1	7.0			0.3			8			10					.20
	3615605	1	7.0			1.1			8			5					.02
Tongli 12	3412601	1	5.7			0.9			53.9			191					.07
	3614602	1	5.7			1.5			53.9			5					.06
Selangor 13	3312601	1	7.2			1.1			821			100					.02
	3313602	1	6.0			1.5			7.8			127					.04
	3314603	1	6.1			1.1			50.6			963					.05
	3516604	1	6.9			1.1			23.4			25					.02
	3517605	1	6.4			1.7			19.5			7					.04
Buloh 14	3212601	1	4.3			1.3			67.6			-					1.44
	3313602	1	3.4			1.5			19.8			-					.21
	3313603	1	4.3			2.5			39.1			-					1.56
	3215609	1	6.3			0.9			11.0			-					.17
	3214604	1	5.1			7.3			232			-					.72
	3214605	1	6.1			0.9			23.7			-					3.60
	3115606	1	6.3			6.3			77.0			-					-
	3215608	1	6.3			1.5			14.0			-					.31
Kelang 15	3013601	9	7.2	7.8	6.8	2.3	3.6	1.0	431	2070	17	1550	8370	25	1.16	3.60	.02
	3014602	8	6.9	7.3	6.5	3.3	6.0	0.8	731	5490	24.4	1510	6180	68	2.11	4.2	.02
	3014603	9	6.9	7.2	6.2	2.5	6.1	0.8	41.1	75.0	20.7	871	2310	33	2.79	6.60	.05
	3015601	7	6.9	7.2	6.5	4.2	10.8	0.2	67.4	143	243	2670	5230	314	3.12	7.20	.12
	3015631	8	7.1	7.3	6.9	13.3	35	2.4	113	470	16.1	6250	12100	2410	2.79	5.70	.02
	3016607	9	7.0	7.2	6.6	10.2	25	1.6	99.0	255	24.9	4280	8740	655	9.02	65.6	.05
	3116630	9	6.8	7.1	6.3	5.0	7.1	1.6	49.2	53.1	15.4	1870	4450	542	2.20	9.0	.02
	3117602	8	6.7	7.2	6.2	4.2	11.7	1.1	19.4	30.8	8.1	146	565	24	1.19	3.0	.02
	3117604	8	6.8	7.3	6.2	3.1	6.1	0.4	18.0	28.6	12.1	408	2080	15	1.52	9.0	.02
	3117603	8	6.6	6.9	6.1	1.5	3.0	0.4	11.4	22.9	5.0	60.3	205	4	0.49	2.3	.00
Langat 16	2814601	1	6.4			1.1			32.5			1000					.07
	2814602	1	6.4			0.9			41.8			400					.06
	2815603	1	4.6			1.5			59.4			995					.04
	2816604	1	5.8			0.5			26.5			943					.02
	2916641	1	6.1			0.5			26.9			484					.02
	3017644	1	-			0.5			15.1			119					.04
	3017611	1	6.3			0.9			19.4			284					.08
	3018612	1	6.2			1.3			44.2			432					.04
	3017613	1	6.3			0.5			17.7			12					.02
	3118614	1	6.3			0.5			9.1			6					.04
	3118647	1	6.5			1.3			-			3					.04
Linggi 18	2319601	6	5.7	7.8	3.9	1.1	2.1	0.5	254	960	38.2	148	410	25	.28	.48	.09
	2420602	6	5.6	6.8	3.4	4.1	18.6	0.9	29.2	49.5	4.1	253	790	25	.45	1.50	.24
	2519603	6	6.0	6.7	4.9	1.5	2.9	0.3	23.6	46.0	2.8	279	778	4	.74	1.02	.30
	2519621	5	6.0	6.6	5.6	8.0	34.6	0.7	34.1	53.7	17.9	149	252	55	.61	1.05	.33
	2519604	6	6.1	6.8	5.7	4.0	14.6	0.9	38.4	44.9	15.7	99.9	365	22	1.13	2.10	.30
	2519605	5	6.5	6.8	6.3	6.3	23.2	0.8	30.6	56.2	10.0	55.4	133	16	1.50	3.30	.30
	2619606	6	5.7	6.4	4.9	1.0	2.1	0.6	17.9	68.6	5.5	12	25	6	.61	1.35	.06
	2619607	6	6.3	6.8	6.0	3.0	4.6	0.5	30.1	37.9	19.6	130	166	50	1.47	2.70	.51
	2719608	6	6.4	7.0	6.1	2.6	7.0	0.5	32.6	66.9	13.9	110	184	39	1.31	2.55	.54
	2719622	5	6.4	6.8	6.1	1.3	2.0	0.5	17.9	25.1	9.4	96	144	6	.91	1.80	.18
	2719609	6	6.5	6.9	6.1	2.1	6.6	0.5	12.5	19.3	7.9	67.2	178	5	.93	2.70	.24
	2719610	6	6.4	6.9	6.1	1.3	2.8	0.5	7.2	11.6	4.1	13.0	28	4	.52	1.50	.18
	Melaka 19	2222601	6	6.7	8.1	6.0	2.5	5.3	0.9	448	2300	12.1	1004	4280	30	.33	.96
2222602		5	6.6	8.1	6.0	1.3	2.3	0.7	17.6	35.7	6.9	15	20	11	1.98	5.40	.42
2222603		5	4.4	6.1	3.1	1.4	2.5	0.8	17.2	32.9	5.5	13.8	20	10	1.50	3.00	.54
2222605		6	5.9	6.5	5.1	1.5	2.1	1.1	28.4	37.4	21.7	12.8	26	5	.85	1.50	.39
2322607		6	6.2	6.5	6.0	1.5	2.1	0.7	17.5	27.5	0.7	20.3	43	5	.15	.60	.01
2312613		6	6.3	6.6	6.0	1.0	1.5	0.6	22.1	28.5	17.6	17.7	42	5	.19	.84	.02
2322610		6	6.4	6.7	6.1	1.3	2.3	0.6	21.2	26.7	17.7	11.3	25	5	.15	.48	.02

Table 26 POLLUTANT LEVELS OF RIVERS IN 1978 (3/3)

Unit: mg/l except pH

River Name & Station No.	WQMS No.	No. of Samples	pH			BOD ₅			COD			Suspended Solid			Ammoniacal Nitrogen		
			Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
luar 21	2025601	6	6.9	7.5	6.4	1.2	2	Nil	833	1580	515	219	945	5	.13	.18	.05
	2125603	6	5.2	6.4	4.2	0.8	1	Nil	173	600	20	79.2	160	20	.13	.24	.04
	2126604	6	5.2	6.3	4.0	1	1	1	70	275	5	73.3	200	10	.09	.13	.02
	2225605	6	5.7	6.5	4.7	1.2	2	1	22.5	35	5	18.3	30	5	.04	.11	.01
	2227606	6	6.1	6.6	4.9	1.2	2	1	35.3	85	20	14	40	5	.05	.10	.01
	2228607	6	6.3	6.9	5.7	1.2	2	Nil	36.3	85	20	11	25	5	.10	.24	.01
	2228608	6	6.3	6.8	5.6	0.7	1	Nil	27.3	35	15	20	40	10	.11	.23	.01
	2328609	6	6.3	6.8	5.7	2.5	9	1	37.8	105	20	20	30	15	.13	.18	.04
	2427611	6	6.4	6.8	5.8	1.8	3	1	25.5	35	5	37	100	10	.15	.24	.08
	2527611	6	6.3	6.7	5.8	2.3	4	1	21.2	35	5	50	100	15	.15	.26	.10
	2627613	6	6.3	6.6	5.8	2.4	4.5	2	31.7	70	5	41	65	20	.20	.38	.13
	2625612	6	6.6	7.1	6.2	0.8	3	Nil	17.5	30	5	65.5	205	15	.06	.14	.01
Jatu Pahat 22	1829602	4	3.5	3.7	3.3	1.3	2	1	45	75	30	40	65	25	.34	.48	.21
	1929603	4	3.4	3.6	3.2	1.3	2	1	27.5	40	20	22.5	50	5	.30	.36	.13
	1928610	4	3.5	3.6	3.3	1.8	4	0	35	40	30	18.8	30	10	.20	.30	.20
Jenut 23	1632601	1	3.7						105			135			.11		
	1833602	1	5.6						35			25			.02		
	1833603	1	5.7						20			50			.02		
Sekudai 23	1536601	9	6.2	6.7	5.9	1.7	3	1	18.2	30	8.5	35	80	10	.18	.45	.02
	1536602	9	6.2	6.6	5.9	1.9	4	Nil	16.5	30	8.5	59.4	115	25	.19	.46	.01
	1636603	9	6.2	6.7	5.7	1.9	5	1	15.2	25	5	48.1	75	30	.19	.54	.01
	1636601	8	5.9	6.4	3.5	2.1	3	Nil	28.9	130	11.5	23.8	55	5	.47	1.30	.10
	1636605	9	6.1	6.7	5.6	2.5	5	1	15.7	30	5	21.1	50	5	.71	1.70	.20
	1636606	9	6.1	6.5	5.5	2.6	7	1	18.3	35	5	35.6	95	10	.58	1.20	.23
	1636607	9	6.1	6.6	5.6	1.4	4	0	17.9	35	5	50	180	5	.07	.11	.02
	1735608	9	6.0	6.6	5.6	1.4	3	Nil	14.5	30	5	28.8	105	5	.10	.22	.01
Johor 24	1739604	6	6.4	7.4	5.6	1.5	2	1	13.7	22	5	-	-	-	.09	.18	.03
	1738605	6	6.1	6.2	5.7	1.7	3	1	18	25	5	-	-	-	.08	.1	.03
	1737606	6	6.0	5.9	5.7	2	3	1	18.7	30	10	-	-	-	.11	.30	.01
	1835608	5	5.6	6.3	4.3	6.4	23	1	25.7	1440	12	-	-	-	1.65	7.8	.01
	1834609	6	5.1	6.2	3.9	4.2	14	Nil	30.8	80	10	-	-	-	.66	1.4	.19
	1834610	6	6.4	7.6	5.9	0.7	1	Nil	13.2	20	4	-	-	-	.04	.08	.01
Endau 27	2636601	3	7.0	7.7	6.3	3.5	5.1	1.8	27.6	43.2	12.7	233	355	20	.17	.19	.14
Pahang 30	3534601	4	6.8	7.6	5.9	1.3	2.5	0.5	18.1	28.6	10.4	43.7	76	5	.07	.12	.02
	3527604	2	6.4			1.7			19.8			47.5	55	40	Nil	Nil	Nil
	3424607	3	7.0	7.7	6.0	0.6	1.3	0.1	14.6	25.8	7.2	95	95	95	.07	.14	Nil
	3424609	3	6.4	7.2	5.9	1.4	2.0	0.7	22.3	30.2	10.4	84	90	78	.09	.16	.02
	3524610	4	6.5	7.2	5.9	1.3	2.5	0.5	34.2	38.2	29.0	23.3	55	5	.06	.08	.04
	3723612	4	6.4	7.2	5.9	55.8	150	2.4	198	620	12.5	53.5	85	22	2.76	6.00	.13
	3421619	3	6.8	7.3	6.4	1.8	2.7	1.3	15.1	21.9	4.2	309	483	135	.03	.04	.02
	3824613	4	6.8	7.2	6.3	1.5	2.1	0.9	14.9	23.1	9.7	12.7	25	4	.04	.06	.02
	3924614	4	5.1	7.0	1.6	1.5	2.3	1.0	27.2	57.0	5.7	61.7	110	16	5.86	23.3	.02
	3519618	4	6.5	7.1	6.2	1.9	3.7	0.7	13.9	19.2	7.3	57.5	90	25	.2	.42	.02
	4220616	4	6.5	6.8	6.1	1.3	1.9	0.5	23.7	38.7	13.4	126	191	7	.10	.20	.02
	4817617	3	6.6	6.7	6.4	1.0	1.3	0.5	12.7	18.2	3.8	38.3	86	4	.07	.10	.04
Kuantan 31	3833601	2	6.4	6.4	6.4	1.2	1.6	0.8	13.7	19.3	8.0	6210	12400	15	.24	.26	.22
	3832602	2	3.8	3.8	3.8	1.4	1.6	1.2	18	18.0	17.9	70	110	30	.15	.17	.12
	3831603	2	5.6	5.6	5.6	0.8	1.1	0.4	7.1	8.1	6.0	19.5	30	9	.06	.10	.02
	3931604	2	5.9	5.9	5.9	0.6	0.7	0.4	6.2	7.2	5.2	33.5	55	12	.07	.12	.02
	3931605	2	6.0	6.0	6.0	1.3	1.6	0.9	4.7	4.8	4.5	30	50	14	.06	.10	.02
	3930606	2	5.5			0.7			5.8			70			.12		
Setiu 37	5628601	1	6.9			1.3			69.4			270			.09		
	5527602	1	7.1			0.5			3.0			5			.04		
	5427665	1	7.2			0.6			4.4			-			Nil		
Keluang 37	5726601	1	8.0			0.8			293			2150			.04		
	5726602	1	7.1			0.5			47.6			-			.07		
	5626603	1	7.6			0.6			14.0			-			Nil		

Table 27 POLLUTANT LEVELS OF RIVERS IN 1979 (1/3)

Unit: mg/l except pH

River Name & Basin No.	WQMS No.	No. of Samples	pH			BOD ₅			COD			Suspended Solids			Ammoniacal Nitrogen		
			Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
Kedah 3	6103601	5	6.4	7.1	5.6	2	3	1	78	185	20	69	155	30	.67	1.90	.15
	6204602	5	6.3	6.8	6.0	1.8	4	1	31	105	5	69	110	45	.24	.50	.01
	6204620	5	6.6	7.1	6.0	7	25	1	27	90	10	67	75	55	.11	.24	.03
	6204603	5	6.6	7.3	6.1	1.2	2	1	12	20	5	60	80	45	.11	.26	.01
	6206605	4	6.7	7.2	6.0	1.3	2	1	11.3	20	5	96.3	135	75	.05	.10	.01
	6206606	4	6.6	7.1	6.1	3.3	7	1	50	160	5	170	360	60	.13	.25	.05
	6206607	4	6.5	7.1	6.0	1.5	2	1	11.3	15	5	83.8	110	60	.07	.15	.01
	6206608	1	5.9			15			50			140			.15		
	6306609	4	6.9	7.2	6.4	2.3	4	1	13.8	40	5	70	140	35	.09	.15	.01
	6306610	4	6.9	7.3	6.3	2.3	6	1	13.8	35	5	77.5	120	45	.21	.65	.04
	6306611	4	6.9	7.3	6.5	1	1	1	6.3	15	Nil	50	55	35	.09	.15	.01
	6306612	4	6.8	7.2	6.5	2	3	1	13.8	30	5	41.3	85	20	.06	.10	.01
Merbok 4	5604601	3	7.7	8.0	7.5	8	20	2	265	305	210	130	160	110	.047	.08	<.01
	5604602	3	7.0	7.2	6.6	3.3	7	Nil	200	365	90	120	175	90	2.31	3.82	.85
	5704607	3	7.8			Nil			315			165			.82		
	5604603	3	7.1			2			140			215			.13		
	5705604	3	7.1			2			50			130			.60		
	5705605	3	6.9	7.2	6.7	8	20	Nil	35	60	15	100	155	60	3.01	5.35	1.73
	5705606	3	7	7.2	6.8	248	340	155	448	570	325	148	205	90	29.8	45.5	14.0
Muda 5	5503601	3	7.2	7.5	6.7	1.7	2.0	1.0	148	275	5	58	120	25	.10	.18	.05
	5504602	3	6.9	7.4	6.5	1.7	2.0	1.0	16.7	35	0	13.3	25	5	.05	.06	.03
	5505603	4	6.5	6.7	6.1	2	3	1	12.5	30	5	60	90	30	.41	1.30	.05
	5505612	6	6.8	7.6	6.3	1.2	2	1	14.2	20	5	72	125	10	.11	.25	.05
	5606604	6	6.8	7.5	6.5	1.8	3	1	4.2	10	0	59	100	15	.08	.15	.01
	5606605	6	7.1	7.6	6.4	1.2	2	1	9.2	30	0	84	180	35	.07	.15	.02
	5806614	6	6.6	7.1	6.3	2.2	4	1	9.2	20	0	45	60	25	.08	.15	.01
	5906607	6	6.6	6.9	6.3	1.4	2	1	9.2	30	0	68	130	25	.08	.15	.01
	6007608	3	6.5	6.7	6.4	1	1	1	13.3	25	5	40	60	20	.10	.15	.05
Juru 6	5304601	11	6.4	7.7	4.8	2.8	6	1	227	525	95	55.5	130	15	1.44	2.83	.20
	5304602	11	5.5	7.9	3.0	3.1	8	1	170	385	25	75	130	15	1.37	2.95	.10
	5304603	10	5.9	7.8	3.4	4.5	15	1	184	590	10	70	130	35	1.93	3.00	.90
	5304604	10	5.2	7.4	3.3	3	5	1	106	320	15	62.5	105	15	2.64	4.91	1.12
	5304605	11	6.4	7.4	6.0	107	290	3	195	695	5	102	250	40	6.42	16.7	.10
	5304606	11	6.9	7.4	5.9	20.9	80	5	102	350	30	-	-	-	9.45	21.0	.50
	5304607	11	6.8	7.4	6.4	76.6	200	8	218	520	60	80.9	170	10	14.9	34.9	1.0
	5304608	9	6.5	7.0	5.9	13.7	80	<1	35.6	130	10	63.3	130	35	1.30	3.95	.03
	5304609	9	6.9	7.5	6.4	36.9	112	4	96.7	230	30	106	295	20	12.0	22.1	3.90
Perai 6	5403602	11	7.3	7.9	6.5	3.4	7	1	259	505	100	77.7	140	15	.22	.51	.01
	5404601	11	7.1	7.8	6.5	2.6	4	<1	192	580	15	65.9	225	10	.28	.45	.01
	5404603	11	7.0	7.7	6.0	3	7	2	121	395	10	67.7	105	20	.30	.60	.01
	5404604	11	6.8	7.6	4.8	3.9	15	2	97	345	5	87.3	190	45	.21	.64	.01
	5404605	11	6.7	7.5	6.1	3.1	8	<1	53.2	180	15	95.5	300	20	.23	.48	.06
	5404608	11	5.9	6.7	4.1	4.8	7	1	22	35	10	63.6	100	25	.55	1.30	.15
	5404609	11	6.1	6.6	5.5	1.9	5	1	19.6	45	5	59.6	90	25	.51	.95	.05
	5505610	3	6.2	6.5	5.9	2.3	4	1	23.3	40	5	80	100	60	.25	.32	.12
Jejawi 6	5204601	3	8.0	8.0	7.9	1.8	3	0.5	401	875	153	48.3	90	5	.11	.25	.01
	5204602	3	7.6			3			184			40			0.02		
	5205603	3	6.3	6.9	6	5.5	10	0.5	12.5	15	10	43.3	65	15	.33	.9	.02
	5205604	3	6.4	7.2	5.5	2.3	3	1	22	36	5	28.3	45	15	.26	.32	.20
	5205606	3	6.3	6.7	6.0	2.7	4	1	8.33	10	5	22.7	50	3	.27	.55	.01
Kerian 8	5104601	2	6.3	7.1	5.4	2			168	285	50	27.5	50	5	.32	.51	.12
	5104602	2	5.9	7.3	4.5	1.5	2	<1	82.5	145	20	40	65	15	.07	.10	.04
	5104603	2	5.6	6.9	4.2	2	3	1	67.5	120	15	40	75	5	.37	.67	.06
	5105604	2	5.8	6.6	5.0	2.5	3	2	22.5	25	20	30	50	10	.11	.13	.08
	5105605	2	4.7	6.0	3.4	2	3	1	27.5	40	15	85	135	35	.4	.72	.08
	5105606	2	5.7	6.4	4.9	3	4	2	22.5	25	20	45	50	40	.04	.05	.02
	5206607	2	6.2	6.8	5.5	3	4	2	17.5	20	15	47.5	55	40	.07	.08	.05
	5307608	2	6.5	6.5	6.4	3.5	4	3	15	20	10	32.5	45	20	.11	.14	.08
Kinta 10	4119630	5	7.1	7.1	7.0	1.6	2.4	0.7	42	72	12	2420	4650	695	.12	.40	.005
	4310601	5	7.3	7.9	6.9	4.6	8.7	1.2	44.8	128	4	1608	2510	425	.76	1.19	.37
	4410461	5	7.5	7.9	6.8	3.8	7.0	1.3	49.3	80	12	1280	4260	130	.88	3.16	.005
Kinta 10	4310662	4	7.4	8.0	6.9	4.7	8.6	1.7	33	52	20	37.3	125	5	1.09	1.88	.50
	4611663	4	7.1	7.6	6.7	2.3	3.4	1.1	11	16	4	16.3	25	10	.06	.20	.00

Table 28 POLLUTANT LEVELS OF RIVERS IN 1979 (2/3)

Unit: mg/l except pH

River Name & Basin No.	WQMS No.	No. of Samples	pH			BOD ₅			COD			Suspended Solids			Ammoniacal Nitrogen		
			Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
Bernam 11	3809601	4	7	7.5	6.0	1.7	2.5	0.6	142	275	25	1210	2900	5	.15	.34	.00
	3709602	4	5.8	7.0	3.5	1.5	3.3	0.3	60.9	165	2.36	868	2190	30	.10	.34	.00
	3813603	4	6.2	6.8	5.9	1	1.8	0.5	8.4	11.0	3.8	45.5	104	8	.11	.3	.02
	3714604	4	6.3	6.9	5.8	0.9	1.8	0.4	12.6	21	6.5	30	56	15	.17	.36	.07
	3615605	4	6.1	6.8	5.8	1.2	1.8	0.5	8.15	12	1.9	129	460	10	.17	.33	.08
Tengi 12	3412601	5	5.4	5.9	4.9	1.1	1.5	0.6	60.5	61	60	64.5	99	30	.26	.40	.12
	3614602	5	5.9	5.9	5.8	0.6	0.7	0.5	3.8			14.7	20	12	.09	.10	.08
	3614603	5	5.9	6.0	5.8	0.4	0.5	0.3	5.2	8.0	3.8	19	24	9	.06		
Selangor 13	3312601	1	6.1				1.7					14			.25		
	3313602	2	4.8	5.3	4.3	0.9	1.1	0.7	39.1	67.5	10.7	1390	2700	15	.07	.13	.00
	3314603	2	6.0	6.1	5.8	1.1	1.7	0.5	24.1	25.6	22.5	582	781	383	.17	.20	.14
	3516604	2	6.5	6.6	6.3	0.7	1.1	0.3	10.6	12.0	9.2	278	280	276	.15	.18	.11
	3517605	2	7.1	7.6	6.6	1.7			6.2	6.3	6.0	31.5	36	27	.17	.20	.14
Buloh 14	3212601	4	6.7	7.8	5.8	3.3	7.1	1.1	85.5	187	2.10	261	584	53	1.73	3.0	.34
	3313602	4	5.2	7.5	3.3	201	500	0.9	1270	3700	47.8	3860	12900	19	9.40	12.1	5.99
	3313603	4	6.5	6.8	6.0	7.5	18	2.6	42.5	56.5	7.6	77.8	139	44	4.32	8.3	2.39
	3215609	4	6.2	6.3	6.0	4.9	8.2	2.2	13.9	21.7	8.4	24.7	36	17	.34	.48	.17
	3214604	4	6.9	7.4	6.6	44.2	144	0.7	218	354	26.1	250	473	43	5.92	12.0	.05
	3214605	4	6.7	6.8	6.6	416	1240	0.5	848	3370	3.9	24	55	5	.15	.51	.00
	3115606	4	6.9	7.3	6.5	4.6	8.8	2.6	42.0	66.5	8.4	111	326	38	9.15	18.0	1.8
	3215607	4	6.4	6.8	6.0	3.3	12.5	1.4	25	29.5	13.0	61.8	136	23	.67	1.13	.23
	3215608	4	6.8	7.2	6.5	1.5	2.8	0.9	12.8	32.8	3.9	61.8	156	13	.36	.46	.30
Kelang 15	3013601	9	7.5	7.8	7.1	1.1	2.0	0.6	48.5	139	0.4	449	1430	12	.82	2.4	.07
	3014602	10	7.0	7.6	5.6	3.2	6.3	0.8	125	258	28.1	1720	6170	60	2.05	4.2	.23
	3014603	9	6.9	7.3	5.4	3.0	4.9	0.8	60.5	161	3.76	2080	6760	80	2.09	3.90	.71
	3015601	9	7.0	7.8	6.8	4.9	17.6	1.0	96.9	86	21.3	1670	4110	255	2.27	9.00	.02
	3015631	9	7.1	7.5	6.9	8.2	23	1.2	191	293	72	4540	9910	713	2.61	9.00	.02
	3016607	9	7.2	8.0	6.7	6.9	16	3.2	134	459	45	1080	2870	200	2.85	6.00	1.67
	3117610	9	7.0	7.4	6.6	7.0	22	1.6	33.7	98	7.1	126	236	70	1.28	3.60	.00
	3116630	9	7.0	7.4	6.1	9.9	22	2.3	76.0	191	21.8	661	981	340	1.80	6.00	.01
	3117602	10	7.0	7.4	6.6	5.0	17.0	1.4	64.7	283	15.1	188	900	33	1.19	4.20	.00
	3117604	8	7.2	7.5	6.7	2.9	5.3	0.3	22.7	56.6	10.1	159	666	30	.25	.54	.00
	3217635	9	6.8	7.1	6.6	1.6	2.7	0.6	15.21	39	7.4	90	250	15	.42	1.13	.00
	3117603	8	6.8	7.8	6.2	1.5	4.3	0.3	16.1	17.7	4.4	69.6	238	10	.29	.45	.16
Langat 16	2814601	8	7.2	7.6	6.9	1.5	3.1	0.9	207	445	37.4	886	2820	9	.06	.08	.01
	2814602	8	6.9	7.3	6.6	0.9	1.1	0.7	54.1	123	6.7	1020	2440	173	.05	.08	.02
	2815603	8	5.1	6.6	4.3	2.1	5.0	0.7	124	418	10.0	2090	7020	193	.30	.6	.13
	2816604	8	5.8	7.6	4.5	3.8	6.1	0.7	1550	5890	50	2270	6610	331	.13		
	2916641	8	6.5	6.8	5.9	2.6	5.6	0.9	24.0	30.0	18.6	162	413	35	.10	.20	.01
	3017644	8	5.2	6.3	3.2	1	1.4	0.7	9.97	16.8	3.9	29.3	52	23	.25	.32	.18
	3017611	8	6.7	7.3	6.3	1.2	1.5	0.7	14.5	24.2	5.5	131	393	23	.19	.28	.06
	3018612	8	6.6	7.2	6.2	4.7	7.5	1.5	30.3	56	13.4	181	413	29	.83	1.44	.22
	3017613	8	6.7	7.0	6.5	8.0	10.6	5.3	58.9	103	7.7	149	460	19	.44	1.19	.06
	3118614	8	7.0	7.6	6.6	1.0	1.7	0.5	7.2	10.5	4.5	40.3	102	8	.09	.10	.07
	3118647	8	5.8	7.3	2.8	1.4	2.3	0.9	19.4	38.0	9.0	52.5	153	12	.10	.13	.06
Linggi 18	2319601	5	6.5	7.9	3.5	1.8	4.9	0.7	35.8	70.0	10.2	132	272	20	1.35	5.28	.01
	2420602	5	6.7	7.6	6.1	2.9	7.0	0.7	30.8	81.0	13.3	307	1330	10	.96	3.30	.26
	2519603	5	6.5	7.1	6.3	1.1	1.9	0.7	6.4	13.3	3.9	39.5	71	9	.51	.72	.16
	2519621	6	6.7	7.3	6.2	2.3	3.7	0.9	23.8	36.4	13.0	143	551	11	1.46	6.00	.29
	2519604	7	6.8	7.2	6.3	2.7	4.8	1.5	31.7	54.6	17.4	285	819	29	1.65	5.70	.20
	2519605	7	6.9	7.6	6.3	1.9	3.7	0.6	19.2	36.4	12.7	72.3	150	9	1.02	3.30	.12
	2619606	7	6.3	7.0	5.6	0.9	2.4	0.3	9.6	17.2	3.9	50.6	116	11	.09	.24	.01
	2619607	6	7.0	7.6	6.7	4.2	6.5	2.0	42.3	88	16.9	112	222	16	2.15	4.20	.65
	2719608	7	6.8	7.1	6.4	19.9	50	2.4	96.8	146	22.7	86.3	179	31.9	5.6	15.3	.60
	2719622	6	6.8	7.1	6.5	1.9	2.9	1.2	15.4	23.0	4.2	54.8	145	19	0.59	1.44	.25
2719609	6	6.9	7.2	6.3	4.1	10.9	1.0	13.6	21.7	4.2	79	161	13	.43	.71	.00	
2719610	6	6.9	7.4	6.6	1.9	5.1	0.8	10.4	15.3	2.4	26.2	45.0	7.0	2.67	15.30	.00	
Melaka 19	2222601	9	7.0	7.7	6.0	2.4	3.6	1.0	40.1	68.2	21.6	1240	10000	26	1.98	7.40	.49
	2222602	6	6.3	6.8	5.8	3.4	7.4	0.9	33.9	48.0	19.5	23.5	37.0	14.0	2.03	6.80	.01
	2222603	9	6.1	6.7	5.8	2.3	3.2	1.1	33.7	40.8	24.9	23.7	37	12	1.63	6.70	.24
	2222605	9	6.1	6.7	5.7	2.8	7.4	1.1	31.6	45.9	23.0	22.4	31.0	11.0	1.27	6.70	.10
	2322607	9	6.3	6.7	6.0	1.4	2.1	0.8	23.0	38.0	14.6	27.6	102	4	1.28	6.70	.02
	2322613	9	6.5	7.2	5.9	1.3	2.2	0.7	20.0	26.9	16.3	32.1	126	6	1.30	7.20	.01
	2322610	9	6.5	7.0	5.9	1.3	2.0	0.6	20.0	26.0	11.7	39	165	3	1.56	7.0	.08

Table 29 POLLUTANT LEVELS OF RIVERS IN 1979 (3/3)

Unit: mg/l except pH

River Name & Basin No.	WQMS No.	No. of Samples	pH			BOD ₅			COD			Suspended Solids			Ammoniacal Nitrogen		
			Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
Muar 21	2025601	5	6.2	7.2	3.5	0.7	1.1	Nil	553	1200	105	127	355	20	.43	1.8	.04
	2125603	5	6.0	6.7	5.3	0.5	1.0	Nil	34	50	10	98	240	40	.05	.10	.02
	2126604	5	6.2	6.7	5.6	0.9	1.0	0.5	33	40	10	68	230	15	.08	.19	.04
	2225605	5	6.4	7.0	5.8	0.7	1.4	Nil	10.4	35	10	54	135	5	.05	.10	.02
	2227606	5	6.5	6.9	6.1	0.8	2	Nil	33	45	20	16	45	5	.04	.07	.02
	2228607	5	6.6	7.2	6.3	0.6	1.6	Nil	32	40	20	80	240	5	.06	.11	.02
	2228608	5	6.3	6.9	5.4	0.5	1.0	Nil	30	50	15	35	50	5	.07	.10	.02
	2328609	5	6.5	7.0	5.8	0.8	1.1	Nil	23	45	5	51	70	40	.08	.12	.03
	2427611	8	6.5	7.0	6.1	1.7	4.1	Nil	32.5	50	10	26.3	70	5	.10	.24	.02
	2527611	8	6.6	7.2	5.9	1.2	3.0	Nil	29.4	45	10	20	55	5	.11	.22	.02
	2627613	8	6.5	6.8	5.8	2.3	4.1	1.0	27.5	35	10	54.4	185	5	.13	.27	.06
	2625612	8	6.8	7.2	6.1	1.3	4	Nil	24.4	55	10	61.3	120	10	.06	.12	.02
	2725615	8	6.9	7.2	6.4	0.8	2	Nil	19.4	35	10	46.9	155	5	.10	.36	.02
	2726616	8	6.7	7.1	6.0	0.7	1.3	Nil	14.4	30	5	30.7	60	5	.06	.16	.02
	2722617	8	6.6	7.0	5.9	1.3	2.4	0.9	16.3	25	5	46.9	95	15	.09	.43	.02
Batu Pahat 22	1829602	5	4.6	6.2	3.4	0.5	1	Nil	276	540	5	74	200	10	.11	.20	.05
	1929603	5	3.6	4.0	3.3	1.4	3.1	0.1	47	70	10	216	460	50	.28	.36	.20
	1928610	5	3.8	4.2	3.5	1.7	4.6	1	47	140	5	128	465	10	.25	.36	.10
Benut 23	1632601	9	4.8	5.9	3.8	0.7	2	Nil	107	390	30	108	290	25	.11	.21	.06
	1833602	9	6.2	6.8	5.6	0.9	1	Nil	28.3	50	5	40.6	85	5	.10	.18	.03
Sekudai 23	1536601	9	6.4	6.6	6.0	1.5	2.0	1.0	19	30	5	68	175	5	.18	.50	.07
	1536602	9	6.4	6.6	6.1	1.9	4.0	1.0	20	35	5	79	145	30	.23	.58	.04
	1636603	9	6.4	6.6	6.1	2.0	4	1	15	30	5	64	105	15	.26	.60	.05
	1636601	9	6.4	6.6	6.1	1.8	4.0	1.0	21	40	10	52	115	25	.57	1.90	.02
	1636605	9	6.4	6.6	6.1	3.6	17	0.9	20	45	5	51	90	10	.44	1.50	.10
	1636606	9	6.4	6.7	6.2	2.8	5.6	1.0	27	90	5	76	225	30	.49	1.80	.02
	1635607	9	6.5	6.7	6.2	1.2	2.0	Nil	14.4	30.0	5	46.7	750	15	.07	.19	.03
	1735608	9	6.3	6.8	5.9	1.2	4	Nil	16.7	30	5	29.4	110	5	.09	.22	.04
Johor 24	1739604	9	6.1	6.8	5.5	1.1	2.9	Nil	17.8	30	5	70.6	140	5	.07	.14	.01
	1738605	8	6.1	6.7	5.6	0.9	2	Nil	18.1	30	5	81.9	265	20	.04	.10	.01
	1737606	9	5.9	6.5	4.7	1.6	3.0	0.7	16.7	25.0	5	83.9	170	20	.05	.12	.02
	1835608	9	5.8	6.3	5.4	1.5	3	1	26.7	40	10	84.4	150	20	.36	.79	.01
	1834609	9	5.8	6.4	4.8	2.9	5	0.8	19.4	35	10	63.3	115	20	.20	.58	.01
	1834610	9	6.2	7.0	5.3	0.6	1.0	Nil	10	30	5	28.1	50	10	.04	.11	.01
Endau 27	2636601	3	6.8	7.1	6.4	0.7	1	0.2	48.3	101	16	70	95	30	.10	.15	.04
	2033610	1	7.5			9.6			520			135			.72		
	2133611	1	5.7			2			30			95			.18		
	2033612	1	5.8			1			35			55			.30		
	2033613	1	6.2			3			60			135			.74		
Pahang 30	3534601	1	6.6			<1			22			45			N.D.		
	3530602	1	6.9			<1			17			40			N.D.		
	3527604	3	7.1	7.4	6.8	0.8	1.3	0.5	14.8	28.5	4.2	116	222	34	.00	.00	.00
	3424607	3	6.8	7.0	6.5	0.7	1.1	0.4	20.2	26.5	10.8	128	179	22	.02	.02	.02
	3424609	3	6.9	7.1	6.5	0.8	0.9	0.5	22.0	32.1	15.4	132	231	41	.09	.09	.09
	3524610	3	7	7.4	6.4	0.7	0.9	0.6	24.8	34.1	16.7	23.7	31	19	.01	.01	.01
	3723612	3	7.3	8.1	6.2	8.0	15	0.9	64.8	111	18.6	17.5	25	10	.08	.08	.08
	3421619	3	6.8	7.0	6.7	0.9	0.9	0.9	17.2	21.4	9.3	142	264	51	.00	.00	.00
	3924614	3	7.1	7.5	6.9	1.1	1.4	0.9	11.2	14.0	8.3	59.7	74	33	.23	.33	.09
	3519618	3	6.8	7.0	6.7	0.6	1.3	0.2	8.6	11.3	5.3	148	337	14	.08	.23	.00
	4023615	2	7.5			0.5			12.4			24.2	33	15.4			
	4220616	3	7.3	7.4	7.1	0.9	0.9	0.8	37.7	66	9.3	39	51	27			
	Kuantan 31	3833601	3	7.2	8.0	6.7	<1.3	2	<1	55	115	21	157	335	50	.10	.29
3832602		3	6.1	7.7	5.2	<1.6	2.9	<1	13.2	15.5	9	20	30	10	.05	.11	N.D.
3831603		3	6.8	7.5	6.0	1.2	1.5	1	18.1	24	11.5	93.3	195	25	.06	.17	N.D.
3931604		3	6.9	7.6	6.2	1.0	1.1	<1	10.8	17.1	4.4	81.7	140	5	.02	.04	N.D.
3931605		3	6.8	7.3	6.3	2.2	3.3	<1	20.9	20.9	20.8	285	380	190	.03	.04	.02
3930606		3	6.8	7.6	6.0	1.4	2.1	<1	8.8	17.5	3	83.3	120	65	.02	.05	N.D.
Setiu 37	5628601	2	6.6	6.6	6.5	<1	1	<1	36.5	44	29	20	35	5	.37	.4	.33
	5527602	3	6.5	7.0	6.3	<1	<1	<1	36	53	16	25	50	10	.06	.10	N.D.
Kluang 37	5726601	1	7.6			<1			280			15			.03		
	5726602	1	6.6			<1			13.4			10			.40		
	5626603	1	7.0			1			21.4			10			.07		

Table 30

CLASSIFICATION OF WOMS ACCORDING TO BOD
CLASSIFICATION USING MEAN BOD₅

Name of River	River Basin No.	WQR No.	1978				1979					
			No. of WQMS	Clean	Mildly Polluted	Moderately Polluted	Grossly Polluted	No. of WQMS	Clean	Mildly Polluted	Moderately Polluted	Grossly Polluted
Kedah	3	3	7	1	3	1	2	12	10	1	0	1
Merbok	4	4	7	2	2	0	3	7	3	2	-	1
Muda	5	5	9	9	0	0	0	9	9	0	0	0
Juru	6	6	9	0	3	1	5	9	3	1	0	5
Peraí	6	6	8	8	0	0	0	8	7	1	0	0
Jejawi	6	7	4	4	0	0	0	5	4	1	0	0
Kerian	8	8	6	6	0	0	0	8	8	0	0	0
Kinta	10	13	4	3	1	0	0	5	3	2	0	0
Bernam	11	14	5	5	0	0	0	5	5	0	0	0
Tengi	12	15	2	2	0	0	0	3	3	0	0	0
Selangor	13	16	5	5	0	0	0	5	5	0	0	0
Buloh	14	17	8	6	2	0	0	9	3	3	0	3
Kelang	15	18	10	5	3	1	1	12	6	4	2	0
Langat	16	19	11	11	0	0	0	11	9	1	1	0
Linggi	18	21	12	9	3	0	0	12	9	2	0	1
Melaka	19	22	7	7	0	0	0	7	7	0	0	0
Muar	21	25	12	12	0	0	0	15	15	0	0	0
Batu Pahat	22	26	3	3	0	0	0	3	3	0	0	0
Benut	23	27	3	3	0	0	0	2	2	0	0	0
Sekudai	23	28	8	8	0	0	0	8	8	0	0	0
Johor	24	29	6	4	2	0	0	6	6	0	0	0
Endau	27	32	1	1	0	0	0	5	4	0	1	0
Pahang	30	35	12	11	0	0	1	12	11	1	0	0
Kuantan	31	36	6	6	0	0	0	6	6	0	0	0
Setiu	37	44	3	3	0	0	0	2	2	0	0	0
Keluang	37	45	3	3	0	0	0	3	3	0	0	0

Remarks: Clean: 0 - 4 mg/lit

Mildly polluted: 4 - 8 mg/lit

Moderately polluted: 8 - 12 mg/lit

Grossly polluted: >12 mg/lit

Table 31

CLASSIFICATION OF WQMS ACCORDING TO SS
CLASSIFICATION USING MEAN SS

Name of River	River Basin No.	WQR No.	1978					1979					
			No. of WQMS	0-50 ppm	50-250 ppm	250-500 ppm	500-1,000 ppm	>1,000 ppm	No. of WQMS	0-50 ppm	50-250 ppm	250-500 ppm	500-1,000 ppm
Kedah	3	3	7	6	1	0	0	0	12	2	10	0	0
Merbok	4	4	7	3	4	0	0	0	7	0	7	0	0
Muda	5	5	9	6	3	0	0	0	9	3	6	0	0
Juru	6	6	9	0	9	0	0	0	9	-	8	-	-
Perai	6	6	8	2	5	0	0	1	8	0	8	0	0
Jejawi	6	7	4	4	0	0	0	0	5	5	0	0	0
Kerian	8	8	6	6	0	0	0	0	8	7	1	0	0
Kinta	10	13	4	2	0	0	0	2	5	2	0	0	3
Bernam	11	14	5	5	0	0	0	0	5	2	1	0	1
Tengi	12	15	2	1	1	0	0	0	3	2	1	0	0
Selangor	13	16	5	2	2	0	1	0	5	2	0	1	1
Buloh	14	17	8	-	-	-	-	-	9	2	5	1	0
Kelang	15	18	10	0	2	1	1	6	12	0	5	1	5
Langat	16	19	11	3	1	4	3	0	11	2	5	0	3
Linggi	18	21	12	2	8	2	0	0	12	2	8	2	0
Melaka	19	22	7	6	0	0	0	1	7	6	0	0	1
Muar	21	25	12	8	3	1	0	0	15	7	8	0	0
Batu Pahat	22	26	3	3	0	0	0	0	3	0	3	0	0
Benut	23	27	3	2	1	0	0	0	2	1	1	0	0
Sekudai	23	28	8	7	1	0	0	0	8	2	6	0	0
Johor	24	29	6	-	-	-	-	-	6	1	5	0	0
Endau	27	32	1	0	1	0	0	0	5	0	5	0	0
Pahang	30	35	12	5	6	1	0	0	12	6	6	0	0
Kuantan	31	36	6	3	2	0	0	1	6	1	4	1	0
Setiu	37	44	3	1	-	1	-	-	2	2	0	0	0
Keluang	37	45	3	-	-	-	-	-	3	3	0	0	0

Remarks: '-' : no data

'0' : no WQMS

Table 32

VALUES OF MEAN, MAX. AND MIN. OF PH, BOD₅,
COD, SS AND NH₄-N, BY RIVER IN 1978

River Name	Basin No.	WQR No.	No. of Samples	pH			BOD ₅			COD			SS			Ammoniacal Nitrogen		
				Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
Kedah	3	3	33	6.5	7.3	3.7	16.8	208	<1.0	55.8	500	Nil	46.4	210	5	0.17	0.77	<0.1
Merbok	4	4	7	6.4	6.7	5.8	34.9	188	3	196	447	10	65.7	90	40	<1.99	13.9	<0.1
Muda	5	5	41	6.5	6.8	6.0	2.2	8	<1.0	18.8	74	0	47.2	110	5	0.12	1.0	<0.1
Juru	6	6	80	6.5	8.9	3.1	35.3	320	<1.0	128	740	Nil	91.5	545	5	4.33	33	<0.1
Perai	6	6	71	6.5	8.0	5.1	2.7	11	<0.5	63.8	300	Nil	3350	44,700	5	0.27	1.89	Nil
Jejawi	6	7	4	7.4	8.0	6.9	1.8	3	0.5	94.3	184	10	23.3	50	5	0.10	0.32	0.01
Kerian	8	8	6	5.1	6.4	4.2	2.7	4	1	23.3	50	10	15.8	40	5	0.09	0.14	0.05
Kinta	10	13	12	7.2	8.1	5.5	3.2	7.4	0.7	22.5	68	40	901	4010	5	0.32	1.28	0.02
Bernam	11	14	5	7.3	7.8	7.0	0.9	1.5	0.3	25.8	52	8	10.3	20	1.5	0.09	0.20	0.02
Tengi	12	15	2	5.7	5.7	5.7	1.2	1.5	0.9	53.9	53.9	53.9	98.0	191	5	0.065	0.07	0.06
Selangor	13	16	5	6.5	7.2	6.0	1.3	1.7	1.1	185	821	7.8	244	963	7	0.034	0.05	0.02
Buloh	14	17	8	5.3	6.3	3.4	2.8	7.3	0.9	60.5	232	11.0	-	-	-	1.14	3.6	0.17
Kelang	15	18	90	6.9	7.8	6.1	5.0	3.5	0.2	159	5490	5	1962	12,100	4	2.69	65.6	0
Langat	16	19	11	6.1	6.5	4.6	0.9	1.5	0.5	29.3	59.4	9.1	425	1000	3	0.043	0.08	0.02
Linggi	18	21	69	6.1	7.8	3.4	2.9	34.6	0.3	44.7	960	2.8	119	790	4	0.87	3.3	0.06
Melaka	19	22	40	6.1	8.1	3.1	1.5	5.3	0.6	84.9	2300	0.7	164	4280	5	0.69	5.4	0.01
Muar	21	25	72	6.1	7.5	4.0	1.4	9	Nil	111	1580	5.0	54.0	945	5	0.11	0.38	0.01
Batu Pahat	22	26	12	3.5	3.7	3.2	1.5	4	0	35.8	75	200	27.1	65	5	0.28	0.48	0.13
Benut	23	27	3	5.0	5.7	3.7	1	1	1	53.3	105	20	70	135	25	0.05	0.11	0.02
Sekudai	23	28	71	6.1	6.7	3.5	1.9	7	0	18.0	130	5	37.9	180	5	0.31	1.7	0.01
Johore	24	29	35	5.9	7.6	3.9	2.6	23	Nil	52.9	1440	4	-	-	-	0.40	7.8	0.01
Endau	27	32	3	7.0	7.7	6.3	3.5	5.1	1.8	27.6	43.2	12.7	233	355	20	0.17	0.19	0.14
Pahang	30	35	42	6.5	7.7	1.6	6.6	150	0.1	37.0	620	3.8	75.9	483	4	0.88	23.3	Nil
Kuantan	31	36	12	5.5	6.4	3.8	1.0	1.6	0.4	9.3	19.3	4.5	1072	12,400	9	0.12	0.26	0.02
Setiu	37	44	3	7.1	7.2	6.9	0.8	1.3	0.5	25.6	69.4	3.0	138	270	5	0.043	0.09	Nil
Keluang	37	45	3	7.6	8.0	7.1	0.6	0.8	0.5	118	293	14.0	2150	2150	2150	0.037	0.04	Nil

Table 33 VALUES OF MEAN, MAX. AND MIN. OF PH, BOD₅, COD, SS AND NH₄-N, BY RIVER IN 1979

River Name	Basin No.	WQR No.	No. of Samples	pH			BOD ₅			COD			SS			Ammoniacal Nitrogen		
				Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
Kedah	3	3	49	6.6	7.3	6.1	2.6	25	1	25.9	185	Nil	78.0	360	20	0.181	1.9	0.01
Merbok	4	4	21	7.2	8.0	6.6	38.8	340	Nil	208	570	15	144	205	60	5.25	45.5	<0.01
Muda	5	5	43	6.8	7.6	6.1	1.6	4	1	20.0	275	0	59.1	180	5	0.11	1.3	0.01
Juru	6	6	93	6.3	7.9	3.0	30.6	290	<1	152	695	5	76.8	295	10	5.75	34.9	0.03
Perai	6	6	80	6.7	7.9	4.1	3.2	15	<1	106	580	5	74.1	300	10	0.33	1.3	0.01
Jejawi	6	7	15	6.9	8.0	5.5	3.1	10	0.5	126	875	5	36.5	90	3	0.20	0.55	0.01
Kerian	8	8	16	5.8	7.3	3.4	2.4	4	<1	52.9	285	10	43.4	135	5	0.19	0.72	0.02
Kinta	10	13	23	7.3	8.0	6.7	3.4	8.7	0.7	37.2	128	4	1163	4650	5	0.58	3.16	0
Bernam	11	14	20	6.3	7.5	3.5	1.3	3.3	0.3	46.4	275	1.9	457	2900	5	0.14	0.36	0
Tengi	12	15	15	5.7	6.0	4.9	0.7	1.5	0.3	23.2	61	3.8	32.7	99	9	0.14	0.40	0.08
Selangor	13	16	9	6.1	7.6	4.3	1.2	1.7	0.3	21.0	67.5	6.0	509	2700	15	0.15	0.20	0
Buloh	14	17	36	6.5	7.8	3.3	76.3	1240	0.5	284	3700	2.1	526	12,900	5	3.56	18.0	0
Kelang	15	18	108	7.0	8.0	5.4	4.6	23	0.3	75.1	459	0.4	1085	9910	10	1.52	9.0	0
Langat	16	19	88	6.3	7.6	2.8	2.6	10.6	0.5	191	5890	3.9	637	7020	8	0.23	1.44	0.01
Linggi	18	21	73	6.7	7.9	3.5	4.0	50	0.3	28.8	146	2.4	114	1330	7	1.59	15.3	0
Melaka	19	22	60	6.4	7.7	5.7	2.1	20	0.6	28.7	68.2	11.7	210	10,000	3	1.56	7.4	0.01
Muar	21	25	96	6.5	7.2	3.5	1.1	4.1	Nil	52.6	1200	5	51.4	355	5	0.10	1.8	0.02
Batu Pahat	22	26	15	4.0	6.2	3.3	1.2	4.6	Nil	123	540	5	139	465	10	0.21	0.36	0.05
Benut	23	27	18	5.5	6.8	3.8	0.8	2	Nil	67.7	390	5	74.3	290	5	0.11	0.21	0.03
Sekudai	23	28	72	6.4	6.8	5.9	2.0	17	Nil	19.1	90	5	58.3	750	5	0.29	1.9	0.02
Johore	24	29	53	6.0	7.0	4.7	1.4	5	Nil	18.1	40	5	68.5	265	5	0.13	0.79	0.01
Endau	27	32	7	6.5	7.5	5.7	2.5	9.6	0.2	113	520	16	90.0	135	30	0.32	0.74	0.04
Pahang	30	35	31	7.0	8.1	6.2	<1.5	15	0.2	23.5	111	4.2	82.3	337	10	0.064	0.33	0
Kuantan	31	36	18	6.8	8.0	5.2	1.5	3.3	<1	21.1	115	3	120	380	5	0.047	0.29	0.02
Setiu	37	44	5	6.5	7.0	6.3	<1	1	<1	36.2	53	16	23.0	50	5	0.18	0.4	0.33
Keluang	37	45	3	7.1	7.6	6.6	<1	1	<1	105	280	13.4	11.7	15	10	0.17	0.4	0.03

Table 34 NUMBER OF POLLUTED WQMS BY RIVER

Name of River	River Basin No.	WQR No.	No. of WQMS	No. of Polluted WQMS (1978)				No. of WQMS	No. of Polluted WQMS (1979)			
				pH	BOD ₅	SS	Ammoniacal Nitrogen		pH	BOD ₅	SS	Ammoniacal Nitrogen
Kedah	3	3	7	5	6	0	0	12	10	1	0	1
Merbok	4	4	7	3	3	0	1	7	0	3	0	3
Muda	5	5	9	8	0	0	1	9	6	0	0	1
Juru	6	6	9	9	8	1	8	9	9	6	0	9
Perai	6	6	8	6	2	1	2	8	6	1	0	1
Jejawi	6	6	4	0	0	0	0	5	3	1	0	0
Kerian	8	8	6	6	0	0	0	8	8	0	0	0
Kinta	10	13	4	4	0	2	1	5	0	2	3	3
Bernam	11	14	5	0	0	0	0	5	5	0	2	0
Tengi	12	15	2	2	0	0	0	3	3	0	0	0
Selangor	13	16	5	3	0	1	0	5	4	0	2	0
Buloh	14	17	8	8	0	-	3	9	5	7	2	6
Kelang	15	18	10	5	4	9	10	12	4	6	9	10
Langat	16	19	11	9	0	3	0	11	7	1	4	2
Linggi	18	21	12	12	4	2	11	12	9	2	3	9
Melaka	19	22	7	7	0	1	3	7	7	1	1	7
Muar	21	25	12	12	1	1	0	15	15	0	0	1
Batu Pahat	22	26	3	3	0	0	0	3	3	0	0	0
Benut	23	27	3	3	0	0	0	2	2	0	0	0
Sekudai	23	28	8	8	0	0	3	8	8	1	1	3
Johore	24	29	6	6	2	-	2	6	6	0	0	0
Endau	27	32	1	0	0	0	0	5	4	1	0	0
Pahang	30	35	12	12	1	0	2	12	2	1	0	0
Kuantan	31	43	6	6	0	1	0	6	5	0	0	0
Setiu	37	44	3	0	0	0	0	2	1	0	0	0
Keluang	37	45	3	0	0	1	0	3	0	0	0	0

Table 35 INVENTORY OF POLLUTANT SOURCES BY RIVER BASIN (1/3)

Basin No.	Name of River	City/Town No.	Rubber Processing Factory No.	Palm Oil Mill No.	Nos. of Tin Mines	Animal Husbandry No.
1	Perlis	1	-	-	-	-
3	Kedah	2, 101, 102, 103	1, 2	-	-	-
4	Merbok	3	3, 4, 5, 6, 7, 8, 9	-	-	-
5	Muda	104	10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22	1	-	1
6	Perai/Juru	5, 6, 109, 110	23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	2, 3, 4	-	2, 3, 4, 5, 6, 7
7	P. Pinang	8, 105, 106, 107, 108	37	-	-	8, 9, 10, 11, 12
8	Kerian		38, 39, 40	5, 6	-	13, 14
9	Kurau & Others	10, 112	41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51	7, 8, 9, 10, 11, 12	2	15, 16, 17, 18
10	Perak	11, 12, 13, 14, 15, 17, 18, 111, 113	52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65	13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25	85	19, 20, 21, 22, 23
11	Bernam	-	66, 67	26, 27, 28, 29, 30	3	24
12	Tengi	-	-	-	-	-
13	Selangor	21	68, 69, 70, 71	31, 32, 33	-	25, 26
14	Buloh	114	72, 73, 74	34, 35, 36, 37, 38	-	27
15	Kelang	22, 23, 24, 25, 116, 117	75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85	39, 40	8	28, 29, 30
16	Langat	26, 115	86, 87, 88, 89, 90, 91, 92, 93, 94	41, 42, 43, 44, 45, 46, 47	14	31, 32
17	Sapang	28	95, 96	48, 49, 50, 51, 52, 53	-	33, 34, 35
18	Linggi	29	97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111	54, 55, 56	-	36, 37

Table 36 INVENTORY OF POLLUTANT SOURCES BY RIVER BASIN (2/3)

Basin No.	Name of River	City/Town No.	Rubber Processing Factory No.	Palm Oil Mill No.	Nos. of Tin Mines	Animal Husbandry No.
19	Melaka	31, 119, 120, 121	112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124	-	-	38
20	Kesang	33	125, 126, 127, 128	57	-	-
21	Muar	30, 32, 34, 122, 125, 145	129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148	58, 59, 60, 61, 62	-	39, 40, 41
22	Batu Pahat	35, 123	149, 150, 151, 152, 153, 154, 155, 156	63, 64, 65, 66	-	42
23	Pontian Kechil & Others	37, 38, 39, 124, 127, 128, 129	157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168	67, 68, 69, 70, 71	-	43, 44
24	Johor	40, 126	169, 170, 171, 172, 173, 174, 175, 176	72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82	2 tin mines & 1 bauxite mine	45
25	Sedili Besar & Sedili Kechil	-	-	N-1	2	-
26	Mersing & Others	42	-	-	-	-
27	Endau	41, 151	177, 178, 179	83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93	2	46
28	Rompin	139, 141, 142, 143, 146, 147, 148, 149, 150	-	94, 95, 96, 97	-	-
29	Bebar & Merchong	140	-	-	-	-
30	Pahang	45, 46, 48, 49, 50, 118, 130, 131, 137, 138, 144, 152, 153, 154, 155, 156	180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195	98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, N-2, N-3	3	-

Table 37 INVENTORY OF POLLUTANT SOURCES BY RIVER BASIN (3/3)

Basin No.	Name of River	City/Town No.	Rubber Processing Factory No.	Palm Oil Mill No.	Nos. of Tin Mines	Animal Husbandry No.
31	Kuantan & Others	47	196, 197, 198	123, 124	3 tin mines & 1 manganese mine	-
32	Kemaman	51	-	125, 126, N-4	1 tin mine & 1 Wolfram mine	-
33	Paka & Others	-	-	-	1	-
34	Dungun	52	-	127, N-5	1	-
35	Marang	-	-	128	-	48
36	Trengganu	53, 132	199	129, N-6	-	-
37	Setiu	-	-	-	-	-
38	Besut	-	-	-	-	-
39	Kemasin & Semerak	56, 57, 134	200	-	-	-
40	Kelantan	54, 55, 58, 133, 135	201, 202, 203, 204, 205, 206	130, 131, 132	-	-
41	Golok	136	-	133	-	-
Total		46	206	139	130	48

Table 38 DEVELOPMENT OF DID'S WATER
QUALITY SAMPLING NETWORK

Item	1974	1975	1976
Principal River Water Quality Stations	28	18	26
Secondary River Water Quality Stations		48	36
Temporary River Water Quality Stations		47	25
Groundwater Quality Stations		58	10
Total	28	171	97

Source; Ref. 10

Table 39 NUMBER OF WATER QUALITY STATIONS
IN ACCORDANCE WITH OBJECTIVES

Item	1974	1975	1976
Experimental Basin Study	3	2	3
Representative Basin Study	2	-	1
Fisheries	8	2	1
Irrigation	5	4	7
Pollution	12	18	10
Water Supply	14	9	7
Baseline Studies	-	29	40

Source; Ref. 10

Table 40

INVENTORY OF SEWERAGE DEVELOPMENT PLANS
IN PENINSULAR MALAYSIA (1/2)

I. AMP Continuation Projects

City	River Basin No.	Population x10 ³		Proposed Plan of Action	Project Data		Source No.
		Total	Served by Sewerage System		Design Year	Design Population x10 ³	
Pulau Pinang	7	434	141	. Implementation of Georgetown Sewer System extension and house connection; Bandar Bayan Baru and North Coast Sewer System.	1980	220	1.
		(1970)	(1970)		1981-85	-	
		555	220		1986-90	355	
		(1980)	(1980)		1991-95	-	
		711			1996-2000	595	
		(1990)					
		910					
		(2000)					
Butterworth/ Bukit Mertajam	6	172	Negligible	. Implementation of Phase I (1980-1985) . Feasibility Study for Prai Industrial Estate (1981) . Design for Prai Industrial Estate (1982) . Implementation for Prai Industrial Estate (1983-85) . Design for Phase II Areas (1985)	1985	194	2,3
		(1970)			1990	288	
		648			1995	453	
		(2000)			2000	648	
Ipoh	10	248	Nil	. Implementation of Phase I (1980-85) . Feasibility Study for Phase II Area (1985)	1985	280	2,4
		(1970)			1990	375	
		840			2000	475	
		(2020)			2010	600	
						2020	
Kuala Lumpur	15	653	131	. Implementation of Phase I (1978-81) . Detailed Design of Phase II (1981) . Implementation of Phase II (1982-85)	1980	411	2,5
		(1970)			1985	668	
		1,670			2005	1,670	
		(2005)					
Shah Alam	15	10	-	. Implementation of Phase I (1981-85) . Design for Phase II (1985)	1980	136	2
		(1976)			1985	191	
		217			1990	217	
		(1990)					

Table 41 INVENTORY OF SEWERAGE DEVELOPMENT PLANS
IN PENINSULAR MALAYSIA (2/2)

2. Projects with Master Plan/Feasibility Studies Completed Under 4MP/Implementation Under 4NP

City	River Basin No.	Population x10 ³		Proposed Plan of Action	Project Data		Source No.
		Total	Served by Sewerage System		Design Year	Design Population x10 ³	
Alor Setar	3	89.5	Nil	. Detailed Engineering Design for Phase I (1981) . Implementation	1985	25.5	2
		(1970)			1990	63.9	
		298			1995	114	
		(2000)			2000	166	
Taiping	9	54.6	-	. Implementation of Phase I (1982-85) . Design for Phase II (1985)	n.a.	n.a.	2
		(1970)					
		183.8					
		(1979)					
Port Klang & Klang	15	125	-	. Implementation of Phase I (1982-85) . Design for Phase II (1985)	Phase I Ultimate System	40.0	2
		(1967)				29.5	
		295					
		(1990)					
Gombak/ Petaling/ Langkat District	15	406.14	-	. Updating Feasibility Study & Design of Phase I (1981) . Implementation of Phase I (1982-85) . Design for Phase II (1985)	1985	90.0	2
		(1980)			1990	180.0	
		644.03					
		(2005)					
Seremban	18	80	Nil	. Implementation of Phase I (1982-85) . Design for Phase II (1985)	1985	139	2
		(1970)			1990	182	
		240					
		(1995)					
Melaka	19	100	-	. Implementation of Phase I (1982-85) . Design for Phase II (1985)	Ph. I	89	2
		(1968)			II	181	
		280			III	261	
		(1990)					
Johor Bahru	23	145	-	. Implementation of Phase I (1982-85) . Design for Phase II (1985)	1985	275	2
		(1972)			1990	412	
		760					
		(2000)					
Kuantan & Port Cobeng	31	98	-	. Implementation of Phase I (1982-85) . Design for Phase II (1985)	1985	50	2
		(1976)			1990	114	
		219			1995	145	
		(1990)					
Kuala Trengganu	36	151	-	. Engineering Design for Phase I (1981-82) . Implementation of Phase I (1983-85) . Design for Phase II (1985)	1985	32.6	2
		(1980)			1990	86.4	
		224			1995	148.64	
		(1990)			2000	189.78	
		308					
		(2000)					

Source; Refs. PK 2, PK 6, PK 15, PK 23 & PK 24.

Table 42 ESTIMATED SALINITY RIVER STRETCH FROM ESTUARY (1/2)

River	River Basin No.	WQR No.	Estimated Salinity River Stretch from Estuary (km) and Remarks	Sources No.
Muda	5	5	Tidal Effect up to Tidal Barrage near Kg. Nangka	1
Perai	6	6	19km	2
Juru	6	6	10km	2
Kurau	9	9	20 ~ 25km	2
Sepetang	9	10	23km	2
Perak	10	13	32km	2
Tengi	12	15	12km	2
Selangor	13	16	12km	2
Buloh	14	17	15km	2
Kelang	15	18	60km	2,3
Langat	16	19	40km	2
Linggi	18	21	10 ~ 20km Tidal Effect up to Linggi Town	2 4
Melaka	19	22	10km Tidal Effect up to Tidal Gate	2 4
Kesang	20		Tidal Effect up to Tidal Gate near Coastal Road	4
Muar	21	25	40 ~ 60km Tidal Effect up to Kg. Kepon	2 4
Batu Pahat	22	26	17km Tidal Effect up to Sri Medang, Pt. Raja	2 4
Benut	23	27	20 ~ 30km	2
Pontian	23	28	10 ~ 15km	2

Table 43 ESTIMATED SALINITY RIVER STRETCH FROM ESTUARY (2/2)

River	River Basin No.	WQR No.	Estimated Salinity River Stretch from Estuary (km) and Remarks	Sources No.
Sekudai	23	28	Tidal Effect up to Tidal Gate	4
Johor	24	29	< 44km Tidal Effect up to some upstream of Junction with Sg. Pelepah	2 4
Sedili	25	30	< 57km Tidal Effect up to some upstream of Junction with Sg. Kayu	2 4
Rompin	28	33	20km 16km Chloride content of 480 ppm Tidal Effect up to Kg. Serebut i.e. 90km Upstream of weir	2 5 6
Pahang	30	35	23.4km	7
Kuantan	31	36	< 16km 27km Tidal Effect up to Pasin Kemudi JKR intake	2 8
Kemaman	32	38	19km	
Trengganu	36	43	8km 17km Tidal Effect up to Pulau Bahi	2 9
Setiu	37	44	7km	2
Keluang	37	45	15 ~ 20km	2
Besut	38	46	12km	2
Kelantan	40	48	Tidal Effect up to Pasir Mas	10
Golok	41	49	13km	2

Source; Refs. 25 to 33

Table 44 SUMMARY OF PROJECTED BOD LOAD AND BOD CONCENTRATION FOR CASE 1

No.	Basin Name	1990			2000		
		BOD Load		BOD	BOD Load		BOD
		From Source (ton/d)	Into River (ton/d)	Concentration in River (mg/lit)	From Source (ton/d)	Into River (ton/d)	Concentration in River (mg/lit)
1	Perlis	5	1	0-0	10	4	0-0
2	P. Langkawi	----- not studied -----					
3	Kedah	18	7	0-0	36	15	0-0
4	Merbok	12	6	15-31	24	14	2-54
5	Muda	19	7	0-2	28	11	0-3
6	Perai	19(30)	4	0-11	32(37)	11	3-32
7	P. Pinang	----- not studied -----					
8	Kerian	10	4	1-2	13	5	1-3
9	Kurau	18	6	3-5	22	6	4-6
10	Perak	165	54	0-6	228	78	0-9
11	Bernam	36	16	0-10	29	11	0-6
12	Tengi	1	0	0-0	1	0	0-0
13	Selangor	16	5	1-3	16	5	1-3
14	Buloh	32	7	19-36	41	10	28-46
15	Kelang	218(32)	115	1-60	250(38)	139	1-105
16	Langat	38	12	0-9	43	13	0-9
17	Sepang	6	1	9-14	8	2	12-20
18	Linggi	49	22	84-279	52	23	75-292
19	Melaka	20(9)	9	28-83	26(21)	12	21-85
20	Kesang	7	3	21-43	7	2	13-37
21	Muar	49(12)	24	6-23	58(15)	28	6-30
22	Batu Pahat	34	16	14-42	51	22	17-85
23	Sekudai	18(40)	10	7-96	27(58)	15	9-117
24	Johor	50	27	5-53	55	31	1-52
25	Sedili Besar	2	0	0-0	6	3	0-3
26	Mersing	0(3)	1	0-0	0(4)	0	0-0
27	Endau	37	21	1-25	43	24	1-29
28	Rompin	26	15	6-14	16	14	5-9
29	Bebar	1	0	1-3	1	1	2-7
30	Pahang	130	73	0-5	143	79	0-4
31	Kuantan	7(19)	4	0-3	11(44)	6	1-4
32	Kemaman	26	15	6-16	23	13	0-10
33	Paka	0	0	0-0	0	0	0-0
34	Dungun	8(2)	5	0-3	5(7)	3	0-2
35	Marang	1	0	0-0	1	0	0-0
36	Trengganu	7(16)	4	0-0	7(43)	4	0-1
37	Setiu	1	0	0-0	1	0	0-0
38	Besut	1	0	0-0	1	0	0-0
39	Kemasin	4	2	4-7	11	5	15-23
40	Kelantan	18(17)	9	0-1	32(54)	18	0-1
41	Golok	----- not studied -----					
Total		1,103(180)	505		1,335(321)	627	

Remarks; (): BOD load discharge to the sea directly

Table 45 COMPOSITION OF BOD LOAD INTO RIVER FOR CASE 1

Unit: ton/d

No.	Basin Name	1990				2000			
		BOD Load into River				BOD Load into River			
		PR	UI	RA	Total	PR	UI	RA	Total
1	Perlis	0	1	0	1	0	4	0	4
2	P. Langkawi	not studied				not studied			
3	Kadah	1	5	1	7	1	13	1	15
4	Merbok	3	3	0	6	8	6	0	14
5	Muda	6	0	1	7	9	1	1	11
6	Perai	1	1	2	4	7	2	2	11
7	P. Pinang	not studied				not studied			
8	Kerian	4	0	0	4	5	0	0	5
9	Kurau	4	1	1	6	3	2	1	6
10	Perak	20	25	9	54	24	42	12	78
11	Bernam	15	0	1	16	9	0	2	11
12	Tengi	0	0	0	0	0	0	0	0
13	Selangor	3	1	1	5	3	1	1	5
14	Buloh	5	0	2	7	7	1	2	10
15	Kelang	13	99	3	115	11	126	2	139
16	Langat	7	3	2	12	8	3	2	13
17	Sepang	1	0	0	1	1	0	1	2
18	Linggi	15	6	1	22	12	9	2	23
19	Melaka	7	1	1	9	8	3	1	12
20	Kesang	3	0	0	3	2	0	0	2
21	Muar	18	5	1	24	20	7	1	28
22	Batu Pahat	6	9	1	16	11	9	2	22
23	Sekudai	3	6	1	10	5	10	0	15
24	Johor	23	4	0	27	24	6	1	31
25	Sedili Besar	0	0	0	0	3	0	0	3
26	Mersing	0	1	0	1	0	0	0	0
27	Endau	14	7	0	21	15	9	0	24
28	Pampir	9	6	0	15	5	9	0	14
29	Bebar	0	0	0	0	0	1	0	1
30	Pahang	55	17	1	73	41	37	1	79
31	Kuantan	4	0	0	4	6	0	0	6
32	Kemaman	14	1	0	15	8	5	0	13
33	Paka	0	0	0	0	0	0	0	0
34	Dungun	5	0	0	5	3	0	0	3
35	Marang	0	0	0	0	0	0	0	0
36	Trengganu	3	1	0	4	3	1	0	4
37	Setiu	0	0	0	0	0	0	0	0
38	Besut	0	0	0	0	0	0	0	0
39	Kemasin	0	2	0	2	0	5	0	5
40	Kelantan	6	3	0	9	5	12	1	18
41	Golok	not studied				not studied			
Total		268	208	29	505	267	324	36	627
		(53)	(41)	(6)	(100)	(42)	(52)	(6)	(100)

Remarks; PR: Palm oil mill and rubber factory effluent
 UI: Urban domestic and urban industry effluent
 RA: Rural and animal husbandry
 (): % of the total BOD load

Table 46 PROJECTED BOD LOAD IN 1990 AND 2000 FOR CASE 1 (1/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
1.	1	0.0	0.0	0	0.0	0.0	0	B.P.
	2	5.1	1.6	-	10.4	4.2	-	C1, R1
	S-total	5.1	1.6		10.4	4.2		
3.	1	1.0	0.1	0	1.5	0.1	0	R4
	2	0.0	0.0	0	0.0	0.0	0	B.P.
	3	14.5	5.8	-	30.1	13.7	-	C2, R5, R6, RF2
	4	2.9	0.7	-	4.6	1.3	-	C101, R3
S-total	18.4	6.6		36.2	15.2			
4.	1	6.6	3.2	31	10.8	5.4	52	R9, RF6, RF7*, RF8*, RF9*
	2	5.3	3.2	30	13.7	8.2	54	C3, RF4*, RF5
	3	0.0	0.0	27	0.0	0.0	50	B.P.
S-total	11.9	6.4		24.4	13.6			
5.	1	1.0	0.1	0	1.3	0.1	0	R8
	2	0.8	0.5	0	1.9	1.2	1	RF16*
	3	5.0	2.0	1	7.0	2.8	2	R10, RF12, RF15*, RF17
	4	0.5	0.3	1	1.1	0.6	2	RF14*, RF21*
	5	2.9	1.4	1	3.3	1.6	2	R11, P1*, RF18
	6	4.3	1.9	2	6.7	3.0	3	R9, RF10*, RF11, RF13*, RF19*, RF20
	7	4.4	0.9	2	6.8	2.0	3	R13, RF22*, A1, C104
	8	0.0	0.0	2	0.0	0.0	3	B.P.
S-total	19.0	7.1		28.1	11.4			
6.	1	0.1	0.0	1	0.6	0.4	6	RF28*, RF35*, RF36*
	2	2.1	0.9	11	3.7	1.8	23	C4, R11
	3	0.1	0.1	9	1.3	0.8	24	RF26*
	4	12.4	2.2	11	21.4	6.6	32	R13, A2, RF24, RF29*, RF30*, RF31*, RF33, RF34, B.P.
	5	4.7	0.5	-	5.2	0.5	-	R14
	6	(30.3)	-	-	(36.8)	-	-	A3, C5, C109, C110
S-total	19.4	3.7		32.2	10.5			

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 47 PROJECTED BOD LOAD IN 1990 AND 2000 FOR CASE 1 (2/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
8.	1	1.0	0.6	1	2.1	0.9	1	R12, RF38*, RF39*
	2	2.5	1.5	2	2.1	1.3	2	P6
	3	1.8	0.2	2	2.2	0.2	3	R20, A13
	4	0.0	0.0	2	0.0	0.0	2	B.P.
	5	4.7	2.1	-	6.2	2.8	-	RF40, P5
S-total		10.0	4.3		12.6	5.1		
9.	1	2.2	1.3	5	2.7	1.6	6	RF50
	2	0.1	0.1	4	0.2	0.1	5	RF47*
	3	0.0	0.0	3	0.0	0.0	4	B.P.
	4	12.5	4.6	-	13.5	4.6	-	C112, A15, P8*
	5	3.6	0.4	-	5.2	0.5	-	R20
S-total		18.4	6.4		21.7	6.9		
10.	1	1.8	0.2	0	3.6	0.4	0	R18
	2	10.1	3.4	1	13.6	3.6	1	C12, R22, RF61*, RF62, P25*
	3	9.1	4.3	2	12.9	6.3	3	C11, A19, RF55, RF57, RF60*
	4	2.0	1.2	2	2.6	1.5	2	RF58
	5	3.7	0.4	2	6.4	0.6	2	R24
	6	94.7	25.2	6	130.0	39.3	9	B.P., C13, C14, C15, C111, C113, A20, A21, R23, RF54*, RF56*, RF59, RF65
	7	30.6	11.5	-	44.6	17.1	-	C17, C18, R26, R27, A22, P16*, P18*, P19*, P20*, P22*, P23, P24*, RF63, RF64*
	8	3.6	2.2	-	4.5	2.7	-	RF52, RF53
	9	9.4	5.6	-	10.1	6.1	-	P13, P14, P15, P17*, P21*
S-total		165.0	53.9		228.2	77.7		
11.	1	0.4	0.1	0	0.7	0.3	1	R30, RF67*
	2	7.6	3.5	4	6.4	2.2	3	R27, RF66*, P28*
	3	7.7	4.6	8	4.2	2.5	5	P29
	4	7.7	4.6	10	4.2	2.5	6	P30
	5	1.4	0.1	7	1.9	0.2	4	R26
	6	0.0	0.0	7	0.0	0.0	4	B.P.
	7	3.3	2.0	-	3.2	1.9	-	P26*, P27*
	8	7.4	0.7	-	8.5	0.9	-	R28, A24
S-total		35.6	15.8		29.2	10.5		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 48 PROJECTED BOD LOAD IN 1990 AND 2000
FOR CASE 1 (3/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
12.	1	0.0	0.0	0	0.0	0.0	0	B.P.
	2	0.8	0.1	-	0.9	0.1	-	R29
	S-total	0.8	0.1		0.9	0.1		
13.	1	2.0	0.7	2	2.2	0.7	2	C21, A25
	2	4.0	0.4	3	3.3	0.3	3	R30
	3	1.0	0.6	1	0.0	0.0	1	P33
	4	2.7	0.3	1	2.5	0.4	1	R31, RF70*
	5	3.7	1.5	2	3.9	1.5	1	R29, P32, RF71
	6	0.0	0.0	1	0.0	0.0	1	B.P.
	7	0.1	0.1	-	0.4	0.2	-	RF68*
	8	0.2	0.1	-	0.7	0.4	-	RF69*
	9	2.1	1.2	-	2.1	1.3	-	P31
	10	0.4	0.0	-	0.5	0.1	-	A26
S-total	16.2	5.0		15.6	4.9			
14.	1	24.1	3.0	36	29.4	3.8	46	C114, A27, R33, RF72, RF73*
	2	0.0	0.0	22	2.1	1.3	37	P38
	3	3.1	1.9	31	3.2	1.9	45	P37
	4	0.0	0.0	29	0.0	0.0	41	B.P.
	5	5.0	2.5	-	6.4	3.3	-	R29, P36
S-total	32.2	7.4		41.0	10.3			
15.	1	0.7	0.4	4	0.8	0.5	5	C116
	2	29.4	6.1	18	19.2	5.4	16	R31, A28, RF76*, RF77, RF81*, RF82*
	3	84.7	50.0	60	108.5	64.0	105	C25, A29
	4	3.0	1.8	59	3.1	1.9	99	RF80, RF83, RF84*
	5	75.5	45.3	57	93.3	56.0	75	C24
	6	1.6	1.0	54	1.5	0.9	68	C117
	7	0.6	0.1	50	0.5	0.1	59	R37
	8	7.5	3.3	46	11.9	5.8	52	C23, R33, RF78*
	9	14.6	7.4	48	11.0	5.0	53	R32, P39, P40, RF79*, RF85*
	10	0.0	0.0	48	0.0	0.0	53	B.P.
	11	(31.6)	-	-	(38.3)	-	-	C22, RF75*, A30
S-total	217.6	115.4		249.7	139.4			

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 49 PROJECTED BOD LOAD IN 1990 AND 2000 FOR CASE 1 (4/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
16.	1	0.0	0.0	0	0.2	0.1	2	RF88*
	2	10.4	3.1	9	9.8	2.9	9	C26, R35, RF87*, RF90, A31
	3	1.1	0.7	5	3.7	2.2	6	C115, P46*, RF91*, RF93*
	4	3.5	1.4	5	4.8	1.8	6	R37, R39, P45, RF86, RF92*
	5	0.0	0.0	4	0.1	0.0	5	RF94*
	6	3.2	1.9	5	3.0	1.8	6	P44*
	7	12.0	1.2	5	14.5	1.5	7	A32
	8	2.3	1.4	6	2.0	1.2	7	P43*, RF89
	9	2.8	0.3	6	2.9	0.3	7	R36
	10	2.6	1.5	7	2.2	1.3	8	P47*
	11	0.0	0.0	7	0.0	0.0	8	B.P.
S-total		37.9	11.4		43.2	13.1		
17.	1	0.7	0.2	14	0.8	0.2	20	R37, RF95*
	2	0.0	0.0	9	0.0	0.0	12	B.P.
	3	5.0	1.0	-	7.0	1.8	-	P48, A33
S-total		5.7	1.2		7.8	2.0		
18.	1	26.3	10.9	229	32.6	13.8	292	C29, A36, RF97, RF101, RF104, RF105
	2	6.2	3.7	228	3.4	2.0	248	P54*
	3	12.1	6.9	279	10.4	5.6	259	R39, P55, RF98*, RF99, RF102*, RF103*, RF106, RF107*, RF108*, RF109*, RF110
	4	1.3	0.1	152	1.7	0.2	138	R38, A37
	5	0.9	0.2	117	1.4	0.3	104	R42, RF100*
	6	1.2	0.1	101	1.7	0.2	89	R44, RF111*
	7	0.0	0.0	85	0.0	0.0	75	B.P.
	8	1.0	0.6	-	0.8	0.5	-	P56*
S-total		49.0	22.5		52.0	22.5		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 50 PROJECTED BOD LOAD IN 1990 AND 2000 FOR CASE 1 (5/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
19.	1	4.5	2.7	81	4.5	2.7	83	RF123*, RF124
	2	4.7	2.4	84	5.1	2.6	85	C119, R43, RF115, RF117*, A38
	3	1.9	0.5	51	3.0	1.0	53	R44, RF119*, RF122*
	4	0.1	0.1	40	0.3	0.2	42	RF118*
	5	3.4	0.3	32	4.5	0.5	32	R45, RF121*
	6	0.0	0.0	32	0.0	0.0	32	B.P.
	7	5.8	-	-	8.1	4.9	-	C121, RF112
	8	(8.9)	-	-	(21.4)	-	-	C31, C120
S-total		20.4	9.2		25.6	11.8		
20.	1	3.9	1.6	24	3.3	1.0	16	R46, P57, RF128*
	2	3.2	1.6	43	3.6	1.8	37	C33, B48, RF125*, RF126*, RF127
	3	0.0	0.0	31	0.0	0.0	26	
S-total		7.0	3.2		6.9	2.8		
21.	1	3.9	2.1	16	4.3	2.3	18	C30, RF139, RF146, A39
	2	1.8	0.2	13	1.5	0.1	14	R41
	3	0.1	0.1	11	0.2	0.1	12	RF141*
	4	6.7	3.6	15	8.8	4.9	19	R43, P59*, P60*, RF148
	5	0.6	0.3	10	1.1	0.6	13	C145
	6	10.9	6.6	18	13.2	7.9	23	C125, P61, RF134*, RF135*, RF136*, RF142
	7	8.7	3.4	21	11.8	4.9	27	C32, R47, RF140, RF147*, A40
	8	4.4	2.6	23	5.2	3.1	29	C122, RF138, RF144*
	9	4.1	0.4	21	6.1	0.6	25	R48
	10	3.0	1.8	22	2.4	1.4	23	P62*, RF137
	11	0.1	0.0	21	0.1	0.1	24	RF145*
	12	0.2	0.1	20	0.3	0.2	23	RF129*, RF143
	13	0.0	0.0	-	0.0	0.0	-	B.P.
	14	4.6	2.8	-	2.9	1.7	-	P58, RF130*, RF132, RF133*
	15	(11.5)	-	-	(15.2)	-	-	RF131*, C34, A41
S-total		49.0	24.1		57.8	28.1		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 51 PROJECTED BOD LOAD IN 1990 AND 2000 FOR CASE 1 (6/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
22.	1	3.4	2.0	42	7.0	4.2	85	P64*, RF156*
	2	0.7	0.1	29	0.7	0.1	57	R53
	3	1.1	0.6	29	2.6	1.6	61	P66*
	4	5.9	3.4	32	8.6	5.2	52	C123, P65, RF154*
	5	4.0	2.1	31	6.4	0.6	35	R49
	6	0.0	0.0	26	0.0	0.0	29	RF153*
	7	2.4	1.0	23	4.3	2.1	28	R47, P63*, RF152*
	8	16.8	6.3	28	21.4	8.4	32	C35, A42, RF149, RF150
	9	0.0	0.0	23	0.0	0.0	26	B.P.
S-total		34.3	15.6		51.1	22.2		
23.	1	1.3	0.8	15	2.4	1.4	28	P68*
	2	12.1	7.3	96	18.0	10.8	117	C38, P70*, RF161*, RF162*
	3	0.4	0.3	81	0.4	0.3	101	RF166
	4	3.4	1.1	64	5.2	1.8	76	C127, R51, P71*
	5	0.6	0.3	51	0.8	0.5	63	RF167*, RF168*
	6	0.0	0.0	46	0.0	0.0	56	B.P.
	7	(39.7)	-	-	(57.5)	-	-	C39, A44
S-total		17.8	9.8		26.9	14.8		
24.	1	1.2	0.5	7	1.2	0.5	7	R53, RF171*, RF173
	2	8.7	5.2	53	8.4	5.1	52	P74
	3	3.2	1.5	23	3.3	1.4	22	R51, P81
	4	9.3	5.6	29	8.4	5.1	27	P81
	5	1.3	0.8	22	2.4	1.4	22	P75*
	6	2.0	0.2	8	2.0	0.2	8	R52
	7	0.0	0.0	8	0.0	0.0	8	B.P.
	8	3.7	1.6	-	5.0	2.3	-	C40, A45
	9	1.3	0.8	-	2.4	1.5	-	P76*, RF174*
	10	14.9	8.9	-	16.2	9.7	-	C126, P77*, P79*, RF176
	11	3.6	2.1	-	3.3	2.0	-	P78, RF169*, RF170*, RF175*
	12	1.3	0.8	-	2.4	1.4	-	P73*
S-total		50.4	28.1		55.2	30.6		
25.	1	0.2	0.0	0	0.2	0.0	0	R54
	2	0.0	0.0	0	4.2	2.5	3	PN-1
	3	0.0	0.0	0	0.0	0.0	2	B.P.
	4	1.4	0.1	-	1.4	0.1	-	R52
S-total		1.6	0.2		5.8	2.7		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 52 PROJECTED BOD LOAD IN 1990 AND 2000 FOR CASE 1 (7/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
26.	1	0.0	0.0	0	0.0	0.0	0	B.P. C42
	2	(2.5)	-	-	(3.7)	-	-	
	S-total	0.0	0.0		0.0	0.0		
27.	1	0.8	0.5	1	0.8	0.5	1	P91*
	2	2.2	1.3	4	2.1	1.3	4	P90
	3	22.8	12.3	25	27.1	14.7	29	C41, R53, P83*, P86, P92, RF177*, A46
	4	4.1	2.5	23	4.0	2.4	26	P84*, P85
	5	1.4	0.8	22	1.7	1.0	24	P93*
	6	0.8	0.5	15	0.8	0.5	17	P89*
	7	1.4	0.8	11	1.7	1.0	13	P87*
	8	1.4	0.8	11	1.7	1.0	12	P88*
	9	0.0	0.0	6	0.0	0.0	7	B.P.
	10	1.7	1.0	-	2.3	1.4	-	C151, R55
	11	0.8	0.1	-	0.8	0.1	-	R54
S-total	37.4	20.7		42.9	23.8			
28.	1	11.4	6.8	14	2.4	1.4	3	C145, C150, P95, P96
	2	1.8	1.1	10	2.5	1.5	4	C148
	3	5.8	3.5	9	0.0	0.0	2	P94
	4	2.1	1.2	8	2.7	1.6	3	C139, C147, R55, P97*
	5	0.5	0.3	8	1.0	0.6	3	C143
	6	2.4	1.5	8	4.2	2.5	4	C142
	7	0.8	0.5	8	1.0	0.6	4	C146
	8	0.9	0.6	8	1.7	1.0	5	C141
	9	0.0	0.0	6	0.0	0.0	4	B.P.
S-total	25.7	15.3		15.6	9.3			
29.	1	0.6	0.4	3	1.2	0.7	7	C140
	2	0.0	0.0	1	0.0	0.0	2	B.P.
S-total	0.6	0.4		1.2	0.7			

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 53 PROJECTED BOD LOAD IN 1990 AND 2000
FOR CASE 1 (8/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
30.	1	0.5	0.1	0	0.8	0.1	0	R63
	2	11.6	7.0	4	6.3	3.8	2	P112*, PN-2
	3	10.9	5.8	5	13.9	7.3	4	C49, C50, R61, R62, P114, P116*, RF182*, RF186*, RF190*, RF192*, RF193
	4	4.5	2.7	2	12.7	7.6	2	C48, RF188*
	5	21.6	11.5	3	14.8	6.6	3	R60, P110, P111*, P113*, P120*
	6	0.9	0.6	3	1.1	0.7	3	P109*
	7	18.3	10.0	4	36.1	20.2	4	C45, C46, C130, R57, R58, P121*, R180*, RF184*, RF185*, RF187*, RF189*, RF191
	8	0.1	0.0	3	1.2	0.7	4	P122*, RF183*
	9	6.3	3.2	3	7.5	3.9	4	C131, C155, R40, P98*, P102*, A47
	10	18.8	10.9	4	19.7	11.5	4	C144, C154, C156, R41, P99*, P100*, P101*, P103*, P118*, P119*, RF194*, RF195*
	11	0.9	0.6	4	1.3	0.8	4	C153
	12	4.9	3.0	4	1.1	0.6	4	P115, RF181
	13	14.0	8.4	4	12.5	7.5	4	P104, P106*, P107, P108*
	14	0.8	0.5	4	1.6	0.9	4	C152
	15	3.9	2.3	4	2.1	1.3	4	P105
	16	11.3	6.7	4	9.8	5.7	4	C137, C138, R56, R59, PN-3, P117
	17	0.0	0.0	4	0.0	0.0	4	B.P.
S-total		129.5	73.1		142.5	79.2		
31.	1	1.3	0.6	0	1.6	0.8	1	R59, P123*, P124*
	2	0.0	0.0	0	0.0	0.0	1	B.P.
	3	5.3	3.2	-	9.1	5.5	-	RF196, RF197*, RF198
	4	(18.6)	-	-	(44.3)	-	-	C47
S-total		6.6	3.8		10.8	6.2		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BD load discharged to the sea directly

Table 54 PROJECTED BOD LOAD IN 1990 AND 2000
FOR CASE 1 (9/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
32.	1	21.3	12.2	16	12.8	7.1	10	R64, PN-4, P125 P126 B.P. C51
	2	2.9	1.7	10	2.1	1.3	6	
	3	0.0	0.0	6	0.0	0.0	4	
	4	2.0	1.2	-	7.6	4.6	-	
	S-total	26.2	15.2		22.5	12.9		
33.	1	0.1	0.0	0	0.0	0.0	0	R65
	2	0.0	0.0	0	0.0	0.0	0	B.P.
	S-total	0.1	0.0		0.0	0.0		
34.	1	0.3	0.0	0	0.2	0.0	0	R65 PN-5, P127* B.P. C52
	2	8.1	4.9	3	4.5	2.8	2	
	3	0.0	0.0	2	0.0	0.0	1	
	4	(2.2)	-	-	(6.5)	-	-	
	S-total	8.4	4.9		4.8	2.8		
35.	1	0.0	0.0	0	0.0	0.0	0	R67
	2	0.0	0.0	0	0.0	0.0	0	B.P.
	3	0.5	0.1	-	0.7	0.1	-	R66
	S-total	0.6	0.1		0.7	0.1		
36.	1	0.4	0.2	0	1.3	0.8	0	C132 R67, RF199 R68, PN-6, P129* B.P. C53, A48
	2	2.5	1.0	0	3.0	1.3	0	
	3	3.9	2.2	0	2.9	1.7	1	
	4	0.0	0.0	0	0.0	0.0	0	
	5	(16.3)	-	-	(42.8)	-	-	
	S-total	6.8	3.5		7.2	3.7		
37.	1	0.7	0.1	0	0.5	0.1	0	R69
	2	0.0	0.0	0	0.0	0.0	0	B.P.
	S-total	0.7	0.1		0.5	0.1		
38.	1	1.0	0.1	0	0.9	0.1	0	R69
	2	0.0	0.0	0	0.0	0.0	0	B.P.
	S-total	1.0	0.1		0.9	0.1		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 55 PROJECTED BOD LOAD IN 1990 AND 2000
FOR CASE 1 (10/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
39.	1	1.6	1.0	7	5.8	3.5	23	C57
	2	0.4	0.0	5	1.1	0.1	16	B.P., R75
	3	0.8	0.5	-	2.4	1.4	-	C56
	4	1.1	0.1	-	1.3	0.1	-	R74
	S-total	4.0	1.6		10.6	5.2		
40.	1	8.2	4.9	1	6.5	3.9	1	C135, P130*
	2	1.5	0.4	0	1.8	0.5	0	R70, P131
	3	2.8	1.7	0	10.1	6.1	1	C133, P132, RF202*, RF203*, RF206*
	4	0.0	0.0	0	0.1	0.1	1	RF204*
	5	3.9	1.6	0	9.9	5.1	1	C54, R72, R73, RF205
	6	0.0	0.0	0	0.0	0.0	1	B.P.
	7	0.5	0.0	-	0.6	0.1	-	R76
	8	1.0	0.5	-	3.4	1.8	-	C58, C134, R75
	9	(17.1)	-	-	(54.2)	-	-	C55, R77, RF201*
S-total	18.0	9.1		32.4	17.4			
Total	1,103.2	506.8		1,355.1	621.9			

Remarks: C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 56 SUMMARY OF PROJECTED BOD LOAD AND BOD CONCENTRATION FOR CASE 2

No.	Basin Name	1990			2000		
		BOD Load		BOD	BOD Load		BOD
		From Source (ton/d)	Into River (ton/d)	Concentration in River (mg/lit)	From Source (ton/d)	Into River (ton/d)	Concentration in River (mg/lit)
1	Perlis	4	1	0-0	7	2	1-0
2	P. Langkawi	----- not studied -----					
3	Kedah	16	6	0-0	24	8	0-0
4	Merbok	11	6	15-31	18	10	24-52
5	Muda	18	7	0-2	26	11	0-3
6	Perai	19(2)	4	0-11	32(3)	10	4-30
7	P. Pinang	----- not studied -----					
8	Kerian	10	4	1-2	12	5	1-3
9	Kurau	14	6	3-5	20	6	4-6
10	Perak	154	49	0-5	199	63	0-7
11	Bernam	36	16	0-10	29	10	0-6
12	Tengi	1	0	0-0	10	0	0-0
13	Selangor	18	5	1-3	19	5	0-3
14	Buloh	35	9	22-40	41	10	27-45
15	Kelang	194(26)	107	1-78	232(34)	126	1-92
16	Langat	39	11	0-9	48	14	0-9
17	Sepang	5	1	4-26	8	2	12-101
18	Linggi	48	22	83-274	47	20	73-245
19	Melaka	20(8)	9	30-84	36(12)	11	29-83
20	Kesang	7	3	21-43	7	3	13-42
21	Muar	48(4)	23	5-22	53(13)	25	6-24
22	Batu Pahat	25	10	16-42	48	20	20-85
23	Sekudai	16(8)	9	6-72	24(9)	13	9-103
24	Johor	50	28	5-53	51	28	1-48
25	Sedili Besar	2	0	0-0	7	3	0-3
26	Mersing	0(2)	0	0-3	0(3)	0	0-6
27	Endau	36	20	1-24	41	22	1-26
28	Rompin	21	13	5-14	21	12	5-9
29	Bebar	0	0	0-1	1	1	2-5
30	Pahang	135	77	0-5	123	67	0-4
31	Kuantan	7(10)	4	0-9	11(33)	6	1-17
32	Kemaman	25	15	6-16	18	10	4-10
33	Paka	0	0	0-0	0	0	0-0
34	Dungun	9(1)	5	0-3	5(4)	3	0-2
35	Marang	0	0	0-0	1	0	0-0
36	Trengganu	7(14)	3	0-2	8(25)	3	0-2
37	Setiu	1	0	0-0	1	0	0-0
38	Besut	1	0	0-0	1	0	0-0
39	Kemasin	4	1	4-5	6	3	8-11
40	Kelantan	17(15)	8	0-1	21(28)	11	0-1
41	Golok	----- not studied -----					
Total		1,051(96)	480		1,246(164)	543	

Remarks; (): BOD load discharge to the sea directly

Table 57 COMPOSITION OF BOD LOAD INTO RIVER FOR CASE 2

Unit: ton/d

No.	Basin Name	1990				2000			
		BOD Load into River				BOD Load into River			
		PR	UI	RA	Total	PR	UI	RA	Total
1	Perlis	0	1	0	1	0	2	0	2
2	P. Langkawi	not studied				not studied			
3	Kedah	1	4	1	6	0	7	1	8
4	Merbok	3	3	0	6	6	4	0	10
5	Muda	6	0	1	7	9	1	1	11
6	Perai	1	1	2	4	7	1	2	10
7	P. Pinang	not studied				not studied			
8	Kerian	4	0	0	4	5	0	0	5
9	Kurau	4	1	1	6	3	2	1	6
10	Perak	19	20	9	48	24	28	11	63
11	Bernam	15	0	1	16	9	0	1	10
12	Tengi	0	0	0	0	0	0	0	0
13	Selangor	3	1	1	5	3	1	1	5
14	Buloh	6	1	2	9	7	0	3	10
15	Kelang	13	92	2	107	11	112	3	126
16	Langat	7	2	2	11	8	3	3	14
17	Sepang	0	0	0	0	1	0	1	2
18	Longgi	15	5	2	22	12	6	2	20
19	Melaka	7	1	1	9	8	1	1	10
20	Kesang	3	0	0	3	2	1	0	3
21	Muar	18	3	2	23	20	3	2	25
22	Batu Pahat	6	3	1	10	11	7	2	20
23	Sekudai	3	5	1	9	5	7	1	13
24	Johor	23	4	0	27	22	5	0	27
25	Sedili Besar	0	0	0	0	3	0	0	3
26	Mersing	0	0	0	0	0	0	0	0
27	Endau	14	6	0	20	15	7	0	22
28	Rompin	10	3	0	13	5	7	0	12
29	Bebar	0	0	0	0	0	1	0	1
30	Pahang	55	20	1	76	41	25	1	67
31	Kuantan	4	0	0	4	6	0	0	6
32	Kemaman	14	1	0	15	8	2	0	10
33	Paka	0	0	0	0	0	0	0	0
34	Dungun	5	0	0	5	3	0	0	3
35	Marang	0	0	0	0	0	0	0	0
36	Trengganu	3	0	0	3	3	0	0	3
37	Setiu	0	0	0	0	0	0	0	0
38	Besut	0	0	0	0	0	0	0	0
39	Kemasin	0	1	0	1	0	3	0	3
40	Kelantan	6	2	0	8	5	5	1	11
41	Golok	not studied				not studied			
Total		268	179	30	477	262	239	38	539
		(56)	(38)	(6)	(100)	(49)	(44)	(7)	(100)

Remarks; PR: Palm oil mill and rubber factory effluent
 UI: Urban domestic and urban industry effluent
 RA: Rural and animal husbandry
 (): % of the total BOD load

Table 58 PROJECTED BOD LOAD IN 1990 AND 2000 FOR CASE 2 (1/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
1.	1	0.0	0.0	0	0.0	0.0	0	B.P.
	2	4.4	1.3	-	6.9	2.2	-	C1, R1
	S-total	4.4	1.3		6.9	2.2		
3.	1	1.0	0.1	0	1.3	0.1	0	R4
	2	0.0	0.0	0	0.0	0.0	0	B.P.
	3	12.6	4.8	-	18.7	7.2	-	C2, R5, R6, RF2
	4	2.7	0.7	-	3.7	0.9	-	C101, R3
	S-total	16.3	5.5		23.8	8.3		
4.	1	6.5	3.2	31	10.6	5.3	52	R9, RF6, RF7*, RF8*, RF9*
	2	4.3	2.6	28	7.2	4.3	42	C3, RF4*, RF5
	3	0.0	0.0	-	0.0	0.0	-	B.P.
	S-total	10.9	5.8		17.8	9.7		
5.	1	0.9	0.1	0	1.2	0.1	0	R8
	2	0.8	0.5	0	1.9	1.2	1	RF16*
	3	4.9	2.0	1	6.6	2.7	2	R10, RF12, RF15*, RF17
	4	0.5	0.3	1	1.1	0.6	2	RF14*, RF21*
	5	2.8	1.4	1	3.3	1.6	2	R11, P1*, RF18
	6	4.3	1.9	2	6.5	3.0	3	R9, RF10*, RF11, RF13*, RF19*, RF20
	7	4.2	0.8	2	5.8	1.4	3	R13, RF22*, A1, C104
	8	0.0	0.0	2	0.0	0.0	3	B.P.
	S-total	18.4	7.0		26.4	10.7		
6.	1	0.1	0.0	1	0.6	0.0	6	RF28*, RF35*, RF36*
	2	1.9	0.8	10	2.5	1.1	16	C4, R11
	3	0.1	0.1	8	1.3	0.8	19	RF26*
	4	12.3	2.2	11	21.4	6.6	30	R13, A2, RF24, RF29*, RF30*, RF31*, RF33*, RF34*, B.P.
	5	4.6	0.5	-	6.0	0.6	-	R14
	6	(2.3)	-	-	(2.6)	-	-	A3, C5, C109, C110
	S-total	19.0	3.6		31.8	9.5		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 59 PROJECTED BOD LOAD IN 1990 AND 2000 FOR CASE 2 (2/10)

Basin No.	Outlet No.	1990			200			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
8.	1	0.9	0.5	1	2.0	0.8	1	R12, RF38*, RF39*
	2	2.5	1.5	2	2.1	1.3	2	P6
	3	1.8	0.2	2	2.1	0.2	3	R20, A13
	4	0.0	0.0	2	0.0	0.0	2	B.P.
	5	4.7	2.1	-	6.2	2.8	-	RF40, P5
S-total		9.9	4.3		12.4	5.1		
9.	1	2.2	1.3	5	2.7	1.6	6	RF50
	2	0.1	0.1	4	0.2	0.1	5	RF47*
	3	0.0	0.0	3	0.0	0.0	4	B.P.
	4	12.1	4.4	-	12.2	3.8	-	C112, A15, P8*
	5	0.0	0.0	-	4.5	0.5	-	R20
S-total		14.4	5.7		19.7	6.1		
10.	1	2.6	0.3	0	3.2	0.3	0	R18
	2	8.9	3.2	1	10.6	3.1	1	C12, R22, RF61*, RF62, P25*
	3	8.6	4.0	2	11.6	5.6	3	C11, A19, RF55, RF57, RF60*
	4	2.0	1.2	2	2.6	1.5	2	RF58
	5	3.0	0.3	2	4.7	0.5	2	R24
	6	87.9	21.3	5	113.0	28.8	7	B.P., C13, C14, C15, C111, C113, A20, A21, R23, RF54*, RF56*, RF59*, RF65
	7	28.2	10.4	-	38.7	14.3	-	C17, C18, R26, R27, A22, P16*, P18*, P19*, P20*, P22*, P23, P24*, RF63, RF64*
	8	3.6	2.2	-	4.5	2.7	-	RF52, RF53
	9	9.4	5.6	-	10.1	6.1	-	P13, P14, P15, P17*, P21*
S-total		154.3	48.5		199.1	62.9		
11.	1	0.5	0.1	0	0.7	0.3	1	R30, RF67*
	2	7.4	3.4	4	6.1	2.1	3	R27, RF66*, P28*
	3	7.7	4.6	8	4.2	2.5	5	P29
	4	7.7	4.6	10	4.2	2.5	6	P30
	5	1.2	0.1	7	1.7	0.2	4	R26
	6	0.0	0.0	7	0.0	0.0	4	B.P.
	7	3.3	2.0	-	3.2	1.9	-	P26*, P27*
	8	7.9	0.8	-	8.5	0.8	-	R28, A24
S-total		35.8	15.8		28.6	10.4		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 60 PROJECTED BOD LOAD IN 1990 AND 2000
FOR CASE 2 (3/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
12.	1	0.0	0.0	0	0.0	0.0	0	B.P. R29
	2	1.0	0.1	0	0.9	0.1	-	
	S-total	1.0	0.1		0.9	0.1		
13.	1	2.0	0.7	2	2.1	0.7	2	C21, A25 R30 P33 R31, RF70* R29, P32, RF71 B.P. RF68* RF69* P31 A26
	2	4.9	0.5	3	3.8	0.4	3	
	3	1.0	0.6	1	0.0	0.0	1	
	4	3.2	0.4	1	5.9	0.7	1	
	5	3.9	1.5	2	3.9	1.5	1	
	6	0.0	0.0	1	0.0	0.0	1	
	7	0.1	0.1	-	0.4	0.2	-	
	8	0.2	0.1	-	0.7	0.4	-	
	9	2.1	1.2	-	2.1	1.3	-	
	10	0.4	0.0	-	0.5	0.1	-	
S-total	17.8	5.1		19.3	5.2			
14.	1	24.3	3.1	38	29.3	3.7	45	C114, A27, R33, RF72, RF73* P38 P37 B.P. R29, P36
	2	2.1	1.2	32	2.1	1.3	37	
	3	3.1	1.9	40	3.2	1.9	44	
	4	0.0	0.0	37	0.0	0.0	40	
	5	5.2	2.6	-	6.3	3.3	-	
S-total	34.7	8.8		40.9	10.2			
15.	1	0.6	0.2	2	0.7	0.4	4	C116 R31, A28, RF76*, RF77, RF81*, RF82* C25, A29 RF80, RF83, RF84* C24 C117 R37 R23, R33, RF78* R32, P39, P40, RF79*, RF85* B.P. C22, RF75*, A30
	2	18.0	4.9	14	23.5	5.8	17	
	3	78.3	46.1	78	93.9	55.2	92	
	4	3.0	1.8	73	3.1	1.9	87	
	5	69.8	41.9	75	86.8	52.1	77	
	6	1.6	0.9	68	1.3	0.8	69	
	7	0.7	0.1	60	0.6	0.1	61	
	8	7.2	3.1	54	11.1	5.1	54	
	9	14.9	7.4	57	11.0	5.0	54	
	10	0.0	0.0	56	0.0	0.0	54	
	11	(26.3)	-	-	(34.3)	-	-	
S-total	193.9	106.5		232.0	126.4			

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 61 PROJECTED BOD LOAD IN 1990 AND 2000 FOR CASE 2 (4/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
16.	1	0.0	0.0	0	0.2	0.1	2	RF88*
	2	11.0	3.0	9	14.6	3.2	9	C26, R35, RF87*, RF90, A31
	3	1.1	0.6	4	4.2	2.5	7	C115, P46*, RF91*, RF93*
	4	3.6	1.4	4	4.3	1.7	7	R37, R39, P45, RF86, RF92*
	5	0.0	0.0	4	0.1	0.0	6	RF94*
	6	3.2	1.9	5	3.0	1.8	7	P44*
	7	12.0	1.2	5	14.5	1.5	7	A32
	8	2.3	1.4	6	2.0	1.2	7	P43*, RF89
	9	3.1	0.3	6	3.3	0.3	7	R36
	10	2.6	1.5	7	2.2	1.3	8	P47*
	11	0.0	0.0	7	0.0	0.0	8	B.P.
S-total		38.8	11.3		48.4	13.7		
17.	1	0.7	0.1	7	0.9	0.2	18	R37, RF95*
	2	0.0	0.0	4	0.0	0.0	12	B.P.
	3	4.0	0.4	-	7.0	1.8	-	P48, A33
S-total		4.7	0.5		7.9	2.0		
18.	1	25.2	0.2	215	28.8	11.4	244	C29, A36, RF97, RF101, RF104, RF105
	2	6.2	3.7	218	3.4	2.0	214	P54*
	3	12.0	6.9	274	9.7	5.5	245	R39, P55, RF98*, RF99, RF102*, RF103*, RF106*, RF107*, RF108*, RF109*, RF110
	4	1.2	0.1	149	1.5	0.1	133	R38, A37
	5	0.8	0.2	115	1.1	0.2	101	R42, RF110*
	6	1.1	0.1	100	1.6	0.2	88	R44, RF111*
	7	0.0	0.0	83	0.0	0.0	73	B.P.
	8	1.0	0.6	-	0.8	0.5	-	P56*
S-total		47.5	21.8		46.8	20.2		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 62 PROJECTED BOD LOAD IN 1990 AND 2000
FOR CASE 2 (5/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load From Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
19.	1	4.5	2.7	81	4.5	2.7	83	RF123*, RF124
	2	5.0	2.4	84	5.0	2.4	81	C119, R43, RF115, RF117*, A38
	3	1.8	0.5	52	2.8	0.9	53	R44, RF119*, RF122*
	4	0.1	0.1	41	0.3	0.2	42	RF118*
	5	3.2	0.3	33	4.5	0.5	32	R45, RF121*
	6	0.0	0.0	32	0.0	0.0	31	B.P.
	7	5.4	2.9	52	6.3	3.8	-	C121, RF112
	8	(7.9)	-	-	(12.2)	-	-	C31, C120
	S-total	20.0	9.0		35.5	10.5		
20.	1	3.9	1.6	25	3.2	1.0	15	R46, P57, RF128*
	2	3.1	1.6	43	3.0	1.7	36	C33, R48, RF125*, RF126*, RF127
	3	0.0	0.0	31	0.0	0.0	26	
	S-total	7.0	3.2		6.2	2.7		
21.	1	3.7	2.1	16	3.9	2.1	16	C30, RF139, RF146, A39
	2	1.8	0.2	12	2.5	0.2	13	R41
	3	0.1	0.1	10	0.2	0.1	11	RF141*
	4	6.7	3.6	15	9.3	5.0	18	R43, P59*, P60*, RF148
	5	0.1	0.1	10	0.7	0.4	12	C145
	6	10.8	6.5	18	12.9	7.8	22	C125, P61, RF134*, RF135*, RF136*, RF142
	7	8.2	3.2	21	7.0	2.3	22	C32, R47, RF140, RF147*, A40
	8	4.1	2.5	22	4.7	2.8	24	C122, RF138, RF144*
	9	3.9	0.4	20	5.7	0.6	21	R48
	10	3.0	1.8	21	2.4	1.4	22	P62*, RF137
	11	0.1	0.0	20	0.1	0.1	21	RF145*
	12	0.2	0.1	19	0.3	0.2	20	RF129*, RF143
	13	0.0	0.0	19	0.0	0.0	20	B.P.
	14	4.6	2.8	-	2.9	1.7	-	P58, RF130*, RF132, RF133*
	15	(4.3)	-	-	(13.0)	-	-	RF131*, C34, A41
S-total	47.5	23.3		52.6	24.7			

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 63 PROJECTED BOD LOAD IN 1990 AND 2000
FOR CASE 2 (6/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
22.	1	3.4	2.0	42	7.0	4.2	85	P64*, RF156*
	2	0.7	0.1	29	1.1	0.1	55	R53
	3	1.1	0.6	29	2.6	1.6	59	P66*
	4	5.5	3.1	31	7.9	4.7	51	C123, P65, RF154*
	5	3.7	2.0	31	6.3	0.6	34	R49
	6	0.0	0.0	25	0.0	0.0	29	RF153*
	7	2.3	1.0	22	4.3	2.1	28	R47, P63*, RF152*
	8	8.6	1.4	20	19.2	7.0	35	C35, A42, RF149, RF150
	9	0.0	0.0	16	0.0	0.0	28	B.P.
S-total		25.4	10.3		48.3	20.4		
23.	1	1.3	0.8	15	2.4	1.4	28	P68*
	2	10.6	6.4	72	15.5	9.3	103	C38, P70*, RF161*, RF162*
	3	0.4	0.3	63	0.4	0.3	89	RF166
	4	3.4	1.1	53	5.1	1.7	69	C127, R51, P71*
	5	0.6	0.3	44	0.8	0.5	57	RF167*, RF168*
	6	0.0	0.0	40	0.0	0.0	52	B.P.
	7	(8.0)	-	-	(9.4)	-	-	C39, A44
S-total		16.3	8.9		24.3	13.2		
24.	1	1.2	0.5	7	0.7	0.1	2	R53, RF171*, RF173
	2	8.7	5.2	53	8.4	5.1	48	P74
	3	3.2	1.5	23	3.4	1.4	20	R51, P81
	4	9.3	5.6	29	8.4	5.1	26	P81
	5	1.3	0.8	22	2.4	1.4	21	R75*
	6	2.0	0.2	8	3.2	0.3	8	R52
	7	0.0	0.0	8	0.0	0.0	8	B.P.
	8	3.3	1.4	-	4.4	1.9	-	C40, A45
	9	1.3	0.8	-	2.4	1.5	-	P76*, RF174*
	10	14.3	8.6	-	12.0	7.2	-	C126, P77*, P79*, RF176
	11	3.6	2.1	-	3.3	2.0	-	P78, RF169*, RF170*, RF175*
	12	1.3	0.8	-	2.4	1.4	-	P73*
S-total		49.5	27.5		51.2	27.5		
25.	1	0.2	0.0	0	0.2	0.0	0	R54
	2	0.0	0.0	0	4.2	2.5	3	PN-1
	3	0.0	0.0	0	0.0	0.0	2	B.P.
	4	1.4	0.1	-	2.2	0.2	-	R52
S-total		1.6	0.2		6.6	2.8		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 64 PROJECTED BOD LOAD IN 1990 AND 2000 FOR CASE 2 (7/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
26.	1	0.0	0.0	0	0.0	0.0	0	B.F.
	2	(2.1)	-	-	(3.1)	-	-	C42
	S-total	0.0	0.0		0.0	0.0		
27.	1	0.8	0.5	1	0.8	0.5	1	P71*
	2	2.2	1.3	4	2.1	1.3	4	P90
	3	21.6	11.6	24	25.7	13.4	26	C41, R53, P83*, P86, P92, RF177*, A46
	4	4.1	2.5	22	4.0	2.4	24	P84*, P85
	5	1.4	0.8	21	1.7	1.0	23	P93*
	6	0.8	0.5	14	0.8	0.5	16	P89*
	7	1.4	0.8	11	1.7	1.0	12	P87*
	8	1.4	0.8	10	1.7	1.0	12	P88*
	9	0.0	0.0	6	0.0	0.0	6	B.P.
	10	1.4	0.8	-	2.0	1.1	-	C151, R55
	11	0.8	0.1	-	0.8	0.1	-	R54
S-total	35.9	19.8		41.2	22.2			
28.	1	11.1	6.6	14	7.2	4.3	9	C145, C150, P95, P96
	2	1.4	0.0	10	2.0	1.2	7	C148
	3	5.8	3.5	9	3.2	1.9	6	P94
	4	1.7	0.9	8	2.3	1.0	5	C139, C147, R55, P97*
	5	0.1	0.1	7	0.7	0.4	5	C143
	6	0.7	0.4	7	3.3	2.0	6	C142
	7	0.2	0.1	7	0.7	0.4	6	C146
	8	0.3	0.2	6	1.3	0.8	6	C141
	9	0.0	0.0	5	0.0	0.0	5	B.P.
S-total	21.3	12.6		20.8	12.1			
29.	1	0.1	0.1	1	1.0	0.6	5	C140
	2	0.0	0.0	0	0.0	0.0	2	B.P.
	S-total	0.1	0.1		1.0	0.6		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 65 PROJECTED BOD LOAD IN 1990 AND 2000
FOR CASE 2 (8/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
30.	1	0.5	0.0	0	0.7	0.1	0	R63
	2	11.6	7.0	4	6.3	3.8	2	P112*, PN-2
	3	10.3	5.5	5	11.1	5.8	4	C49, C50, R61, R62, P114, P116*, RF182*, RF186*, RF190*, RF192*, RF193
	4	3.6	2.1	2	8.5	5.1	2	C48, RF188*
	5	21.5	11.5	3	15.4	6.6	2	R60, P110, P111*, P113*, P120*
	6	0.9	0.6	3	1.1	0.7	2	P109*
	7	16.6	9.0	3	28.5	15.4	4	C45, C46, C130, R57, R58, P121*, RF180*, RF184*, RF185*, RF187*, RF189*, RF191
	8	0.1	0.0	3	1.2	0.7	3	P122*, RF183*
	9	6.1	3.0	3	7.0	3.4	3	C131, C155, R40, P98*, P102*, A47
	10	17.1	9.9	4	17.0	10.3	4	C144, C154, C156, R41, P99*, P100*, P101*, P103*, P118*, P119*, RF194*, RF195*
	11	0.8	0.5	3	1.0	0.6	4	C153
	12	4.9	3.0	3	1.1	0.6	4	P115, RF181
	13	14.0	8.4	4	12.5	7.5	4	P104, P106*, P107, P108*
	14	0.6	0.4	4	0.9	0.6	4	C152
	15	3.9	2.3	4	2.1	1.3	4	P105
	16	22.5	13.4	4	8.4	4.9	4	C137, C138, R56, R59, PN-3, P117
	17	0.0	0.0	-	0.0	0.0	-	B.P.
S-total		134.9	76.5		122.7	67.3		
31.	1	1.3	0.6	0	1.6	0.8	1	R59, P123*, P124*
	2	0.0	0.0	0	0.0	0.0	1	B.P.
	3	5.3	3.2	-	9.1	5.5	-	RF196, RF197*, RF198
	4	(16.2)	-	-	(33.0)	-	-	C47
S-total		6.6	3.8		10.7	6.3		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 66 PROJECTED BOD LOAD IN 1990 AND 2000
FOR CASE 2 (9/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
32.	1	20.9	12.2	16	12.4	7.1	10	R64, PN-4, P125 P126 B.P. C51
	2	2.9	1.7	10	2.1	1.3	6	
	3	0.0	0.0	6	0.0	0.0	4	
	4	1.6	1.0	-	3.5	2.1	-	
	S-total	25.4	14.9		18.0	10.4		
33.	1	0.2	0.0	0	0.3	0.0	0	R65 B.P.
	2	0.0	0.0	0	0.0	0.0	0	
	S-total	0.2	0.0		0.3	0.0		
34.	1	0.4	0.0	0	0.5	0.1	0	R65 PN-5, P127* B.P. C52
	2	8.1	4.9	3	4.5	2.7	2	
	3	0.0	0.0	2	0.0	0.0	1	
	4	(1.2)	-	-	(3.5)	-	-	
	S-total	8.5	4.9		5.1	2.8		
35.	1	0.0	0.0	0	0.0	0.0	0	R67 B.P. R66
	2	0.0	0.0	0	0.0	0.0	0	
	3	0.4	0.1	-	0.4	0.0	-	
	S-total	0.4	0.1		0.5	0.0		
36.	1	0.3	0.2	0	0.7	0.4	0	C132 R67, RF199 R68, PN-6, P129* B.P. C53, A48
	2	2.3	1.0	0	2.6	1.2	0	
	3	4.6	2.3	0	4.4	1.8	0	
	4	0.0	0.0	0	0.0	0.0	0	
	5	(14.1)	-	-	(25.4)	-	-	
	S-total	7.2	3.4		7.8	3.4		
37.	1	0.6	0.1	0	0.7	0.1	0	R69 B.P.
	2	0.0	0.0	0	0.0	0.0	0	
	S-total	0.6	0.1		0.7	0.1		
38.	1	1.0	0.1	0	1.0	0.1	0	R69 B.P.
	2	0.0	0.0	0	0.0	0.0	0	
	S-total	1.0	0.1		1.0	0.1		

Remarks; C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 67 PROJECTEC BOD LOAD IN 1990 AND 2000 FOR CASE 2 (10/10)

Basin No.	Outlet No.	1990			2000			Pollution Sources
		BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	BOD Load from Pollution Sources (ton/d)	BOD Load into Main Stream (ton/d)	BOD Concentration (mg/lit)	
39.	1	1.3	0.8	5	2.8	1.7	11	C57
	2	0.4	0.0	4	0.4	0.0	8	B.P., R75
	3	0.6	0.4	-	1.2	0.7	-	C56
	4	1.1	0.1	-	1.6	0.2	-	R74
S-total		3.5	1.3		6.0	2.6		
40.	1	8.2	4.9	1	5.5	3.3	0	C135, P130*
	2	1.5	0.4	0	2.1	0.5	0	R70, P131
	3	1.9	1.2	0	5.2	3.1	0	C133, P132, RF202*, RF203*, RF206*
	4	0.0	0.0	0	0.1	0.1	0	RF204*
	5	3.6	1.4	0	6.2	2.7	0	C54, R72, R73, RF205
	6	0.0	0.0	0	0.0	0.0	0	B.P.
	7	0.5	0.0	-	0.7	0.1	-	R76
	8	0.8	0.4	-	1.5	0.8	-	C58, C134, R75
	9	(14.5)	-	-	(28.3)	-	-	C55, R77, RF201*
S-total		16.6	8.4		21.3	10.6		
Total		1,051.3	480.0		1,244.5	543.0		

Remarks: C: City, R: Rural, P: Palm oil mill, RF: Rubber factory
A: Animal husbandry, *: P and RF with purification facilities
B.P.: Balance point, (): BOD load discharged to the sea directly

Table 68 WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF PALM OIL MILLS (1/5)

Basin No.	Palm Oil Mill No.	Water Demand ($10^3 \text{ m}^3/\text{y}$)					Remarks
		1980	1985	1990	1995	2000	
5	1	29	48	48	48	60	with P.S.
6	2	3	12	12	12	40	with P.S.
	3	5	23	24	24	80	with P.S.
	4	1	24	25	25	40	L.D. with P.S.
8	5	3	12	12	12	40	N.A.
	6	20	48	52	52	80	N.A.
9	7	20	48	52	52	80	with P.S.
	8	28	72	77	77	120	with P.S.
	9	4	19	31	31	60	with P.S.
	10	12	52	83	84	160	L.D. with P.S.
	11	6	27	42	42	80	with P.S.
	12	6	27	42	42	80	with P.S.
10	13	18	34	34	34	60	without P.S.
	14	45	88	91	91	160	N.A.
	15	6	12	12	12	20	N.A.
	16	18	34	34	34	60	with P.S.
	17	45	88	91	91	160	with P.S.
	18	24	45	45	45	80	with P.S.
	19	35	68	68	68	120	with P.S.
	20	6	12	12	12	20	with P.S.
	21	12	23	23	23	40	with P.S.
	22	12	23	23	23	40	with P.S.
	23	12	23	23	23	40	N.A.
	24	24	45	45	45	80	with P.S.
	25	5	42	56	56	60	with P.S.
11	26	20	40	43	43	60	with P.S.
	27	39	80	85	85	120	with P.S.
	28	50	104	112	112	160	with P.S.
	29	145	160	160	160	160	N.A.
	30	145	160	160	160	160	N.A.

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 69 WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF PALM OIL MILLS (2/5)

Basin No.	Palm Oil Mill No.	Water Demand (10^3 m ³ /y)					Remarks
		1980	1985	1990	1995	2000	
13	31	29	40	43	40	80	N.A.
	32	44	68	43	40	80	N.A.
	33	20	20	20	17	20	N.A.
14	34	43	60	64	60	120	N.A.
	35	43	60	64	60	120	N.A.
	36	56	78	84	80	200	N.A.
	37	43	60	64	60	120	L.D.
	38	39	40	43	40	80	N.A.
15	39	39	40	40	40	40	N.A.
	40	193	200	200	200	240	N.A.
16	41	48	68	72	68	160	N.A.
	42	48	68	72	68	160	N.A.
	43	25	54	61	53	80	with P.S.
	44	48	105	113	104	160	with P.S.
	45	7	9	10	9	40	L.D.
	46	16	12	21	19	120	L.D. with P.S.
17	47	36	82	89	80	120	with P.S.
	48	13	19	20	19	80	N.A.
	49	20	28	29	28	120	with P.S.
	50	7	9	10	9	40	N.A.
	51	13	19	20	19	80	with P.S.
	52	36	51	54	52	120	L.D.
	53	17	55	80	80	80	L.D.
18	54	32	108	160	160	160	L.D. with P.S.
	55	40	92	120	120	120	N.A.
	56	18	37	38	38	48	with P.S.
20	57	31	48	48	48	48	L.D.
21	58	56	80	80	80	80	N.A.
	59	4	6	44	105	120	with P.S.
	60	4	7	44	106	120	with P.S.
	61	77	139	139	139	320	N.A.
	62	56	80	80	80	80	with P.S.

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 70 WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF PALM OIL MILLS (3/5)

Basin No.	Palm Oil Mill No.	Water Demand (10 ³ m ³ /y)					Remarks
		1980	1985	1990	1995	2000	
22	63	38	69	70	70	160	L.D. with P.S.
	64	77	139	139	139	320	with P.S.
	65	28	56	56	56	160	L.D.
	66	20	42	42	42	120	L.D. with P.S.
23	67	33	89	92	92	160	L.D. with P.S.
	68	69	96	96	96	160	with P.S.
	69	52	72	72	72	120	L.D. with P.S.
	70	87	120	120	120	200	with P.S.
	71	35	48	48	48	80	L.D. with P.S.
24	72	35	48	48	48	80	N.A.
	73	69	96	96	96	160	with P.S.
	74	66	178	180	180	320	L.D.
	75	69	96	96	96	160	with P.S.
	76	69	96	96	96	160	with P.S.
	77	104	144	144	144	240	with P.S.
	78	52	72	72	72	120	N.A.
	79	87	120	120	120	200	L.D. with P.S.
	80	69	96	96	96	160	with P.S.
	81	139	192	192	192	320	N.A.
82	35	48	48	48	80	N.A.	
25	N-1	-	-	-	-	160	without P.S.
27	83	41	112	115	115	200	L.D. with P.S.
	84	8	23	24	24	40	with P.S.
	85	25	67	69	69	120	N.A.
	86	8	23	24	24	40	L.D.
	87	17	44	46	46	80	with P.S.
	88	17	44	46	46	80	L.D. with P.S.
	89	8	23	24	24	40	L.D. with P.S.

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 71 WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF PALM OIL MILLS (4/5)

Basin No.	Palm Oil Mill No.	Water Demand (10 ³ m ³ /y)					Remarks
		1980	1985	1990	1995	2000	
27	90	17	44	46	46	80	N.A.
	91	8	23	24	24	40	with P.S.
	92	41	112	115	115	200	N.A.
	93	17	44	46	46	80	with P.S.
28	94	111	119	119	119	120	L.D.
	95	78	80	80	80	80	L.D.
	96	111	119	119	119	120	L.D.
	97	111	120	120	120	120	with P.S.
30	98	52	116	120	120	120	L.D. with P.S.
	99	69	153	160	160	160	with P.S.
	100	18	40	40	40	40	L.D. with P.S.
	101	37	56	56	56	80	L.D. with P.S.
	102	146	146	146	146	200	with P.S.
	103	200	200	200	200	200	with P.S.
	104	95	144	144	144	200	L.D.
	105	80	80	80	80	80	N.A.
	106	72	111	111	111	160	with P.S.
	107	37	56	56	56	80	L.D.
	108	95	144	144	144	200	with P.S.
	109	37	56	56	56	80	with P.S.
	110	70	160	160	160	160	N.A.
	111	52	120	120	120	120	with P.S.
	112	160	160	160	160	160	with P.S.
	N-2	-	240	240	240	240	without P.S.
113	35	80	80	80	80	L.D. with P.S.	
114	52	80	80	80	80	N.A.	
115	40	40	40	40	40	L.D.	
116	26	40	40	40	40	with P.S.	
117	80	80	80	80	80	L.D.	
N-3	-	80	80	80	80	without P.S.	
118	110	167	178	178	240	with P.S.	
119	95	144	159	159	200	with P.S.	
120	88	200	200	200	200	with P.S.	
121	120	219	219	219	240	with P.S.	
122	85	85	85	85	120	with P.S.	

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 72 WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF PALM OIL MILLS (5/5)

Basin No.	Palm Oil Mill No.	Water Demand (10 ³ m ³ /y)					Remarks
		1980	1985	1990	1995	2000	
31	123	135	146	146	146	160	with P.S. L.D. with P.S.
	124	100	109	109	109	120	
32	125	148	320	320	320	320	N.A.
	N-4	-	89	96	96	120	N.A.
	126	60	60	60	72	80	N.A.
34	127	28	80	80	80	80	with P.S.
	N-5	-	116	116	116	120	N.A.
35	128	76	80	80	80	80	with P.S.
36	129	97	120	120	120	120	with P.S.
	N-6	-	53	53	53	80	N.A.
40	130	3	122	164	164	180	with P.S.
	131	4	9	9	9	24	N.A.
	132	9	17	17	17	48	N.A.
41	133	86	100	100	100	120	with P.S.

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 73 WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF RUBBER FACTORIES (1/7)

Basin No.	Rubber Factory No.	Water Demand (10^3 m ³ /y)					Remarks
		1980	1985	1990	1995	2000	
3	1	46	51	56	66	77	without P.S.
	2	93	102	112	133	153	without P.S.
4	3	56	62	68	81	95	with P.S.
	4	56	62	68	81	95	with P.S.
	5	19	21	23	27	32	without P.S.
	6	356	394	432	521	610	N.A.
	7	185	205	225	272	318	with P.S.
	8	370	410	450	544	637	with P.S.
5	9	178	197	216	261	305	with P.S.
	10	25	29	30	39	44	with P.S.
	11	137	158	179	217	255	N.A.
	12	73	84	95	115	135	L.D.
	13	205	237	269	325	382	with P.S.
	14	123	142	162	195	229	with P.S.
	15	123	142	162	195	229	with P.S.
	16	294	340	386	466	547	with P.S.
	17	171	198	224	271	318	without P.S.
	18	123	142	162	195	229	N.A.
	19	70	81	92	111	130	with P.S.
	20	62	71	81	98	115	without P.S.
	21	37	43	49	59	69	with P.S.
	22	103	119	135	163	191	with P.S.
6	23	171	176	180	267	353	with P.S.
	24	148	152	157	230	305	L.D.
	25	400	411	422	624	825	without P.S.
	26	160	164	169	249	330	with P.S.
	27	111	114	117	173	229	with P.S.
	28	27	28	29	42	56	with P.S.
	29	89	91	93	138	183	with P.S.
	30	68	69	71	106	140	with P.S.
	31	615	632	649	959	1,270	with P.S.
	32	105	107	110	163	216	without P.S.
	33	31	32	32	48	63	with P.S.
	34	18	18	19	28	37	without P.S.
	35	9	12	12	20	26	with P.S.
	36	34	35	36	53	70	with P.S.

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 74 WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF RUBBER FACTORIES (2/7)

Basin No.	Rubber Factory No.	Water Demand (10 ³ m ³ /y)					Remarks
		1980	1985	1990	1995	2000	
7	37	741	821	902	1,087	1,271	without P.S.
8	38	119	131	143	173	204	with P.S.
	39	119	131	143	173	204	with P.S.
	40	259	286	313	380	446	without P.S.
9	41	37	41	44	53	62	without P.S.
	42	178	197	216	261	305	with P.S.
	43	119	131	144	174	204	without P.S.
	44	301	333	365	441	517	with P.S.
	45	81	89	98	118	139	with P.S.
	46	70	77	84	102	120	without P.S.
	47	44	49	54	65	76	with P.S.
	48	119	131	144	174	204	without P.S.
	49	59	66	72	87	102	without P.S.
	50	216	239	262	316	370	N.A.
	51	59	66	72	87	102	without P.S.
10	52	173	177	180	217	255	without P.S.
	53	242	247	252	304	356	without P.S.
	54	173	177	180	217	255	with P.S.
	55	173	177	180	217	255	without P.S.
	56	130	132	135	163	191	with P.S.
	57	346	353	360	435	509	without P.S.
	58	234	238	243	293	344	without P.S.
	59	32	33	34	41	48	with P.S.
	60	113	115	117	141	165	with P.S.
	61	21	21	22	28	31	with P.S.
	62	104	106	108	130	153	L.D.
	63	299	305	310	375	439	without P.S.
	64	113	115	117	141	165	with P.S.
	65	52	53	54	65	76	without P.S.
	11	66	30	33	36	43	51
67		81	90	99	119	139	with P.S.
13	68	65	72	79	95	112	with P.S.
	69	121	133	146	177	208	with P.S.
	70	52	57	63	76	89	with P.S.
	71	12	14	15	19	22	L.D.

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 75 WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF RUBBER FACTORIES (3/7)

Basin No.	Rubber Factory No.	Water Demand ($10^3 \text{ m}^3/\text{y}$)					Remarks
		1980	1985	1990	1995	2000	
14	72	43	45	47	50	53	without P.S.
	73	281	294	307	324	341	with P.S.
	74	19	20	21	21	22	L.D.
15	75	74	78	81	86	90	with P.S.
	76	217	227	238	251	264	with P.S.
	77	593	621	649	685	721	without P.S.
	78	36	38	41	41	46	with P.S.
	79	193	202	211	223	234	with P.S.
	80	104	109	114	120	126	without P.S.
	81	89	93	97	103	108	with P.S.
	82	593	621	649	685	721	with P.S.
	83	207	217	227	240	252	without P.S.
	84	170	178	187	197	207	with P.S.
	85	80	84	88	92	97	with P.S.
16	86	177	178	178	188	198	without P.S.
	87	76	76	76	81	85	with P.S.
	88	193	194	194	205	216	with P.S.
	89	64	64	64	68	72	without P.S.
	90	80	80	81	85	90	without P.S.
	91	20	20	20	20	21	with P.S.
	92	109	109	110	115	121	with P.S.
	93	39	39	39	41	43	with P.S.
	94	56	56	56	60	63	with P.S.
17	95	156	165	174	183	193	with P.S.
	96	39	41	43	46	48	without P.S.

Remarks; P.S.: Purification system
L.S.: Land disposal
N.A.: Not available

Table 76. WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF RUBBER FACTORIES (4/7)

Basin No.	Rubber Factory No.	Water Demand (10^3 m ³ /y)					Remarks
		1980	1985	1990	1995	2000	
18	97	85	89	93	98	103	without P.S.
	98	111	116	121	128	135	with P.S.
	99	505	528	552	580	613	L.D.
	100	152	159	166	176	185	with P.S.
	101	177	186	194	205	215	without P.S.
	102	37	39	40	43	45	with P.S.
	103	37	39	40	43	45	with P.S.
	104	237	247	258	273	287	without P.S.
	105	221	232	242	256	269	without P.S.
	106	30	31	33	34	35	with P.S.
	107	58	61	64	67	71	with P.S.
	108	52	54	57	60	63	with P.S.
	109	48	50	53	55	58	with P.S.
	110	74	77	81	85	90	L.D.
111	37	39	40	43	45	with P.S.	
19	112	408	427	446	470	495	without P.S.
	113	45	47	50	52	55	with P.S.
	114	-	-	-	-	-	N.A.
	115	326	341	356	376	396	without P.S.
	116	-	-	-	-	-	N.A.
	117	133	139	145	153	161	with P.S.
	118	148	155	162	171	180	with P.S.
	119	163	171	178	188	198	with P.S.
	120	37	39	41	43	45	N.A.
	121	33	34	34	38	40	with P.S.
	122	556	582	608	641	675	with P.S.
	123	114	119	125	132	139	with P.S.
	124	481	503	526	555	584	L.D.
	20	125	15	16	17	18	19
126		9	10	11	11	12	with P.S.
127		230	243	257	272	286	without P.S.
128		36	38	40	42	44	with P.S.

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 77 WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF RUBBER FACTORIES (5/7)

Basin No.	Rubber Factory No.	Water Demand (10^3 m ³ /y)					Remarks
		1980	1985	1990	1995	2000	
21	129	33	36	38	41	43	with P.S.
	130	10	10	12	12	12	with P.S.
	131	147	158	169	178	188	with P.S.
	132	67	72	77	81	85	without P.S.
	133	62	67	71	75	79	with P.S.
	134	41	44	48	50	53	with P.S.
	135	168	181	193	204	215	with P.S.
	136	173	186	200	211	222	with P.S.
	137	187	201	215	227	239	without P.S.
	138	240	258	276	292	307	without P.S.
	139	210	226	242	255	269	without P.S.
	140	157	169	180	190	200	without P.S.
	141	79	85	91	96	101	with P.S.
	142	287	308	330	347	366	without P.S.
	143	21	22	24	25	26	without P.S.
	144	125	135	144	152	160	with P.S.
	145	53	57	61	65	68	with P.S.
	146	33	36	38	41	43	without P.S.
147	100	108	115	122	128	with P.S.	
148	205	220	236	249	262	without P.S.	
22	149	62	67	72	76	80	without P.S.
	150	56	60	65	68	72	without P.S.
	151	22	23	25	27	28	with P.S.
	152	37	40	43	46	48	with P.S.
	153	11	14	15	15	16	with P.S.
	154	14	15	16	17	18	with P.S.
	155	46	50	54	57	60	with P.S.
	156	250	271	292	308	324	with P.S.

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 78

WATER DEMAND PROJECTION AND PURIFICATION
SYSTEM OF RUBBER FACTORIES (6/7)

Basin No.	Rubber Factory No.	Water Demand (10^3 m ³ /y)					Remarks
		1980	1985	1990	1995	2000	
23	157	91	99	107	112	118	with P.S.
	158	205	222	240	253	266	with P.S.
	159	38	41	44	47	49	without P.S.
	160	83	91	98	103	108	with P.S.
	161	152	165	178	187	197	with P.S.
	162	211	229	247	261	274	with P.S.
	163	227	247	266	281	296	without P.S.
	164	30	32	34	39	42	with P.S.
	165	45	49	53	56	59	with P.S.
	166	45	49	53	56	59	without P.S.
24	167	205	222	240	253	266	with P.S.
	168	152	165	178	187	197	with P.S.
	169	14	15	16	17	18	with P.S.
	170	22	24	26	28	29	with P.S.
	171	47	51	54	57	60	with P.S.
	172	14	15	16	17	18	L.D.
	173	71	77	83	87	92	without P.S.
	174	15	16	17	18	19	with P.S.
27	175	9	9	11	12	12	with P.S.
	176	321	348	375	395	416	without P.S.
	177	358	388	419	442	466	with P.S.
	178	155	168	181	191	201	L.D.
	179	108	220	126	133	140	with P.S.

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 79 WATER DEMAND PROJECTION AND PURIFICATION SYSTEM OF RUBBER FACTORIES (7/7)

Basin No.	Rubber Factory No.	Water Demand ($10^3 \text{ m}^3/\text{y}$)					Remarks
		1980	1985	1990	1995	2000	
30	180	53	62	72	101	130	with P.S.
	181	263	311	359	504	648	N.A.
	182	22	26	30	42	54	with P.S.
	183	24	28	32	45	58	with P.S.
	184	30	35	41	57	74	with P.S.
	185	63	75	86	121	155	with P.S.
	186	37	44	50	71	91	with P.S.
	187	100	118	137	191	246	with P.S.
	188	24	28	32	45	58	with P.S.
	189	158	187	216	302	389	with P.S.
	190	17	22	27	37	49	with P.S.
	191	110	131	151	212	272	without P.S.
	192	45	53	61	86	110	with P.S.
	193	79	93	108	151	194	without P.S.
	194	105	124	144	201	259	with P.S.
195	42	50	57	81	104	with P.S.	
31	196	215	258	301	432	564	without P.S.
	197	56	68	79	113	146	with P.S.
	198	220	263	307	441	575	N.A.
36	199	153	169	186	222	259	without P.S.
39	200	74	82	91	109	128	with P.S.
40	201	142	157	173	207	242	with P.S.
	202	14	16	18	21	25	with P.S.
	203	7	7	7	10	10	with P.S.
	204	14	16	18	21	25	with P.S.
	205	93	103	113	135	158	without P.S.
	206	9	10	11	13	15	with P.S.

Remarks; P.S.: Purification system
L.D.: Land disposal
N.A.: Not available

Table 80 PROJECTION OF PIG PRODUCTION (1/2)

Animal Husbandry No.	City/Town	Basin No.	Number of Pigs (head)		
			1980	1990	2000
1	Bertam	5	8,960	11,300	13,600
2	Tasek Gelugor	6	30,100	37,900	45,900
3	Bagan Ajam Bagan Jermal	6	8,980	11,300	13,700
4	Machang Bubok	6	7,830	9,850	11,900
5	Bukit Tengah	6	7,690	9,680	11,700
6	Bukit Taubun	6	27,800	34,900	42,300
7	Sungei Bakap	6	12,000	15,200	18,300
8	Telok Bahang	7	10,500	13,200	16,000
9	Tanjong Bunga	7	5,020	6,310	3,070
10	Paya Terubong	7	17,900	22,500	27,300
11	Sungei Nibong	7	18,100	22,800	27,600
12	Bayau Lepas	7	37,900	47,700	57,800
13	Parit Buntar	8	5,740	7,220	8,560
14	Sungei Acheh	8	5,990	7,530	9,110
15	Kerian	9	22,900	28,800	34,800
16	Taipung/Larut Matang/Selama	9	55,500	69,800	84,200
17	Dinding Lumut	9	11,700	14,700	17,800
18	Sitiawan	9	2,110	2,650	3,150
19	Kuala Kangsar	10	5,620	11,500	14,000
20	Kinta	10	219,000	275,000	333,000
21	Kampar	10	6,150	7,740	9,180
22	Tapah/Batang Padang	10	27,900	35,200	42,100
23	Telok Anson	10	3,760	4,730	5,610
24	Sabak Bernam	11	14,800	18,600	22,500
25	Ulu Selangor	13	4,010	5,050	6,110
26	Kuala Selangor	13	1,730	2,170	2,630
27	Sungei Buluh	14	87,800	111,000	134,000
28	Gombak	15	31,100	39,100	47,400
29	K.L.	15	10,800	13,600	16,500

Table 81 PROJECTION OF PIG PRODUCTION (2/2)

Animal Husbandry No.	City/Town	Basin No.	Number of Pigs (head)		
			1980	1990	2000
30	Kelang	15	3,590	4,530	5,480
31	Ulu Langat	16	3,740	4,710	5,700
32	Kuala Langat	16	47,700	60,000	72,700
33	Sepang	17	16,100	20,200	24,400
34	Jimah	17	164,000	207,000	245,000
35	Port Dickson	17	3,660	4,610	5,460
36	Seremban	18	39,000	49,100	58,200
37	Linggi	18	2,130	2,680	3,180
38	Tampin	19	3,030	3,810	4,520
39	Kuala Pilah	21	1,500	1,890	2,240
40	Segamat	21	6,150	7,730	9,170
41	Muar	21	16,300	20,600	24,400
42	Batu Pahat	22	29,800	37,500	44,500
43	Pontian Kechil	23	35,400	44,600	52,900
44	Johor Bahru	23	31,600	39,800	47,200
45	Kota Tinggi	24	4,540	5,710	6,770
46	Keluang	27	2,430	3,050	3,620
47	Jelebu	30	1,110	1,390	1,650
48	Kuala Trengganu	36	1,750	2,200	2,610

Table 82 ASSUMED DEVELOPMENT OF SEPTIC TANK
IN URBAN AREA

Pollution Source	Unit: %		
	1980	1990	2000
Septic tank	20	35	50
Others	80	65	50

Table 83 ASSUMED BOD CONCENTRATION OF
NON-SEWERAGE-URBAN-DOMESTIC

Pollution Source	NUPL	Unit: mg/lit		
		1980	1990	2000
Septic tank	80	16	28	40
Others	200	160	130	100
Non sewerage urban domestic		180	160	140

Table 84 NUPL BY CLASSIFICATION OF MANUFACTURING AND CUSTOMER WATER DEMAND BY STATE

Classification of Manufacturing	NUPL (mg/lit)	Customer Water Demand (10^6 m ³ /y)							
		Perlis/Kedah/ P. Pinang		Perak		Selangor		N. Sembilan/ Melaka	
		1990	2000	1990	2000	1990	2000	1990	2000
Food	250	29.6	49.3	21.6	21.8	70.3	53.7	9.1	8.8
Textile	400	17.0	14.6	16.7	23.4	10.9	11.7	0.4	0.5
Wood Product	610	0.7	1.2	0.7	0.5	0.9	0.6	0.8	0.6
Paper Product	150	11.0	11.0	1.0	4.0	50.8	50.8	0.2	0.6
Publishing	150	1.2	3.0	0.4	1.5	7.2	22.4	0.2	0.5
Chemicals	160	38.3	82.4	57.7	173.4	112.3	112.3	37.1	54.1
Rubber	10	16.7	60.7	14.0	27.0	19.5	28.7	12.8	24.1
Non-metal	10	1.8	5.5	16.9	37.7	17.6	30.1	2.4	5.4
Basic Metal	10	13.6	28.4	4.7	15.9	9.3	23.8	0.5	1.7
Machinery	10	21.5	46.0	5.3	2.2	48.9	122.3	3.8	11.8
Miscellaneous	350	0.0	0.0	0.6	0.1	0.5	1.0	12.3	31.8

Classification of Manufacturing	NUPL (mg/lit)	Customer Water Demand (10^6 m ³ /y)							
		Johor		Pahang		Trengganu		Kelantan	
		1990	2000	1990	2000	1990	2000	1990	2000
Food	250	41.8	48.1	35.7	65.9	4.6	9.4	5.9	14.5
Textile	400	22.1	35.5	0.0	0.1	0.5	1.4	1.0	3.5
Wood Product	610	1.4	1.2	7.6	11.0	0.5	0.8	0.4	0.8
Paper Product	150	13.6	13.6	0.0	0.0	0.0	0.0	0.0	0.0
Publishing	150	0.5	2.1	0.2	1.5	0.0	0.1	0.2	1.8
Chemicals	160	22.1	22.1	9.5	50.9	8.4	58.7	12.8	99.7
Rubber	10	32.2	71.1	15.6	55.5	0.8	3.1	4.1	19.3
Non-metal	10	2.8	7.2	3.8	15.6	0.2	0.7	0.1	0.6
Basic Metal	10	0.1	0.4	0.0	0.0	4.3	16.6	0.0	0.0
Machinery	10	12.8	50.6	2.4	13.8	0.4	2.5	0.3	2.1
Miscellaneous	350	0.6	1.7	0.0	0.1	0.0	0.2	0.0	0.2

Table 85. NUPL OF INDUSTRIAL EFFLUENT BY STATE

State	BOD Concentration (mg/lit)	
	1990	2000
Kedah/Perlis	155	120
P. Pinang	155	120
Perak	165	145
Selangor	145	110
N. Sembilan	185	195
Melaka	120	110
Johor	180	140
Pahang	205	155
Trengganu	155	140
Kelangan	170	155

Table 86 ASSUMED DISCHARGE RATIO, RUNOFF RATIO, INFILTRATION RATIO AND BOD CONCENTRATION OF EFFLUENT ASSUMED UNDER PRESENT PURIFICATION LEVEL

Pollution Source	Year	Discharge Ratio	NUPL (mg/lit)	Runoff Ratio	Infiltration Ratio
Domestic					
Urban sewerage	1990 & 2000	0.9	30	1.0	0.2
Urban non-sewerage	1990	0.9	160	0.6	0
	2000	0.9	140	0.6	0
Rural	1990 & 2000	0.8	200	0.1	0
Manufacture					
Urban sewerage	1990 & 2000	1.0	30	1.0	0.2
Urban non-sewerage	1990 & 2000	1.0		0.6	0
Rural	1990 & 2000	1.0	<u>/3</u>	0.1	0
Palm Oil Mill					
With P.S.	1990	0.55	50	0.6	0
	2000	0.3	50	0.6	0
Without P.S. <u>/1</u>	1990	0.55	22,000	0.6	0
	2000	0.3	22,000	0.6	0
Land disposal	1990	0.1	50	0.6	0
	2000	0.1	50	0.6	0
Rubber Factories					
With P.S.	1990	0.9	50	0.6	0
	2000	0.8	50	0.6	0
Without P.S.	1990	0.9	2,320	0.6	0
	2000	0.8	2,320	0.6	0
Land disposal	1990	0.1	50	0.6	0
	2000	0.1	50	0.6	0
Animal Husbandry	1990 & 2000	1.0	200 <u>/2</u>	0.1	0

Remarks; /1: Purification System, /2: g/d/head, /3: See Table 21

Table 87 ASSUMED DEVELOPMENT OF LAND DISPOSAL IN PALM OIL MILLS AND RUBBER FACTORIES

	1980	1990	2000
Palm oil mills	25	50	75
Rubber factories	0	10	20

Unit: %

Table 88 ASSUMED DISCHARGE RATIO OF PALM OIL MILLS AND RUBBER FACTORIES

	1980	1990	2000
Palm Oil Mills			
Surface runoff ratio of land disposal area	0.25 x 0.1	0.5 x 0.1	0.75 x 0.1
Discharge ratio of palm oil mills	0.75	0.5	0.25
Runoff ratio	0.8	0.55	0.3
Rubber Factories			
Surface runoff ratio of land disposal area	0 x 0.1	0.1 x 0.1	0.2 x 0.1
Discharge ratio of rubber factories	1.0	0.9	0.8
Runoff ratio	1.0	0.9	0.8

Table 89 RESIDUAL PURIFICATION RATIO BY BASIN

Basin No.	RP Ratio	Basin No.	RP Ratio	Basin No.	RP Ratio	Basin No.	RP Ratio
1	0.7	11	0.7	21	0.7	31	0.7
2	0.7	12	0.7	22	0.7	32	0.7
3	0.9	13	0.7	23	0.7	33	0.7
4	0.9	14	0.9	24	0.7	34	0.7
5	0.7	15	0.8	25	0.7	35	0.7
6	0.9	16	0.8	26	0.7	36	0.7
7	0.7	17	0.7	27	0.8	37	0.7
8	0.7	18	0.9	28	0.7	38	0.7
9	0.7	19	0.7	29	0.7	39	0.7
10	0.8	20	0.7	30	0.7	40	0.7
						41	0.7

Table 90 EFFECTIVE CATCHMENT AREA AND RIVER MINIMUM MAINTENANCE FLOW FOR WATER QUALITY

Basin No.	Effective Catchment Area for Water Quality (km ²)	Minimum Maintenance Flow at Balance Point Q 97%	
		(m ³ /s)	(10 ⁻³ m ³ /s/km ²)
1	550	2.34	4.25
2	-	-	6.54
3	2,510	14.26	5.68
4	340	2.14	6.29
5	4,200	27.97	6.66
6	400	2.99	7.48
7	-	-	7.09
8	1,360	7.77	7.51
9	451	3.39	6.79
10	13,555	52.19	3.85
11	2,170	14.52	6.69
12	420	3.40	8.10
13	1,685	19.61	11.64
14	240	1.77	7.38
15	1,100	10.04	9.13
16	1,800	15.75	8.75
17	18	0.15	8.45
18	1,170	2.21	1.89
19	615	0.95	1.54
20	675	0.78	1.15
21	5,840	7.77	1.33
22	2,025	4.03	1.99
23	220	1.42	6.44
24	2,490	14.09	5.66
25	1,300	8.48	6.52
26	290	2.35	8.12
27	4,350	30.15	6.93
28	3,500	18.76	5.36
29	370	2.70	7.29
30	2,770	143.21	5.17
31	1,635	11.58	7.08
32	1,755	18.02	10.27
33	815	7.39	9.07
34	1,760	20.63	11.72
35	445	5.52	12.41
36	4,600	61.50	13.37
37	418	4.79	11.46
38	770	8.64	11.22
39	118	1.81	15.37
40	12,600	164.43	13.05
41	-	-	-

Table 91 STANDARD RELATING TO LIVING ENVIRONMENT
FOR RIVERS IN JAPAN

Category	Purpose of Utilization	Standard Values ^{/1}				
		pH	BOD (mg/lit)	SS (mg/lit)	DO (mg/lit)	Number of Coliform Groups (NPN/0.1 lit)
AA	Water supply, class 1; conservation of natural environment & uses listed in A-E	6.5-8.5	1 or less	25 or less	7.5 or more	50 or less
A	Water supply, class 2; fishery, class 1; bathing & uses listed in B-E	6.5-8.5	2 or less	25 or less	7.5 or more	1,000 or less
B	Water supply, class 3; fishery, class 2, & uses listed in C-E	6.5-8.5	3 or less	25 or less	5 or more	5,000 or less
C	Fishery, class 3; industrial water, class 1, & uses listed in D-E	6.5-8.5	5 or less	50 or less	5 or more	
D	Industrial water, class 2; agricultural water ^{/2} , & uses listed in E	6.0-8.5	8 or less	100 or less	2 or more	
E	Industrial water, class 3; conservation of environment	6.0-8.5	10 or less	Floating matter such as garbage should not be observed.	2 or more	

Remarks; ^{/1}: The standard value is based on the daily average value.
(The same applies to the standard values of lakes and coastal waters.)
^{/2}: At the point of abstraction for agriculture, pH shall be between 6.0 and 7.5 and dissolved oxygen shall not be less than 5 mg/lit.

(The same applies to the standard values of lakes.)

1. Conservation of natural environment: Conservation of scenic spots and other natural resources.
2. Water supply, class 1: Water treated by simply cleaning operation, such as filtration.
Water supply, class 2: Water treated by normal cleaning operation such as sedimentation and filtration.
Water supply, class 3: Water treated through a highly sophisticated cleaning operation including pretreatment.
3. Fishery, class 1: For aquatic life such as trout and bull trout inhabiting oligosaprobic water, and those of fishery class 2 & class 3.
Fishery, class 2: For aquatic life, such as the salmon family and sweetfish inhabiting oligosaprobic water and those of fishery class 3.
Fishery, class 3: For aquatic life such as carp and silver carp inhabiting B-mesosaprobic water.
4. Industrial water, class 1: Water given normal cleaning treatment such as sedimentation.
Industrial water, class 2: Water given sophisticated treatment by chemicals.
Industrial water, class 3: Water given special cleaning treatment.
5. Conservation of environment: Up to the limits at which no unpleasantness is caused to people in their daily life (including a walk by the riverside, etc.).

Source; Ref. 37

Table 92 WATER QUALITY CRITERIA FOR FRESH SURFACE WATER PROPOSED BY THE NATIONAL POLLUTION CONTROL COMMISSION IN PHILIPPINES

Classification	Purpose of Utilization	Standard Values			
		pH	BOD mg/lit	DO mg/lit	Coliform MPN/100 mlit
AA	Domestic Water Supply ^{/1}	7-8.5	-	-	50 or less
A	Domestic Water Supply ^{/2}	6.5-8.5	5 or less	5 or more	500 or less
B	Bathing	6.5-8.5	10 or less	5 or more	1,000 or less
C	Fishing	6.5-8.5	15 or less	5 or more	5,000 or less
D	Agricultural and Industrial Water Supply	6.0-8.5	-	3 or more	-

Remarks; /1: Domestic water supply: Water from watersheds which are uninhabited and otherwise protected and can be used for water supply with limited treatment.

/2: Domestic water supply: A conventional treatment is necessary for water supply use of these waters.

Source; Refs. 38

Table 93 PRESENT BOD₃ CONCENTRATION LIMITS FOR
WATERCOURSE DISCHARGE FOR PALM OIL MILLS
AND RUBBER FACTORIES

Unit: mg/lit

Year	Palm Oil Mill	SMR & Conventional Grade Factory	Latex Concentration Factory
1978	5,000	-	-
1979	2,000	300	-
1980	1,000	200	450
1981	1,000 - 500	100 (50)*	300
1982	500 - 250	-	200
1983	250	-	100 (50)*

Remarks; *: This additional limit is the arithmetic mean value determined on the basis of a minimum of four samples taken at least once a week for four weeks consecutively.

Source; Refs. 12, 13

Table 94 BREAKDOWN OF CONSTRUCTION COST OF
PUBLIC SEWERAGE SYSTEMS FOR BUTTERWORTH
AND BUKIT MERTAJAM

	Cost (M\$106)	Share (%)
Trunk Sewer	166	27
Pumping Facilities	5	1
Treatment Facilities	50	8
Land	45	7
Sub-total	266	44
Branch Sewer	281	46
House Connection Pipe	62	10
Sub-total	343	56
Total	609	100

Remarks; (1): At 1976 price
(2): Excluding engineering cost and physical contingency.

Source; Ref. 40

Table 95 ASSUMED UNIT CONSTRUCTION COST FOR
WATER POLLUTION ABATEMENT FACILITIES

Item	Public Sewerage Systems	Purification Facilities			Unit; M\$10 ⁶ /10 ³ m ³ /d Pretreatment Facilities	
		Palm	Rubber	1990&2000	Primary	Secondary
		1990	2000		Pretreatment	Pretreatment
Direct Const. Cost	105.3	2.5	2.25	0.96	26.7	78.6
Land Acquisition	5.3	-	-	-	-	-
Engineering	10.5	0.25	0.23	0.10	2.67	7.86
Sub-total	121.1	2.75	2.48	1.06	29.37	86.46
Physical Contingency	36.3	0.85	0.72	0.34	8.83	25.94
Total	157.4	3.6	3.2	1.4	38.2	112.4