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**MALAYSIA
ENVIRONMENTAL
QUALITY REPORT
1996**



**Department of Environment
Ministry of Science,
Technology and the Environment
Malaysia**

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MALAYSIA

Environmental

Quality Report

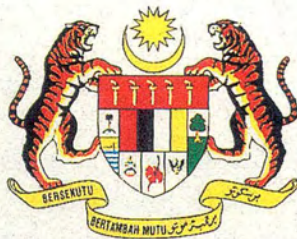
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MALAYSIA

Environmental

Quality Report

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**Department of Environment
Ministry of Science,
Technology and the
Environment
Malaysia**

Department of Environment, Malaysia

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Abbreviations

ADB	Asian Development Bank
AEY	ASEAN Environment Year
AMME	ASEAN Ministerial Meeting on the Environment
APO	Asian Productivity Organisation
ASEAN	Association of South East Asian Nations
ASOEN	ASEAN Senior Officials on the Environment
AWASI	Area Watch and Sanction Inspection
BAS	Branched Alkyl Benzene Sulphonates
BIMP	Brunei-Indonesia-Malaysia-Philippines
BOD	Biochemical Oxygen Demand
CETDEM	Centre for Environment, Technology and Development Malaysia
CFC	Chlorofluorocarbon (s)
CICM	Chemical Industries Council of Malaysia
COBSEA	Co-ordinating Body on the Seas of East Asia
COD	Chemical Oxygen Demand
COP	Conference of the Parties
CPO	Crude Palm Oil
db	decibel(s)
DOE	Department of Environment
DOKUMAS	Document Management System
DSE	German Foundation for International Development
EAGA	East ASEAN Growth Area
<i>E. coli</i>	<i>Escherichia coli</i>
EDSS	Environmental Decision Support System
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EPM	Environmental Protection Management
EPSM	Environmental Protection Society of Malaysia
EPU	Economic Planning Unit
EQA	Environmental Quality Act
EQR	Environmental Quality Report
EXCO	Executive Council
FLIR	Forward Looking Infrared Radar
FMM	Federation of Malaysian Manufacturers
FOMCA	Federation of Malaysian Consumers Association
FRTAM	Federation of the Rubber Trade Associations of Malaysia
GIS	Geographic Information System
HCFC	Hydro Chlorofluorocarbon (s)
HSU	Hartridge Smoke Unit (s)
INFOTERRA	International Referral System for Sources of Environmental Information
INTAN	National Institute of Public Administration
IPCS	International Programme on Chemical Safety
IRPTC	International Register of Potentially Toxic Chemicals
ISIS	Institute of Strategic and International Studies
JICA	Japan International Co-operation Agency
MAC	Mobile Air Conditioning
MASAAM	Motorcycles and Scooter Assemblers Association of Malaysia
MEW	Malaysia Environment Week



MEXCOE	Ministers and State Executive Councillors Responsible for Environmental Matters
MF	Multilateral Fund
MICCI	Malaysian International Chamber of Commerce and Industry
MISIF	Malaysian Iron and Steel Industry Federation
MFIC	Malaysian Furniture Industries Council
MITI	Ministry of International Trade and Industry
MMVAA	Malaysian Motor Vehicles Assemblers Association
MNS	Malaysian Nature Society
MOA	Ministry of Agriculture
MOH	Ministry of Health
MOHR	Ministry of Human Resources
MOMG	Malaysian Oleochemical Manufacturers Group
MOPGC	Malaysian Oil Palm Growers Council
MOSTE	Ministry of Science, Technology and the Environment
MOT	Ministry of Transport
MOU	Memorandum of Understanding
MRPC	Malaysian Rubber Producers Council
MSJCE	Malaysia-Singapore Joint Committee on the Environment
NAQMP	National Air Quality Monitoring Programme
NFP	National Focal Point
NGO	Non-Governmental Organisation
NH ₃ N	Ammoniacal Nitrogen
NPOE	National Policy on the Environment
NREB	Natural Resource and Environment Board
ODS	Ozone-Depleting Substance (s)
OECD	Organisation for Economic Co-operation and Development
OEWG	Open-Ended Working Group
PIC	Prior Informed Consent
PM	Particulate Matter
POMA	Palm Oil Millers Association
PORIM	Palm Oil Research Institute of Malaysia
RAC	Refrigerant Air Conditioning
RM	Ringgit Malaysia
RNR	Raw Natural Rubber
RRIM	Rubber Research Institute of Malaysia
SEAP	South East Asia Pacific
SMI	Small and Medium Industry
SOM	Senior Officials Meeting
SS	Suspended Solids
TSP	Total Suspended Particulate
UIA	Universiti Islam Antarabangsa (International Islamic University)
UKM	Universiti Kebangsaan Malaysia
ULG	Unleaded Gasoline
UM	Universiti Malaya
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UPM	Universiti Putra Malaysia
USM	Universiti Sains Malaysia
UTM	Universiti Teknologi Malaysia
UUM	Universiti Utara Malaysia
WHO	World Health Organisation
WQI	Water Quality Index
WWF	World Wide Fund for Nature

ANNEX

Proposed Interim National Water Quality Standard for Malaysia

PARAMETERS	CLASSES					
	I	IIA	IIB	III#	IV	V
Ammoniacal Nitrogen	0.1	0.3	0.3	0.9	2.7	2.7
BOD (mg/l)	1	3	3	6	12	12
COD (mg/l)	10	25	25	50	100	100
DO (mg/l)	7	5-7	5-7	3-5	3	1
pH	6.5-8.5	6.5-9.0	6.5-9.0	5-9	5-9	-
Colour (TUC)	15	150	150	-	-	-
Elec. Conductivity (µmhos/cm)**	1000	1000	-	-	6000	-
Floatables	NV	NV	NV	-	-	-
Odour	NOO	NOO	NOO	-	-	-
Salinity(%)**	0.5	1	-	-	2	-
Taste	NOT	NOT	NOT	-	-	-
Total Dissolved Solid (mg/l)	500	1000	-	-	4000	-
Total Suspended Solid (mg/l)	25	50	50	150	300	300
Temperature (C)	-	Normal 2	-	Normal 2	-	-
Turbidity (NTU)	5	50	50	-	-	-
Feacal Coliform (counts/100 ml)	10	100	400	5000 (20000) @	5000 (2000) @	-
Total Coliform (counts/100 ml)	100	5000	5000	5000	5000	5000
Al (mg/l)	-	-	-	0.056	0.5	-
As (mg/l)	N	0.05	NR	0.045 (0.44)	0.1	+
Ba (mg/l)	N	1	NR	-	-	+
Cd (mg/l)	N	0.005	NR	0.001 (0.011**)	0.01	+
Cr (IV) (mg/l)	N	0.05	NR	0.054 (1.45)	0.1	+
Cr (III) (mg/l)	N	-	NR	- (2.53)	-	+
Cu (mg/l)	N	1	NR	0.01 (0.012*)	0.2	+
Hardness (mg/l)	N	100	NR	-	-	+
Ca (mg/l)	N	-	NR	-	-	+
Mg (mg/l)	N	0.05	NR	-	-	+
Na (mg/l)	N	-	NR	-	3 SAR	+
K (mg/l)	N	-	NR	-	-	+
Fe (mg/l)	N	0.3	NR	1	1(Leaf) 5 (Others)	+
Pb (mg/l)	N	0.05	NR	0.01 (0.014*)	5 -	+
Mn (mg/l)	N	0.1	NR	0.1	0.2	+



PARAMETERS	CLASSES					
	I	IIA	IIB	III#	IV	V
Hg (mg/l)	N	0.001	NR	0.0001 (0.004)	0.002	+
Ni (mg/l)	N	0.05	NR	- (0.9*)	0.2	+
Se (mg/l)	N	0.01	NR	0.037 (0.25)	0.02	+
Ag (mg/l)	N	0.05	NR	- (0.0002)	-	+
Sn (mg/l)	N	NR	NR	0.05	-	+
U (mg/l)	N	NR	NR	-	-	+
Zn (mg/l)	N	5	NR	- (0.35)	2	+
B (mg/l)	N	1	NR	3.4	0.75	+
Cl (mg/l)	N	200	NR	-	79	+
C12 (mg/l)	N	-	NR	0.022	-	+
CN (mg/l)	N	00.2	NR	0.0023 (0.058)	-	+
F (mg/l)	N	1	NR	- (11)	1	+
NO3/NO2 (mg/l)	N	7/3	NR	0.028 (0.37)	5	+
P (mg/l)	N	0.1	NR	0.1	-	+
Silica (mg/l)	N	50	NR	-	-	+
SO ₄ (mg/l)	N	200	NR	-	-	+
S (mg/l)	N	0.05	NR	0.001	-	+
CO ₂ (mg/l)	N	-	NR	-	-	+
Gross- (Bql)	N	0.1	NR	-	-	+
Gross- (Bql)	N	1	NR	-	-	+
Ra-226 (Bql)	N	+0.1	NR	-	-	+
Sr-90 (Bql)	N	+0.1	NR	-	-	+
CCE (µg/l)	N	500	NR	-	-	+
MBAS/BAS (µgl)	N	500	NR	200	NR	+
O & G (Mineral) (mg/l)	N	40;NF	NR	NL	NR	+
O & G (Emulsified edible) (µgl)	N	7000;NF	NR	NL	NR	+
PCB (mg/l)	N	0.1	NR	0.044 (6.1)	NR	+
Phenol (µg/l)	A	10	NR	- (9900)	NR	NR
Aldrin/	A	0.02	NR	0.08	NR	NR
Dieldrin (µg/l)	A		NR	(0.2) 0.13	NR	NR
BHC (µg/l)	A	2	NR	(9.9)	NR	NR



PARAMETERS	CLASSES					
	I	IIA	IIB	III#	IV	V
Chlordane ($\mu\text{g/l}$)	A	0.08	NR	(2.2) 0.004	NR	NR
t-DDT ($\mu\text{g/l}$)	A	0.1	NR	(1)	NR	NR
Endosulfan ($\mu\text{g/l}$)	A	10	NR	- (0.01)	NR	NR
Heptachlor/ Epoxide ($\mu\text{g/l}$)	A	0.05	NR	0.06 (0.91)	NR	NR
Lindane ($\mu\text{g/l}$)	A	2	NR	0.38 (2.9)	NR	NR
2,4-D ($\mu\text{g/l}$)	A	70	NR	(450)	NR	NR
2,4, 5-T ($\mu\text{g/l}$)	A	10	NR	(160)	NR	NR
2,4, 5-TP ($\mu\text{g/l}$)	A	4	NR	(850)	NR	NR
Paraquat ($\mu\text{g/l}$)	A	10	NR	(1800)	NR	NR

Notes:

CLASS I : Conservation of natural environment water supply I - practically no treatment necessary.
Fishery I - very sensitive aquatic species

CLASS IIA : Water Supply II - conventional treatment required
Fishery II - sensitive aquatic species

CLASS IIB : Recreational use with body contact

CLASS III : Water Supply III - extensive treatment required
Fishery III - common, of economic value, and tolerant species livestock drinking

CLASS IV : Irrigation

CLASS V : None of the above

NV : No Visible floatable materials or debris

NOO : No Objectionable odour

NOT : No Objectionable taste

** : Related Parameters, only one recommended for use

@ : Maximum not to be exceeded

NR : No Recommendation

* : At hardness 50 mg/l CaCO_2

: 24-hr average and maximum (bracketed) concentrations are shown

NF : Free from visible film, sheen, discoloration and deposits

NL : Free from visible layer, discoloration and deposits

N : Natural levels

+ : Levels above Class IV

A : Absent

Foreword



The Environmental Quality Report is published in fulfilment of the Environmental Quality Act, 1974. Section 3(1)(i) states that Director General shall:

“...publish an annual report on environmental quality not later than 30th September of the following year...”

In 1996, the environmental management in Malaysia notched up several milestones. The Parliament endorsed the government proposal to further provide definite legislative support to manage emerging environmental issues: the regulation of environmental hazardous substances; their manufacture, movements and disposal; collection of cess to promote waste reduction; recycling and reuse; deposit and rebate scheme; provision of appropriate public information; compensation for pollution victims. At the same time the government facilitated the establishment of an integrated

scheduled waste treatment through private investment. It now remains for the industries to understand and accept the concept and the ultimate benefits to all communities, industries included.

Continuing effort by DOE to raise public awareness is now very visible and showing results. Environmental NGOs have given both active and constructive support to environmental protection. The local media have contributed by highlighting environmental issues and governmental conservation effort. The New Straits Times and the Economic Planning Unit environmental survey in particular have given bearing on the environmental awareness level and the future direction to be undertaken. The Departments' concerted effort on environmental education and awareness, especially in reaching out to the younger generations in showing result, judging from their active participation in environmental activities and their usage of an enviro-library services. In this regard, support from the private sector has been encouraging.

There are visible increasing commitment by agencies and state authorities having jurisdiction over national resources towards more concrete conservation effort, though much remain to be done in our fast pace towards a developed nation status. The areas of concerns are coastal zone management, hill land, forest and forest cover preservation. The Department will continue to collaborate and cooperate with other agencies, both at Federal and State level to improve upon the existing institutional framework to deal with these environmental problems.

Deteriorating air quality from mobile sources remains the biggest threat. The AWASI (Area Watch and Sanction Inspection) programme to rid KL, and ultimately, other urban centres of pollution from motor vehicle emissions is showing results. Enforcement and deterrent measures have been improved without increasing expense in manpower and equipment. Regrettably the motorcycle manufacturing industry had failed to respond to national concerns about air pollution, especially the haze threat. It cannot be more emphasized to all concerned that air quality improvement work must be progressively built upon. Delayed decision to accommodate any sector would cost the country dearly at the end of the day.

Sewage remains the biggest source of water pollution. Pressure has been exerted on the concessionaire to improve the situation. It has finally established a priority list and schedule for action as required by DOE.

The implementation of various new strategies has increased the success of enforcement activities by the Department. This has been strongly supported by the courts as seen from the much heavier penalties imposed for environmental offenses.

Malaysian contribution towards global environmental protection effort is well recognized. The Malaysian model of pragmatic environmental management and development has gained recognition from UNEP, UNDP and the World Bank among other organizations. Through cooperation with other developing countries in providing environmental training programmes, Malaysia is playing a greater



role in global environmental protection in line with our Prime Minister's call to intensify South-South cooperation.

The environmental challenges ahead are formidable. There is still much to be done in the years ahead to fulfil our commitment to the people to conserve and manage our natural resources. The rate of success achievable will depend greatly on the cooperation of the public and the private sectors.



IR. TAN MENG LENG, JMN, KMN
DIRECTOR-GENERAL OF ENVIRONMENTAL QUALITY
MALAYSIA
31 JULY 1997

Executive Summary

Chapter 1





In the Seventh Malaysia Plan (7th MP), an approximate RM1.9 billion has been allocated in the Government's development budget for the improvement and protection of the environment as well as to conserve and promote sustainable resource use.

1996 was yet another active and successful year for environmental management in Malaysia. The Environmental Quality (Amendment) Act 1996 (Act A953) was gazetted on 1st August 1996, a significant first step towards progressive implementation of the Clean Air Plan has been effected; regulation of mobile sources is now in place for petrol and diesel vehicles, the gazettment came into force on 1st. September 1996 of the Environmental Quality (Control of Emission from Diesel Engines) Regulations, 1996 and on 1st November 1996, the Environmental Quality (Control of Emission from Petrol Engines) 1996. In recognition of the Department of Environment's achievements in contributing to local and global efforts for the Protection of the Ozone Layer, the Department was presented with the Stratospheric Ozone Award by the United States Environmental Protection Agency on 25 October 1996; for its excellence in client services and its effort to promote public-private sector partnership under the Malaysia Incorporated Concept, the Malaysian Chamber of Commerce and Industry awarded the prestigious "Anugerah Cepak" (Efficiency Award) to DOE on 7th November 1996.

In 1996, 370 preliminary EIA reports and 4 detailed EIA reports were received, an increase of 8% compared to 1995. While preliminary EIA reports continued to be processed by the State Offices, detailed EIAs and EIAs of projects that straddle States were processed at the Head Office. Greater emphasis had been placed on improving professionalism and accountability in assessment and post-surveillance work. Project involving large scale earthworks, coastal zone reclamation, iron and steel mill, pulp and paper mill and major chemical processes now mandated detailed EIA preparation.

Ten new fully automated air quality monitoring stations with telemetric systems were installed in Johor, Melaka, Negri Sembilan, Pahang, Perak, Pulau Pinang, Sarawak, Selangor dan Terengganu. The overall status of air quality throughout the country based on the Air Pollutant Index (API) was generally good and no case of serious haze was registered in 1996. Pollution loads from domestic sources continued to grow.

Motor vehicles, as a major source of urban air pollution continued to increase in number. There was an increase of 0.9 million (12%) vehicles in 1996 compared to 1995. The sector emitted 2.4 million tonnes of carbon monoxide, 457.9 thousand tonnes of hydrocarbon, 146.3 thousand tonnes of oxides of nitrogen and 19 thousand tonnes of particulate matter.

In 1996, there were 909 river monitoring stations in Malaysia. From the data collected, based on the National Water Quality Indices (Indeks Kualiti Air Negara - IKAN), 42 rivers were classified as clean, 61 slightly polluted and 13 rivers remained polluted. However the overall river quality was generally on a deteriorating trend. The major causes were silt due to soil erosion and organic pollutant from partially treated sewage and animal wastes. On the other hand, the marine environmental quality in 1996 had improved compared to 1995. As in previous years, the main contaminants of the coastal waters in all States were oil and grease, total suspended solids (TSS) and *Escherichia coli* (*E. coli*). In 1996, a total of 60 sightings of oily waste discharges from passing ships into Malaysian waters were reported. To deter such practice, the Department tightened up detention procedures and instituted prosecution based on photographic evidence and observers' testimony. The draft regulations to control desludging activities are under vetting by Attorney-General's Chamber. DOE's dynamic promotion of the protection of the Straits of Melaka saw the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas Project being initiated. A new project for Groundwater Monitoring and Reporting Network in Peninsular Malaysia was established in 1996. Through this project the DOE would monitor the status of groundwater in the country and recommend necessary measures for the protection of groundwater contamination. A nationwide survey in 1996 also concluded that a significantly high population of the urban public were exposed to noise levels exceeding the 65dB (A) ($L_{daytime}$) due to greater traffic volumes and construction activities.

In 1996, enforcement emphasis was placed on 3 sectors: sewage discharge, textiles and metal finishing. Violations were mainly due to inadequate effluent treatment, increase in production without commensurate increase in treatment plant capacity, and slow response to plant upset. The licenses of 4 palm oil mills and 4 rubber factories were temporarily suspended and withdrawn upon repeated violations of



licensing conditions. For non-prescribed premises, under the Environmental Quality (Sewage and Industrial Effluents) Regulations 1979, metal finishing and leather industries have yet to comply with the requirements of the Regulations. The draft regulations to prescribe them for specific control are still under vetting by the Attorney General's Chambers. Occasional non-compliance were reported for other industries, with respect to Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Suspended Solids (SS), Oil and Grease. The overall industrial compliance with the Environmental Quality (Clean Air) Regulations, 1978 was generally satisfactory though odour and fugitive emissions remained problematic.

The construction of the Integrated Scheduled Waste Disposal and Treatment Facility at Bukit Nanas progressed according to plan for 1996. Three Task Force Committees were formed to monitor and facilitate its progress. In 1996, a total of 165 licenses for the setting up of scheduled waste facilities and transportation were issued by the Department to deal with an estimated amount of 331,000 tonnes of scheduled wastes. Review was being carried out on scheduled waste transporters' operations and alleged unlawful practices by recovering operators. Issuing of licenses had been tightened up for export as well. The MAWAR (Malaysian Agenda for Waste Reduction) with set targets for specific sectors was launched and waste producer responsibility was being further developed.

Kerbside inspections and surprise check against excessive black smoke emission was reintroduced until 31 August 1996. On 1 September 1996, all tests and enforcement were conducted under the new Environmental Quality (Control of Emission from Diesel Engines) Regulations 1996. The Area Watch And Sanction Inspection (AWASI) Programme was first introduced in Kuala Lumpur such that enforcement 'could be seen and be heard', whereby a total of 20,137 vehicles were visually inspected, out of which 982 were summoned and 531 vehicles were issued with prohibition orders. The nationwide retail sale of unleaded gasoline (ULG) increased from 68% in 1995 to 76% in 1996. It is anticipated that the usage of ULG will be further increase in 1997 with the introduction of new regulations for petrol vehicles i.e. the Environmental Quality (Control of Emission from Petrol Engines) Regulations 1996.

During the Sixth Malaysian Plan period, various governments agencies, non-governmental organizations (NGOs) and the private sector

implemented numerous environmental education, training and awareness programmes. In 1996, there was a phenomenal increase in the number and scope of activities for environmental education and awareness programmes organised by DOE which included environmental camps, exhibitions, quizzes, seminars/workshops, competitions and audio-visual environmental trailers pertaining to the protection of air, water and the marine environment. These efforts culminated in the Malaysian Environment Week (MEW) held between 21-27 October 1996 in the historical city of Malacca. With regard to information dissemination, a total of 71,700 (65,700 in Bahasa Malaysia and 6,000 in English) DOE publications were distributed locally and internationally, a 123% increase compared to the year 1995. A total of 40,000 publications were distributed to 1,426 urban and rural schools. A total of 12 dialogues were held between DOE, various industrial sectors and NGOs.

Under the Montreal Protocol, the Department successful obtained support of USD 13.1 million out of USD27.3 million approved from the Multilateral Fund for 84 phase-out projects and activities. These projects are expected to phase out 5,444 MT of ODS upon completion by 1998. A new scheme of financing for the SMIs under the auspices of the DOE/Multilateral Fund/World Bank was successfully negotiated. Continuous departmental effort and co-operation from the private sector had brought about success of this programme and thereby assisted Malaysian industries to obtain ozone friendly technologies and thus remained competitive in the world market.

In the field of international environmental cooperation, the Department continued to be dynamically involved in environmental programmes and activities at the regional and international level and had been a significant environmental player in the international scene especially in the interest of developing countries. In the international arena, Malaysia participated actively in the various working groups established by the Basel Convention to better define waste category and bringing about an international ban of toxic wastes to non OECD countries. The Department was also dynamically involved in various international environmental fora, especially those relating to the control of banned or severely restricted chemicals; the Denmark-Malaysia-Sweden Initiative on Environmentally Sound Management of Hazardous Chemicals was further enhanced. At the national level, DOE was responsible for



preparing the National Information for the UNCED + 5 on Environmentally Sound Management of Toxic Chemicals, Illegal International Traffic in Toxic and Dangerous Products, Hazardous Wastes, Radioactive Wastes, Atmosphere, Oceans and Fresh Waters. With regard to regional environmental cooperation, the Malaysia-Singapore Joint Committee on the Environment produced a plan for the clean-up of the Johor Straits, a Chemical and Hazardous Substances Spill Response Plan for the Johor Causeway and strict enforcement of vehicular emissions. The Seventh Meeting of ASEAN Senior Officials on the Environment (ASOEN) reviewed the reports of the six ASOEN Working Groups and the status of the ASEAN Co-operation Programme in various environmental

areas with UNEP, international agencies and other Dialogue Partners. In addition Brunei/Indonesia/Malaysia/Philippines EAGA Working Group on Environmental Management also reviewed the progress of its existing projects which involved the private sector. The Coordinating Body of Seas of East Asia (COBSEA) considered the new development, particularly with regard to the decisions of UNCED and Agenda 21 and emerging environmental issues facing the region. At the request of the World Bank, DOE cooperated to introduce environmental management training programmes for other lesser developing countries based on the Malaysian pragmatic approach in environmental protection and development from the viewpoint of a developing country.

Organisational Structure

Chapter 2



ORGANISATIONAL STRUCTURE

The Department of Environment is headed by a Director General who is appointed under Section 3(1) of the Environmental Quality Act, 1974. The Department is made up of five Divisions at the Head Office viz. Administration, Information Systems, Control, Development Planning and Environmental Assessment, as well as 13 State

Offices located at Johor Bahru (Johor), Alor Setar (Kedah/Perlis), Kota Bahru (Kelantan), Kuala Lumpur (Federal Territory), Melaka, Seremban (Negeri Sembilan), Kuantan (Pahang), Ipoh (Perak), Butterworth (Pulau Pinang), Kota Kinabalu (Sabah), Kuching (Sarawak) and Kuala Terengganu (Terengganu), an office at Pulau Langkawi and an Environmental Advisory Office at the MIDA Head Office in Kuala Lumpur (Figure 2.1).

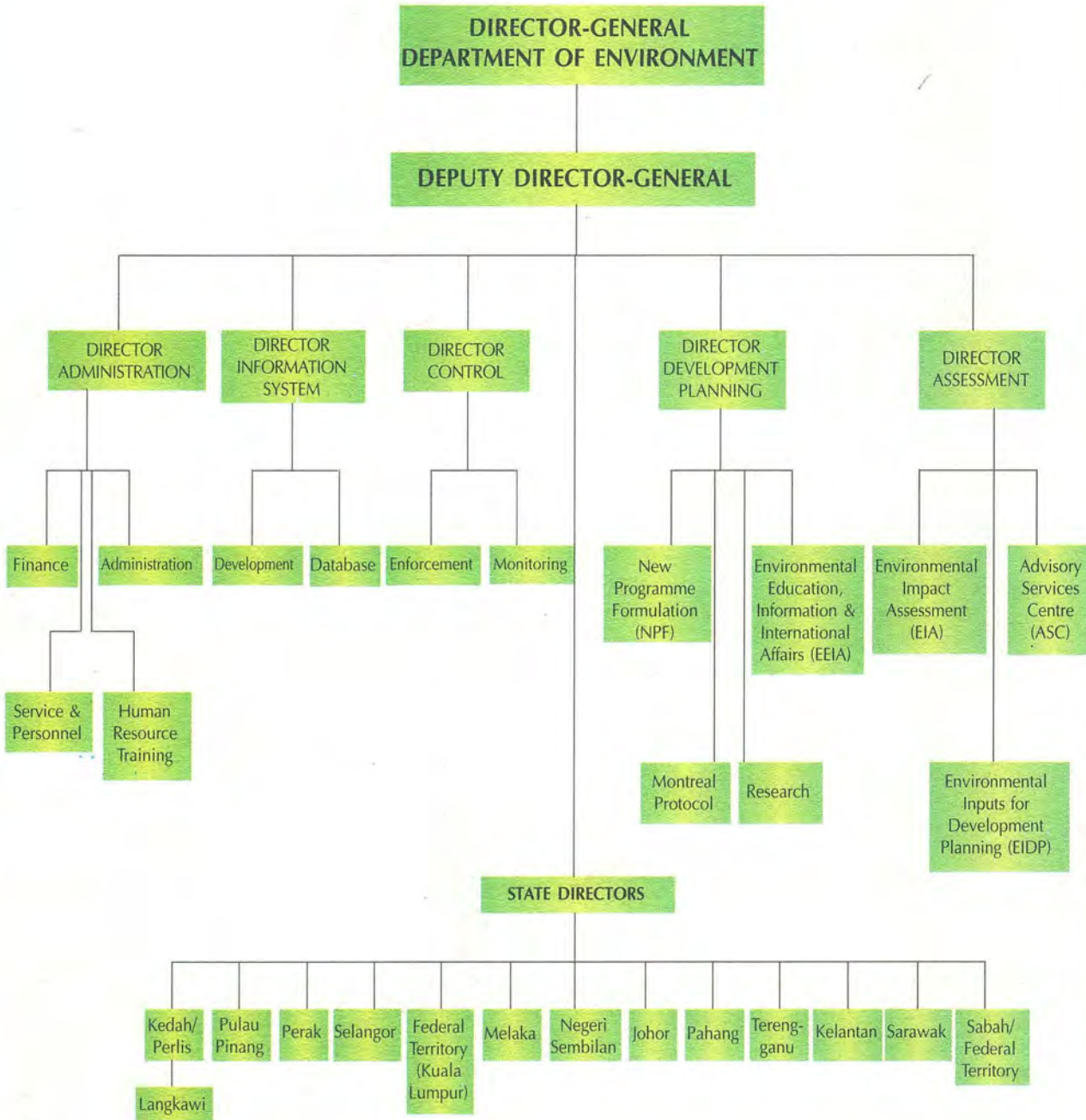


Figure 2.1 Malaysia: Department of Environment Organisational Structure, 1996.

HUMAN RESOURCES

The total personnel strength of DOE as of 31 December 1996 was 516, comprising of 147 officers in the management and professional group and 369 in the supportive group. The distribution of personnel is as shown in Figure 2.2.

FINANCE

The total budget allocation received by the Department for the year 1996 was RM34,007,807.25, an increase of RM3,361,327.25 (11%) over the previous year. From this amount a sum of RM27,768,507.25 (81.7%) was allocated for operational expenditure (Figure 2.3), while RM6,239,300.00 (18.3%) was for implementing development projects (Figure 2.4).

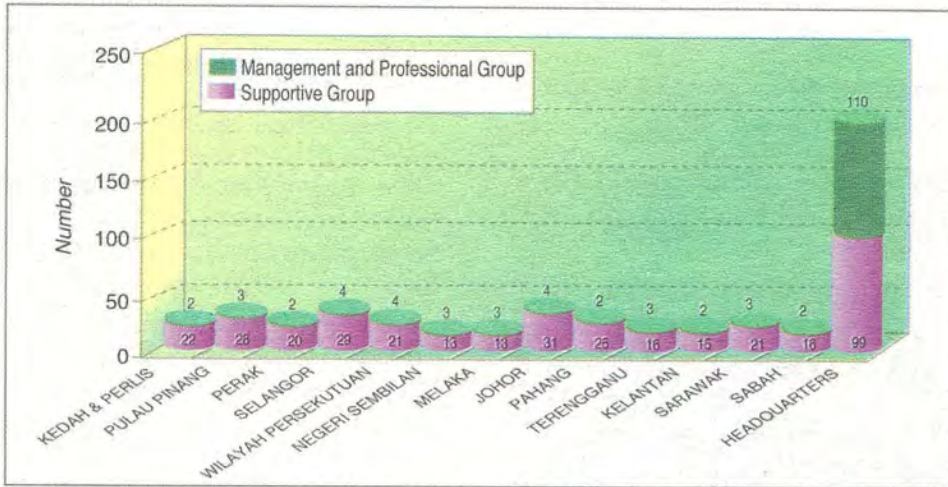


Figure 2.2 DOE: Distribution of Personnel, 1996

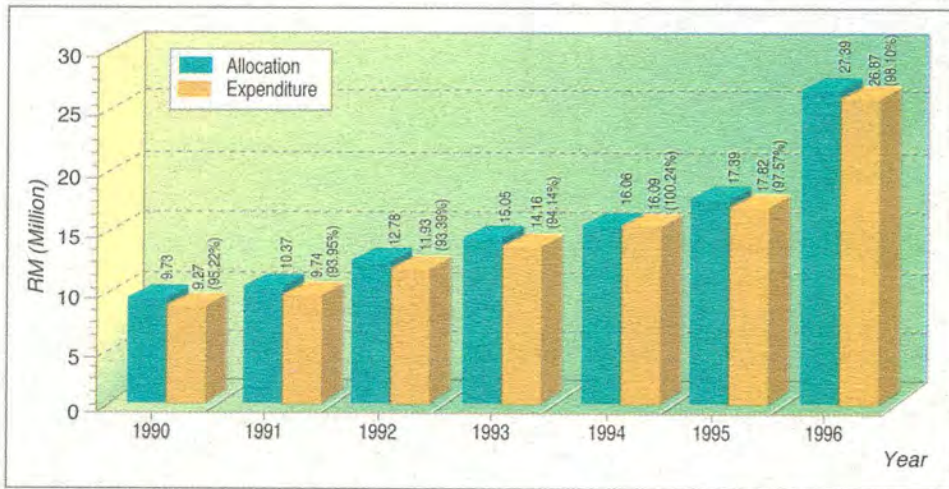


Figure 2.3 Department of Environment: Operational Allocation & Expenditure, 1996

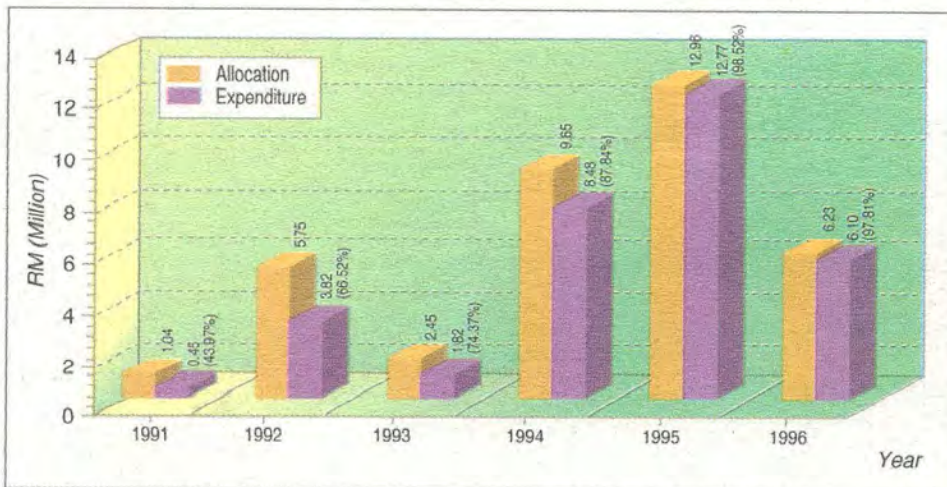


Figure 2.4 Department of Environment: Allocation & Expenditure for Development Projects, 1996

ENVIRONMENTAL QUALITY COUNCIL

The Environmental Quality Council, established by virtue of Section 4(1) of the Environmental Quality Act, 1974, was convened on four occasions in 1996, to deliberate on several substantive matters pertaining to:

- Amendments to the Environmental Quality Act, 1974
- Proposed Environmental Quality (Tanker Cleaning) Regulations
- Exemption from effluent-related fees for the palm oil mills and natural rubber factories



EQC meeting in June, 1996

- The National Environmental Policy
- Malaysia's position with regard to international development on dangerous and hazardous chemicals
- New approach towards the enhancement of the EIA process
- Proposal to set up an Environmental Fund
- Proposal on imposing cess for polluting industries
- Environmental Quality Report 1995
- Compliance of EIA approval conditions
- Macro EIA
- Proposed Amendments to the Environmental Quality (Sewage and Industrial Effluents) Regulations 1979
- Progress of the Bukit Nanas Integrated Scheduled Waste Treatment and Disposal Facility
- Revised Guidelines for the Prevention and Control of Soil Erosion and Siltation
- Environmental awards and recognition for citizens.

The 1996 Council members appointed under to Section 4(2) of the Act, are as follows:-

(a)	Y.Bhg. Prof Dato' Dr. Mohd. Sham Mohd Sani.	Chairman	Section 4(2) (a)
(b)	Y.Bhg. Dato' V. Danabalan	Ministry of Science, Technology and the Environment	Section 4(2) (b)
(c)	Y.Bhg. Datuk Asmat Kamaludin	Ministry of International Trade and Industry	Section 4(2) (c)
(d)	Ir. Neo Tong Lee	Ministry of Agriculture	Section 4(2) (cc)
(e)	Ir. Zakaria bin Nanyan	Ministry of Human Resources	Section 4(2) (d)
(f)	Encik Ahmad Pharmy bin Abdul Rahman	Ministry of Transport	Section 4(2) (dd)
(g)	Ir. Dr. Mukundan Pillay	Ministry of Health	Section 4(2) (e)
(h)	Y.Bhg. Datuk Chin Kui Bee	Ministry of Tourism and Environmental Development, Sabah	Section 4(2) (f)
(i)	Y.Bhg. Abang Helmi bin Tan Sri Ikhwan	Ministry of Resource Planning, Sarawak	Section 4(2) (f)
(j)	Ir. Hussein bin Rahmat	PETRONAS	Section 4(2) (g)
(k)	Dr. Gurmit Singh	Malaysian Oil Palm Growers Council (MOPGC)	Section 4(2) (gg)
(l)	Dato' Haji Mohamed Saufi bin Haji Abdullah	Federation of Malaysian Manufacturers (FMM)	Section 4(2) (h)
(m)	En. D. Selvaraj	Malaysian Rubber Producers Council (MRPC)	Section 4(2) (hh)
(n)	Assoc. Prof. Dr. Muhamad Awang	Universiti Putra Malaysia	Section 4(2) (i)
(o)	Y.Bhg. Dato' Dr. Salleh b. Mohd. Nor	Malaysian Nature Society (MNS)	Section 4(2) (j)
(p)	Ir. Gurmit Singh K.S	Environmental Protection Society of Malaysia (EPSM)	Section 4(2) (j)

MEETING BETWEEN MINISTER OF SCIENCE, TECHNOLOGY AND THE ENVIRONMENT WITH STATE MINISTERS AND EXECUTIVE COUNCILLORS RESPONSIBLE FOR ENVIRONMENTAL MATTERS (MEXCOE)

MEXCOE meetings were held twice in 1996, i.e. on September 10 in Kuala Lumpur and on October 21 in Melaka. The October Meeting in Melaka was held in conjunction with the national-level Malaysian Environment Week (MASM 1996) celebrations hosted by the Melaka Government.

MEXCOE deliberated, and agreed on a number of policy issues relating to the enhancement and upgrading of environmental prevention and

control strategies as well as the enhancement of cooperation between Federal and State agencies in environmental management. Other matters discussed were:

- Convention for Biological Diversity;
- RAMSAR Convention - Protected Areas for Biodiversity Conservation;
- Management of sludge disposal resulting from effluent treatment systems;
- Monitoring of compliance of waste disposal sites;
- Handling of oily wastes arising from shipping industry;
- Proposed Environmental Quality (Amendments) Act 1996; and
- Revised Guidelines for the Prevention and Control of Soil Erosion and Siltation.

The 1996, MEXCOE members are as follows:-

a) Y.B. Datuk Amar James Wong Kim Min	Minister of Environment and Tourism SARAWAK
b) Y.B. Datuk Bernard G. Dompok	Minister of Tourism and Environment Development SABAH
c) Y.B. Puan Cik Ah @ Ramlah bt. Long	Chairman of Land, Forestry and Environment Committee, PERLIS
d) Y.B. Tuan Haji Abdul Razak b. Hashim	Chairman of Human Resource, Environment and Voluntary Association Committee, KEDAH
e) Y.B. En. Ch'ng Toh Eng	Chairman of Science, Technology and Environment and Human Development Committee, SELANGOR
f) Y.B. Dato' Bahari b. Tan Sri Yahya	Chairman of Public Facility, Housing and Environment Committee, PAHANG
g) Y.B. En. Wong Foon Meng	Chairman of Environment Development, Health and Consumer Affairs Committee, TERENGGANU
h) Y.B. Dr. Chua Soi Lek	Chairman of Environment and Consumer Affairs Committee, JOHOR
i) Y.B. En. Lee Chee Leong	Chairman of Health and Environment Committee, PERAK
j) Y.B. Dr. Yeow Chai Thiam	Chairman of Housing and Local Government, Environment, Science and Technology Committee, NEGRI SEMBILAN
k) Y.B. Datuk Haji Yasin Hj. Mohd. Sharif	Chairman of Housing, Environment, Local Government and Consumer Affairs Committee, MELAKA
l) Y.B. Datuk Abdul Rashid Abdullah	Chairman of Agriculture, Fishery and Environment Committee, PULAU PINANG
m) Y. Bhg. Tuan Hj. Mohd. Aris b. Ajmal Mohd.	Department of Federal Development, KELANTAN
n) Y. Bhg. Dr. M. Jayaranam	Deputy Chairman of Environment, Dewan Bandaraya KUALA LUMPUR



MALAYSIA INCORPORATED CONCEPT

In line with the objective of the Malaysia Incorporated Concept to inculcate and enhance cooperation and understanding between the public sector and the private sector and Non-Governmental Organizations (NGOs) for the common goal of national development, a total of 102 activities were initiated in 1996 by the Department. These activities included dialogues, consultative meetings and staff exchange training programmes.

Under the staff exchange training programme between the private sector and the DOE, eight DOE officials were attached to seven firms and correspondingly eight senior executives from the private sectors attended a week's training at the DOE Head Office in August 1996. The participating companies were:

- (i) Nestle Malaysia Berhad;
- (ii) Texas Instruments (M) Sdn. Bhd.;
- (iii) Colgate Palmolive (M) Sdn. Bhd.;
- (iv) Petronas Research and Scientific Services;

- (v) Procter and Gamble (M) Sdn. Bhd.;
- (vi) Lucky Creamery (M) Sdn. Bhd.;
- (vii) Lee Rubber Co. (Pte.) Ltd.

At the DOE, the participants were briefed on the functions and responsibilities of the Department, coupled with field visits to water, air and noise monitoring stations as well as the Kuala Lumpur Federal Territory Environment Office. Based on the participants' feedback, the attachment programme was found to be beneficial and should be further expanded in the coming years.

As in previous years, the 1996 series of dialogues between DOE, the Industries and NGOs served as a useful forum for exchange of views, information and experiences. It also allowed participants to express their concern in a non-confrontational manner. The Honourable Minister of Science, Technology and the Environment also presided at separate dialogues with representatives from the Housing Developers' Association and the NGOs. A total of 12 dialogues on environmental issues were held throughout the year (Table 2.1).

Table 2.1 Department of Environment: Dialogues held in 1996

Date	Participants	Main Issues
January 25	The Honourable Minister of Science, Technology and the Environment with the Housing Developers' Association.	Land clearing, earthwork activities for site preparation and construction.
February 29	SPG Oleochemical., Amoco Chemical., MTBE(M), Perwaja Steel, Kuantan Oil Products and Dovechem Chemical Industry from Kuantan and Kemaman.	Smoke and gaseous emissions.
March 26	Hotels, Chalets and Resorts Developers and officials of Kuantan Town Council.	Environmental performance of public sanitary facilities
April 18	Federation of Malaysian Manufacturers' (FMM)	Privatisation of air and water monitoring and environmental regulation
April 18	Malaysian International Chamber of Commerce (Sabah Branch)	Environmental requirements and the EIA procedure.
April 26	Y.B Perak State Exco for Environment, Taman Chandan Desa residents and Quarry Operators	Dust from quarry operations and alternative access road.
May 13	Y.B Perak State Exco for Environment and Asia Pacific Latex Sdn. Bhd.	Odour pollution.
June 11	The Honourable Minister of Science, Technology and the Environment with Non-Governmental Organisations	Environmental regulations and EQA amendments, EIA & environmental awareness activities.
June 21	Y.B Perak State Exco for Environment and Chip Lam Seng Sdn. Bhd.	Effluent treatment system and storage of toxic wastes.
August 8	Malaysian Oleochemical and Manufacturers Group (MOMG)	Export of spent catalyst, transportation and exportation of scheduled wastes.
August	Siemens Components (Adv. Tech.) Sdn. Bhd., Melaka	Environmental policy and awareness activities
September 12	Industrial Associations	Waste disposal, incineration and storage of scheduled wastes.

State of The Environment

Chapter 3



AIR QUALITY

Monitoring Programme and Air Quality Studies

Under the privatization agreement for air quality monitoring signed between the Government of Malaysia and Alam Sekitar Malaysia Sdn Bhd (ASMA) in 19 April 1995, 10 new fully automated air quality monitoring stations with telemetry system were established in 1996 in Johor, Melaka, Negeri Sembilan, Pahang, Perak, Pulau Pinang, Sarawak, Selangor and Terengganu. ASMA also continues to manage the existing 7 semi-automated high volume samplers for total suspended particulates (TSP) and respirable particulates (PM_{10}).

Two air quality studies were carried out by the Department, namely the Langkawi Air Quality Baseline Study under the International Hydrological Program (IHP) and Joint Air

Quality Study in Pasir Gudang, Johor in collaboration with UPM. The Langkawi Air Quality Research Study was carried out as part of the overall IHP integrated study for the island whilst the Pasir Gudang study was aimed to establish an action plan for air pollution control and management in the area. The Department would continue to support transport management studies on the Intergrated Urban Transportation Strategies for Environmental Improvement in Kuala Lumpur.

Status of Air Quality

Based on the Malaysian Air Pollution Index (MAPI), an indicator for air quality, the overall air quality status throughout the country in 1996 was generally good (Figure 3.1) and no case of serious haze was registered in 1996. For the Klang Valley, the index was generally between good and moderate whilst the pollutants' levels were below the Recommended Malaysian Guidelines (RMG) (Figure 3.2a, 3.2b and 3.2c). From general observation based on 10 automatic stations throughout the year, in the Klang Valley 40% of the readings were found to exceed 50 (MAPI value) whilst in other areas only 27% of the index readings exceeded 50. Annual average ambient concentrations of lead in the City of Kuala Lumpur, Petaling Jaya and Shah Alam were generally low between 0.25 - 0.35 $\mu\text{g}/\text{m}^3$ (Figure 3.2d).



The fully Automatic Air Quality Monitoring Station at Pasir Gudang, Johor.

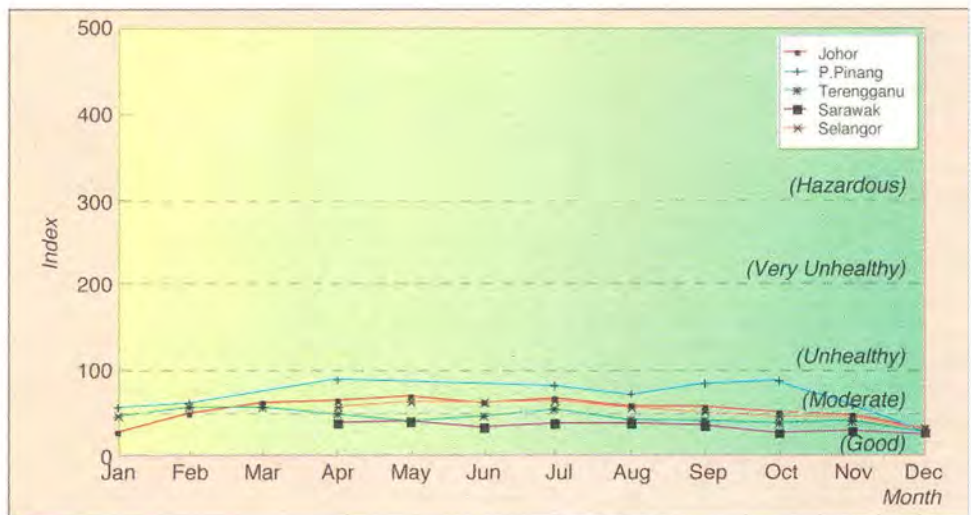


Figure 3.1 Malaysia: Air Pollution Index, 1996

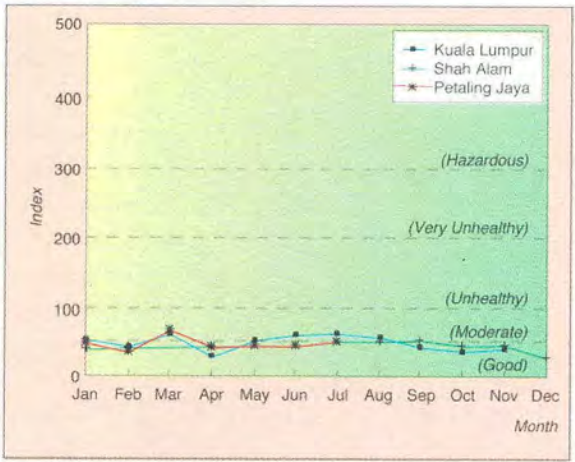


Figure 3.2a Klang Valley: Air Pollution Index, 1996

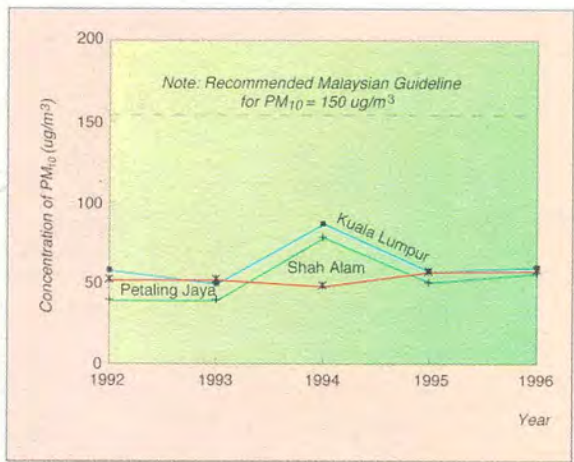


Figure 3.2b Klang Valley: Yearly Average Concentration of Respirable Particles (PM₁₀), 1992-1996

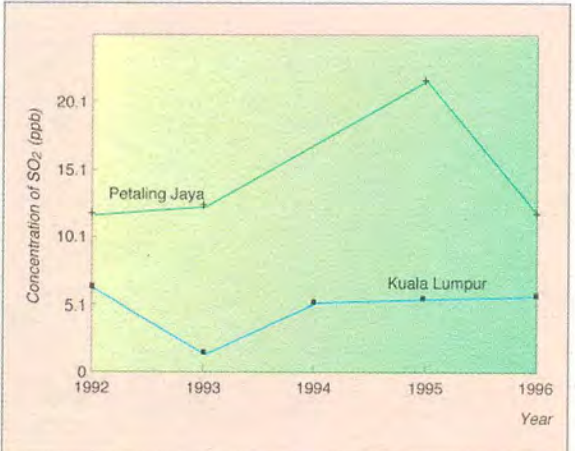


Figure 3.2c Klang Valley: Yearly Average Concentration of Sulphur Dioxide (SO₂), 1992-1996

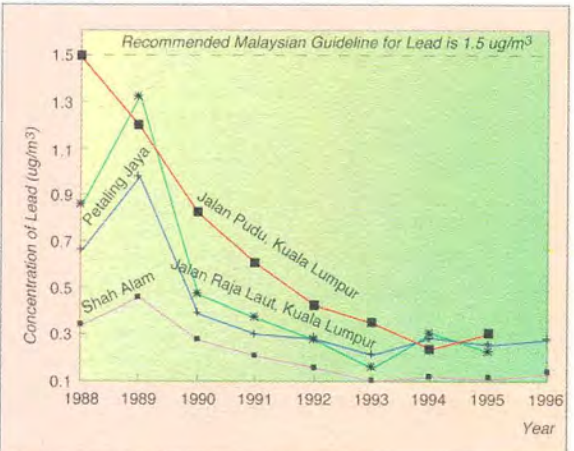


Figure 3.2d Kuala Lumpur & Selangor: Annual Average Concentration Of Lead, 1988-1996

NOISE

Noise Monitoring Programme

Baseline noise monitoring activities in schools, hospitals and public places were extensively carried out in the year. In response to public complaints, both noise and vibration measurements were carried out in the Klang Valley, especially for the Light Rail Transit system (LRT) construction sites. Baseline monitoring was also conducted in the vicinity of the Kuala Lumpur International Airport (KLIA) to establish the baseline noise value before the commencement of use.

Status Of Noise

Based upon 19 selected schools and hospitals monitored, it was found that the urban public was exposed to noise levels exceeding the 65 dB(A) ($L_{daytime}$) (Figure 3.4) compared with those in rural areas. Majority of the sources were traffic and construction activities in the neighbourhood. The level of noise at public places ranged from 65 dB(A) to 80 dB(A). The noise measured during the daytime on 26-27 March 1996 at 4 selected locations in the vicinity of the KLIA project site in Sepang showed that the levels were between 41 dB(A) and 71.0 dB(A) as shown in Figure 3.5.



Noise monitoring at a construction site

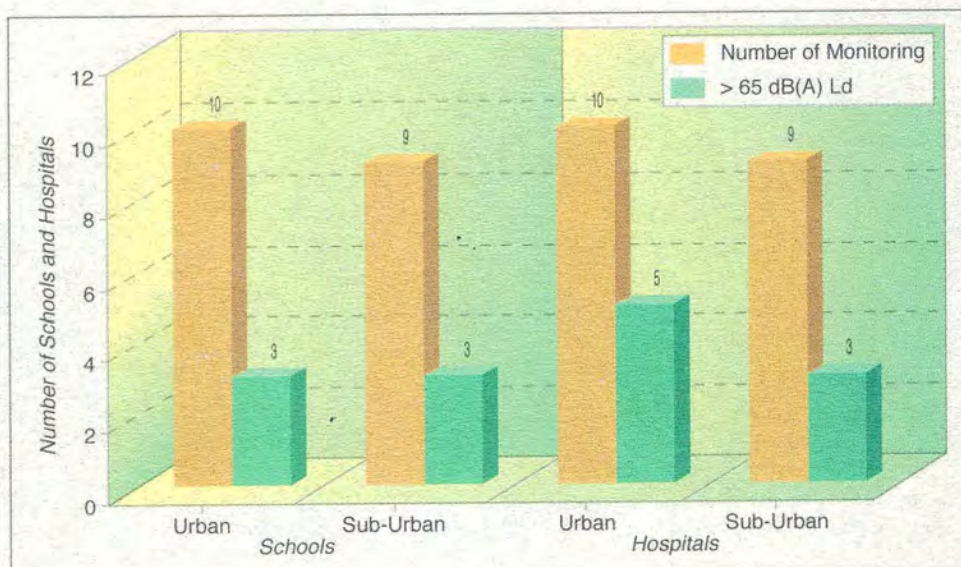


Figure 3.4 Malaysia: Noise Monitoring at Selected Schools and Hospitals, 1996

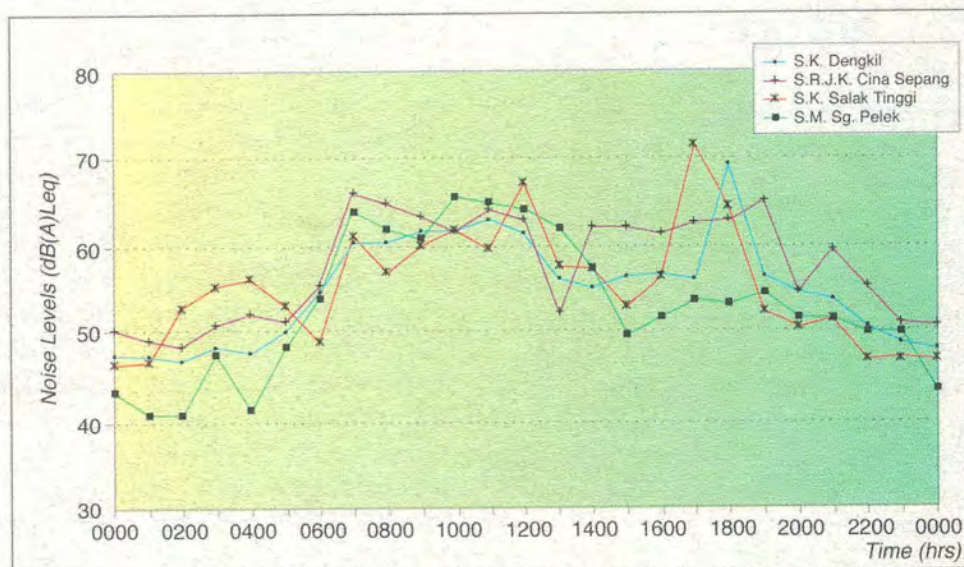


Figure 3.5 Noise Levels in the Vicinity of KLIA Project Site Sepang, 26-27 March 1996

RIVER WATER QUALITY

Status of the Malaysian Rivers

River water samples were collected from 909 monitoring stations for analysis to compute the Water Quality Indices (WQI) using 6 parameters (pH, dissolved oxygen, biological oxygen demand, chemical oxygen demand, ammoniacal nitrogen and suspended solid). Based on the WQI, 42 rivers were classified as clean (Table 3.1) (WQI 81-100), 61 slightly polluted (WQI 60-80) and 13 rivers polluted (WQI 0-59).

The polluted rivers were Sg. Pinang, Sg. Juru, Sg. Sepang, Sg. Jejawi, Sg. Tukang Batu, Sg. Kempas, Sg. Rambah, Sg. Landas, Sg. Kelang, Sg. Danga, Sg. Perai, Sg. Air Baloi and Sg. Buloh.



Monitoring of river water quality using a Telemetry System

Table 3.1 Malaysia: List of Clean Rivers, 1996

State	Water Quality Region	River Basin
Johor	30C	Paloi
	30A	Sedili Besar
	29A	Kim-Kim
Kedah	05	Muda
Kelantan	48	Kelantan
	47K	Kemasin
	49	Golok
Pahang	36	Kuantan
	33	Rompin
	35CH	Bertam
	35B	Bera
	35M	Mentiga
	35L	Lepar
	32AE	Anak Endau
	34	Bebar
	35P	Pahang
	Sabah	93
90		Kalumpang
71		Mengalong
75		Papar
76		Putatan
78		Kadamaian
77		Damit
84		Labok
95		Kalabakan
83		Sugut
91		Tawau
86		Kinabatangan
73		Membakut
72		Padas
94		Brantian
85	Kaya	
Sarawak	62	Similajau
	50	Batang Kayan
	60	Batang Tatau
Selangor	16	Selangor
	19C	Chauu
Terengganu	43	Terengganu
	40	Paka
	41	Dungun
	46	Besut
	38	Kemaman



Pollution Status for Heavy Metals

Cadmium (Figure 3.6), 53 rivers monitored exceeding the standard of 0.001 mg/l Class III (as in Annex).

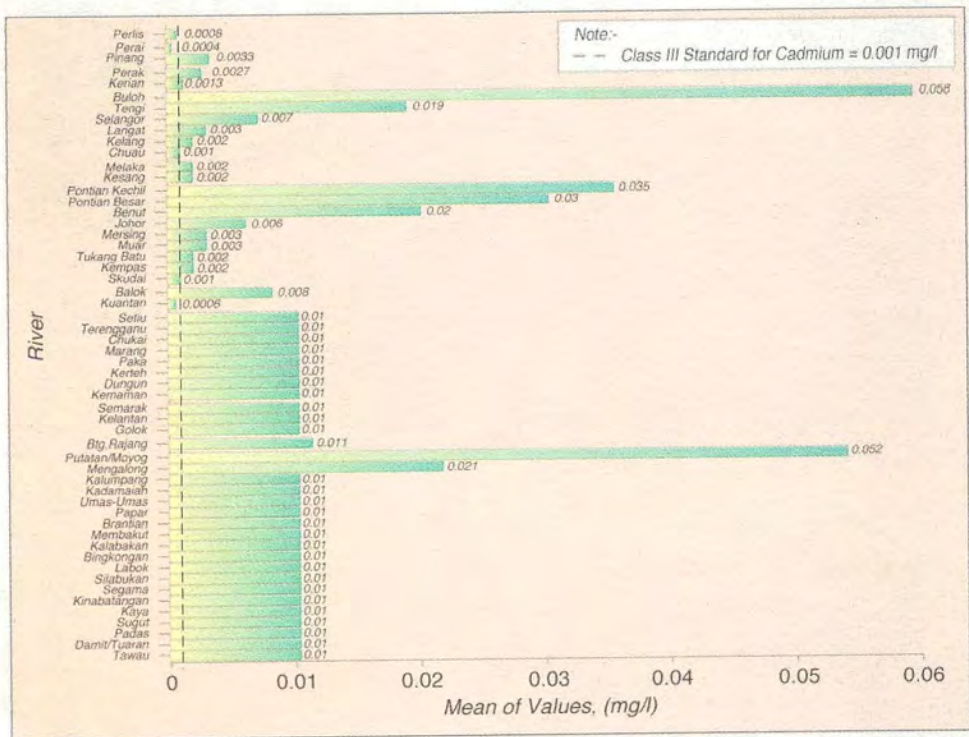


Figure 3.6 Malaysia: Level of Cadmium in River Water Quality, 1996

Iron (Figure 3.7), 44 rivers monitored exceeding the standard of 1.00mg/l Class III (as in Annex).

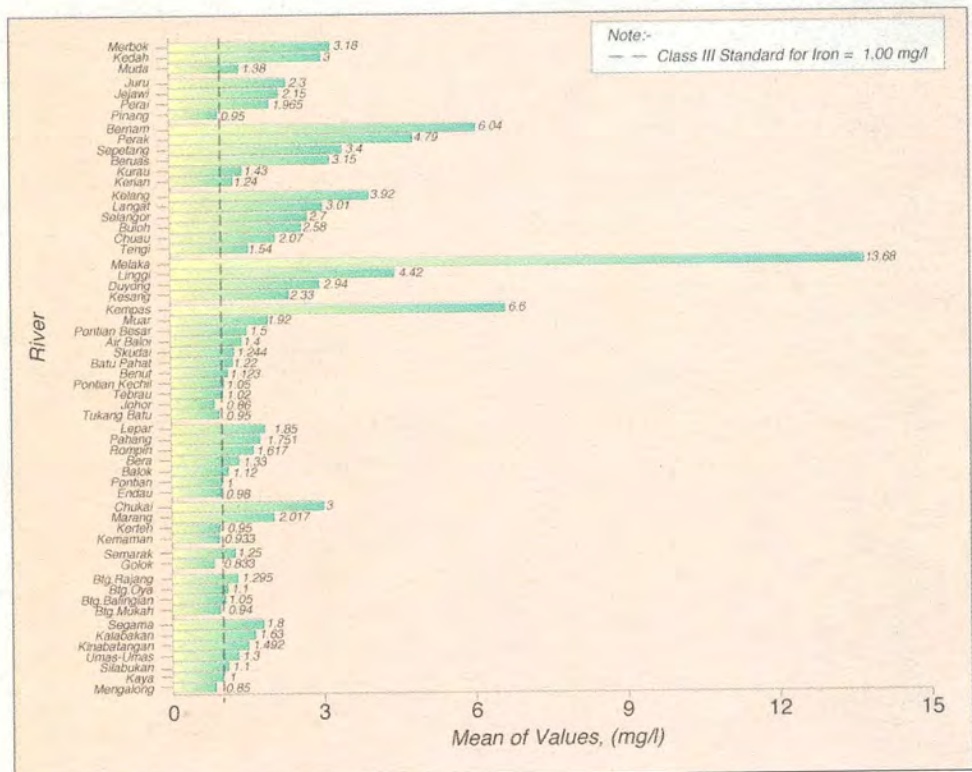


Figure 3.7 Malaysia: Level of Iron in River Water Quality, 1996

Lead (Figure 3.8), 36 rivers monitored exceeding the standard of 0.01 mg/l Class III (as in Annex).

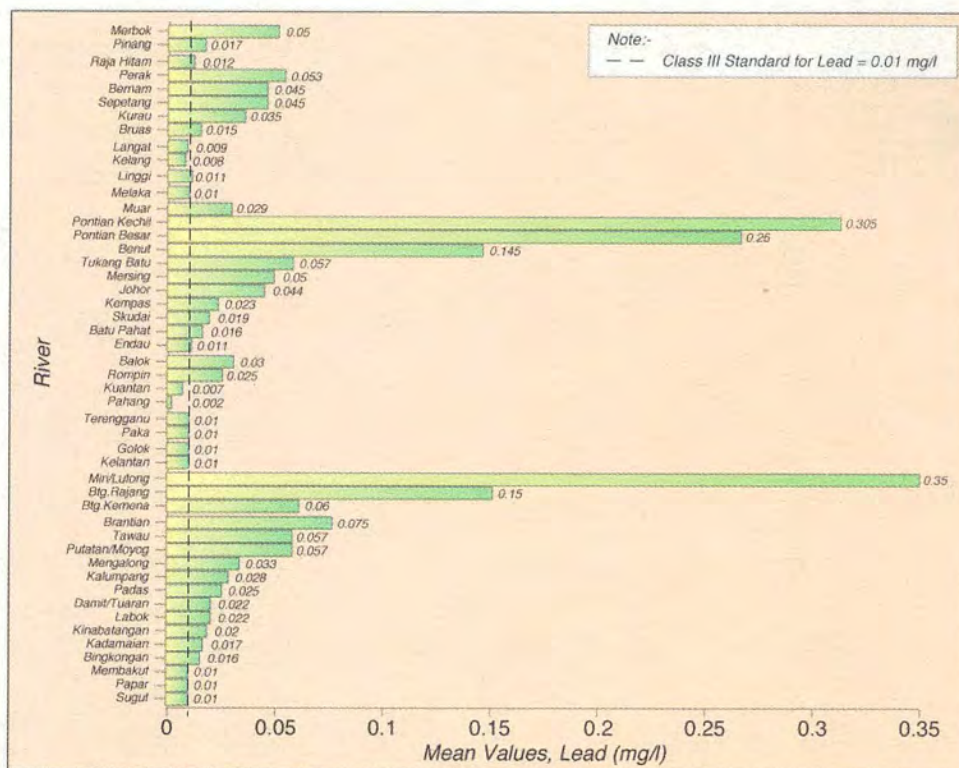


Figure 3.8 Malaysia: Level of Lead in River Water Quality, 1996

Mercury (Figure 3.9), 24 rivers monitored exceeding the standard of 0.0001mg/l Class III (as in Annex).

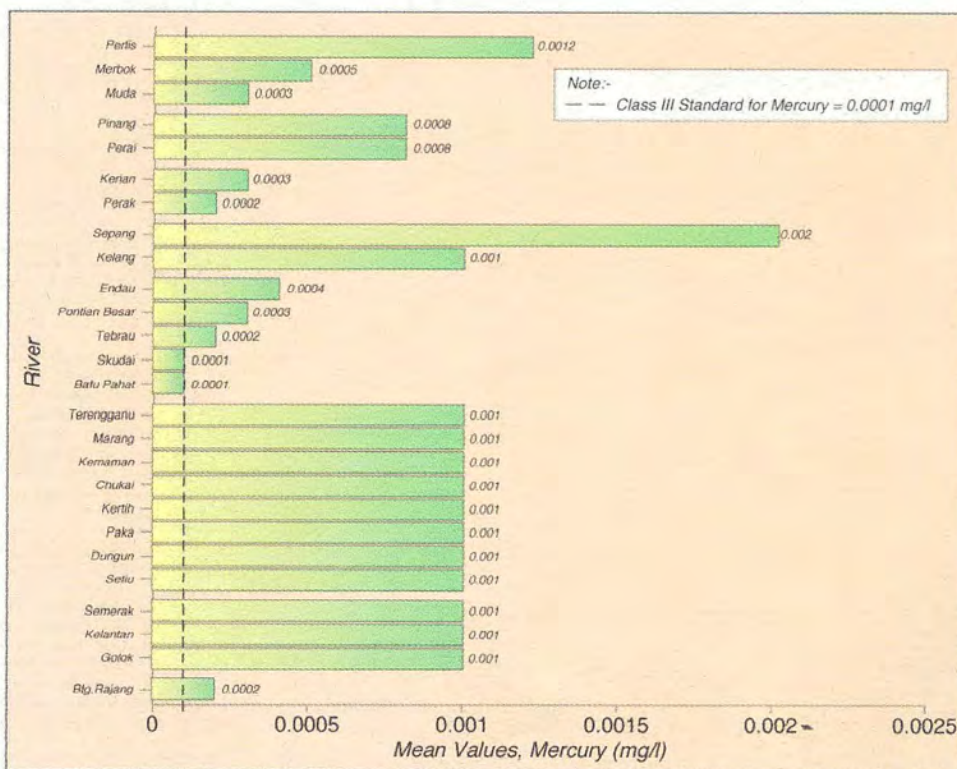


Figure 3.9 Malaysia: Level of Mercury in River Water Quality, 1996



Copper (Figure 3.10), 24 rivers monitored exceeding the standard of 0.01mg/l Class III (as in Annex).

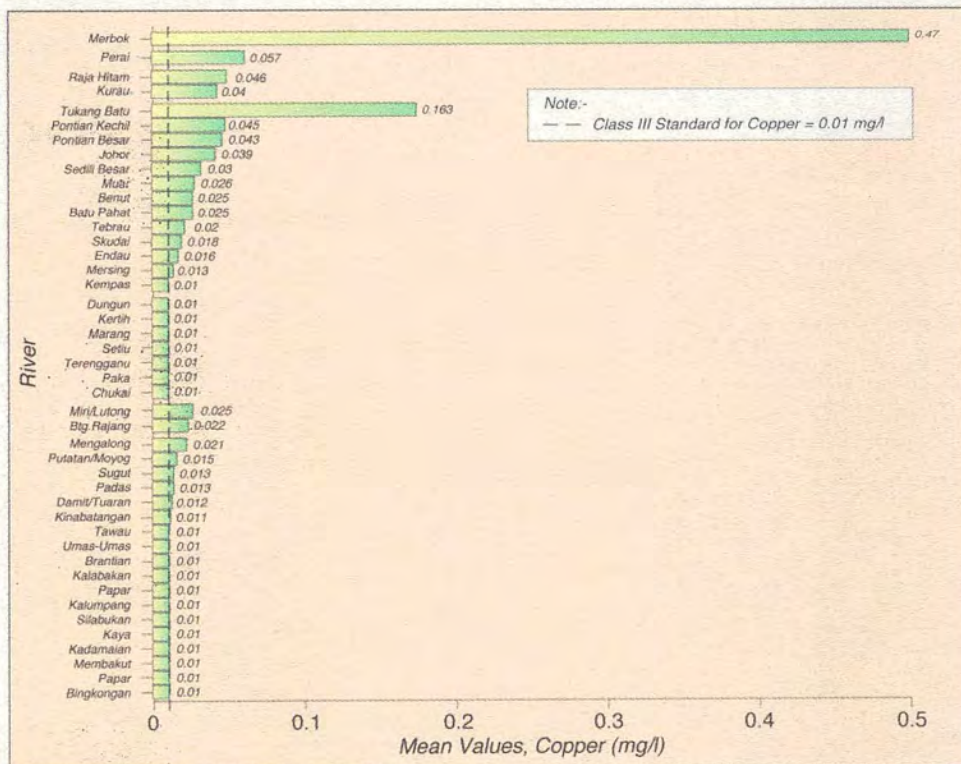


Figure 3.10 Malaysia: Level of Copper in River Water Quality, 1996

Manganese (Figure 3.11), 7 rivers monitored exceeding the standard of 0.1mg/l Class III (as in Annex).

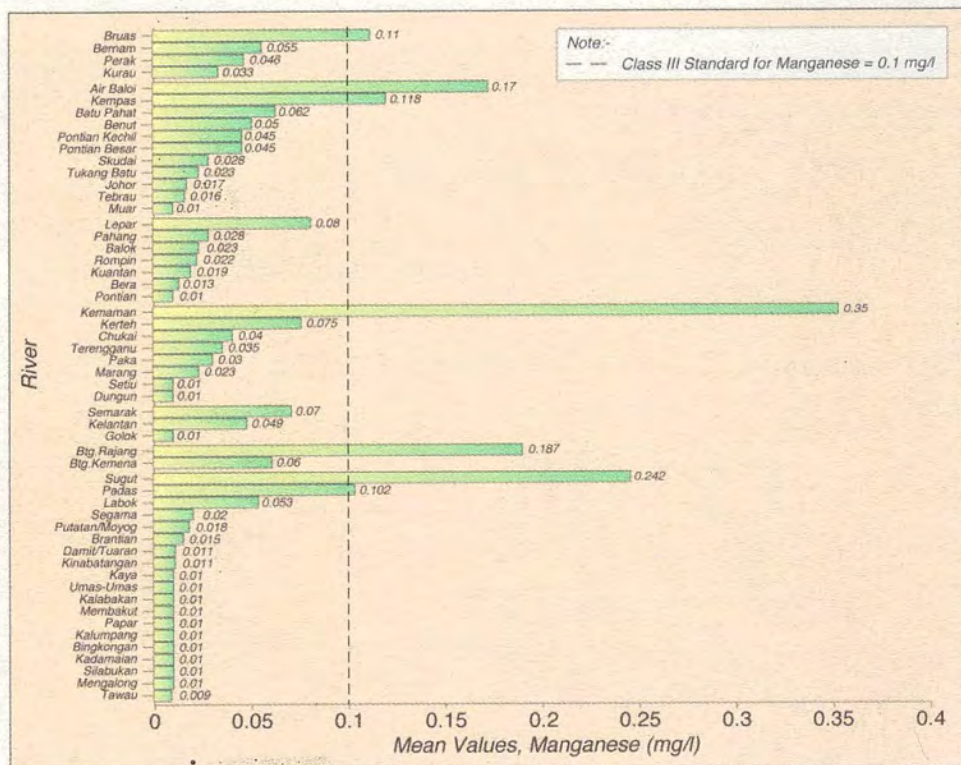


Figure 3.11 Malaysia: Level of Manganese in River Water Quality, 1996

Chromium (Figure 3.12), 4 rivers monitored exceeding the standard of 0.054mg/l Class III (as in Annex).

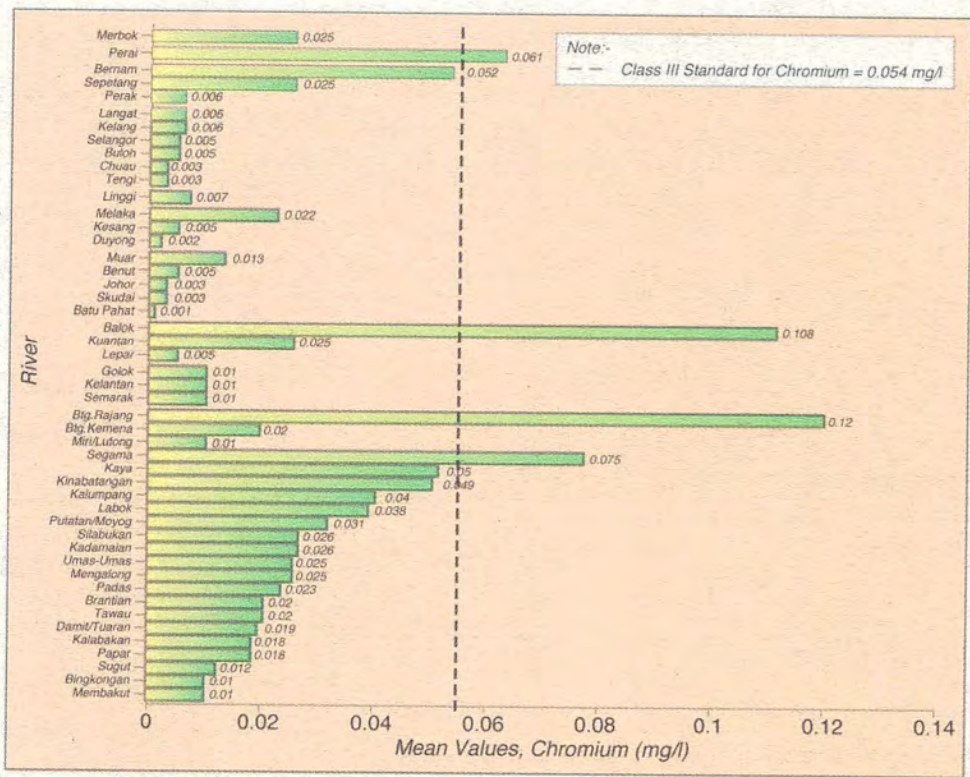


Figure 3.12 Malaysia: Level of Chromium in River Water Quality, 1996

Zinc (Figure 3.13), 4 rivers monitored exceeding the standard of 0.35mg/l Class III (as in Annex).

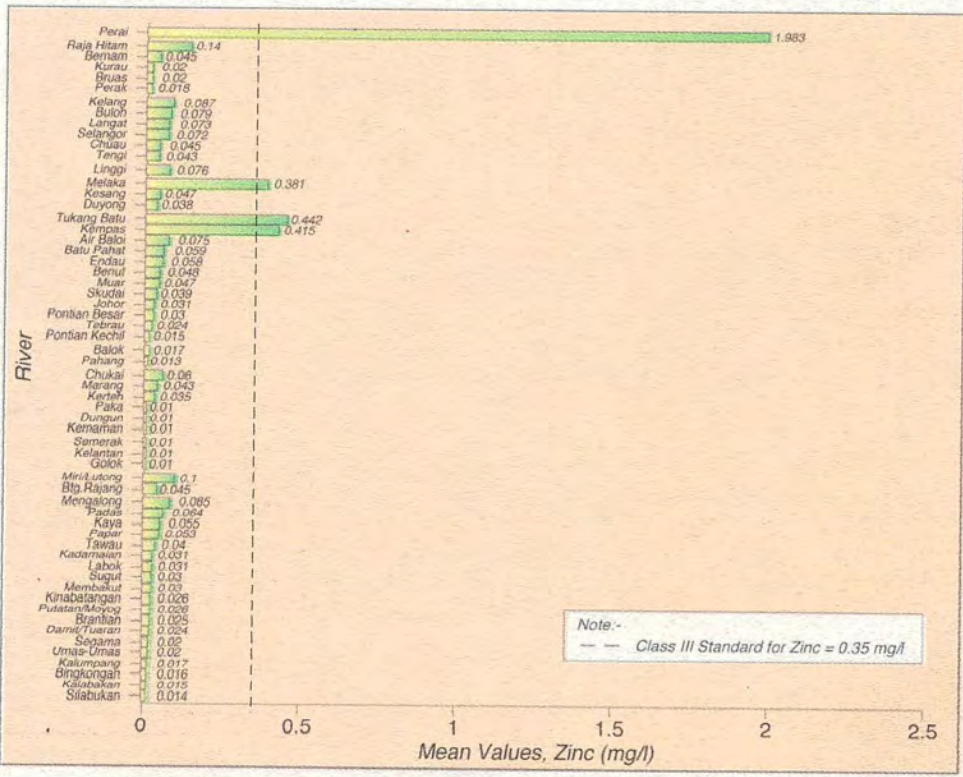


Figure 3.13 Malaysia: Level of Zinc in River Water Quality, 1996

Nickel (Figure 3.14), no rivers exceeding the standard of 0.9 mg/l Class III (as in Annex).

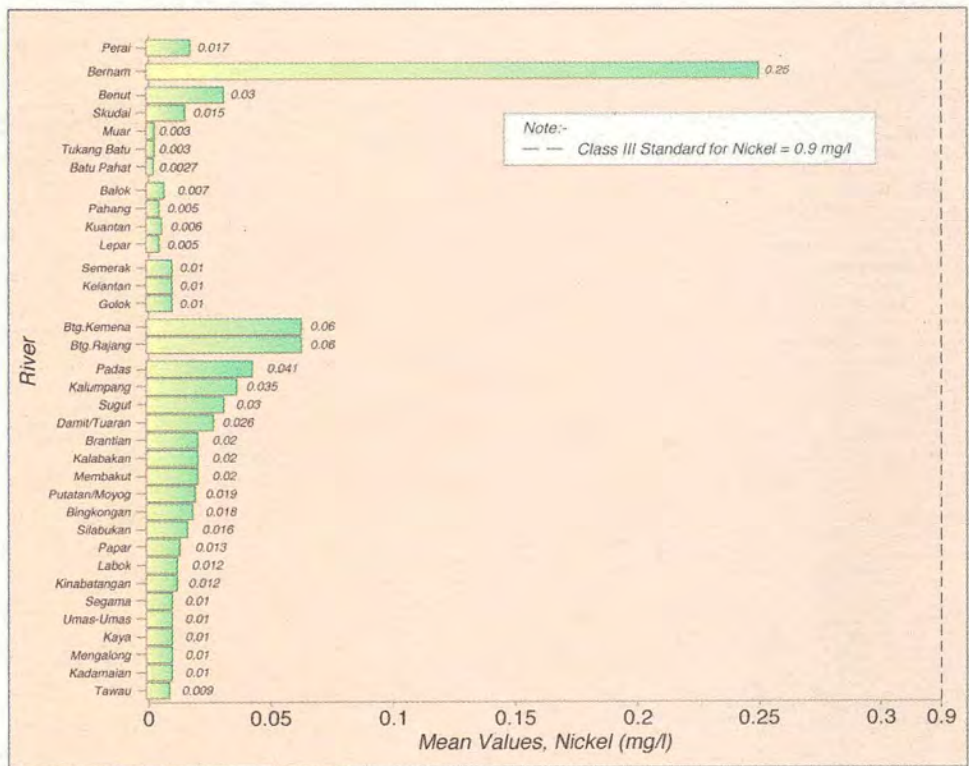


Figure 3.14 Malaysia: Level of Nickel in River Water Quality, 1996

SOURCES OF RIVER POLLUTION

Agro-based, Manufacturing, Livestock Farming and Domestic Waste (Biological Oxygen Demand)

In terms of BOD, fifteen river catchments were heavily polluted from these sources, 8 of which

had deteriorated further than previous year. The 8 were Sg. Juru, Sg. Jejawi, Sg. Perai, Sg. Muar, Sg. Kelang, Sg. Bingkongan, Sg. Danga and Sg. Langat. The highest rate of deterioration (-5.72) was recorded by Sg. Muar in Johor. Johor have 67 premises for palm oil mill, of which 4 were in Muar.

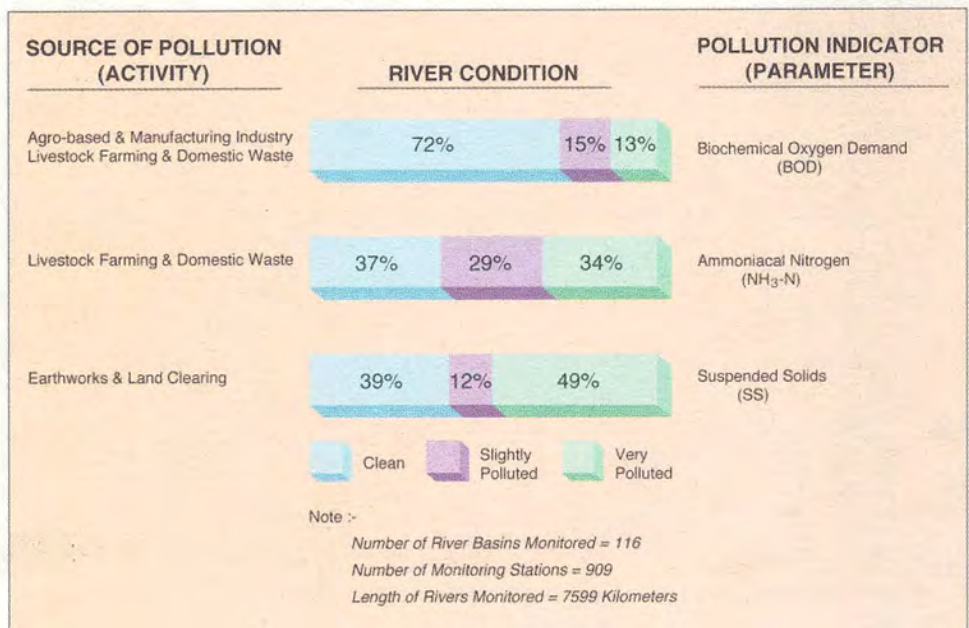


Figure 3.15 Malaysia: Status of River Water Quality Based on Activity, 1996

Livestock Farming & Domestic Wastes (Ammoniacal Nitrogen)

Thirty four percent of organic loading into the river were contributed by livestock farming and domestic waste. The number of river catchments which were heavily polluted by these sources were 38, of which Johor (13), Selangor (7), Pulau Pinang (4), Perak (4), Melaka (3), Kedah (3), Sarawak (2), Pahang (1) and Perlis (1). The trend in ammoniacal-nitrogen pollution indicated that 23 rivers had deteriorated.

Earthworks and Land Clearing (Suspended Solids)

In 1996, 57 major rivers were found to be heavily polluted by suspended solids, of which 38 rivers had deteriorated. Johor and Sarawak each had the highest (14), followed by Sabah (9), Perak (5), Pulau Pinang (4), Selangor (3), Melaka (2), Terengganu (2) and Negri Sembilan (1).

Overall, the river water quality had deteriorated at a rate of -0.50, and the major sources of pollution were suspended solids and organic pollutants (Figure 3.15).

MARINE ENVIRONMENTAL QUALITY

Overall Status Of Marine Quality

In 1996, a total of 597 samples were collected from 202 marine monitoring stations, compared to 557 samples from 186 monitoring stations in 1995.

The marine environmental quality in 1996 had improved compared to 1995. As in previous years, the main contaminants of the coastal waters of all States were oil and grease, total suspended solids (TSS) and *Escherichia coli* (*E. coli*) (Figure 3.16). Almost 72% of the total number of monitoring stations were polluted by oil and grease, 54% by TSS and 30% by *E. coli*.

Escherichia coli

Readings exceeding the Proposed Interim Standard of 100 MPN/100 ml were observed in the coastal waters off Pahang, Johor, Negri Sembilan, Kelantan, Perak and Selangor, while in the coastal waters off Sabah, Terengganu

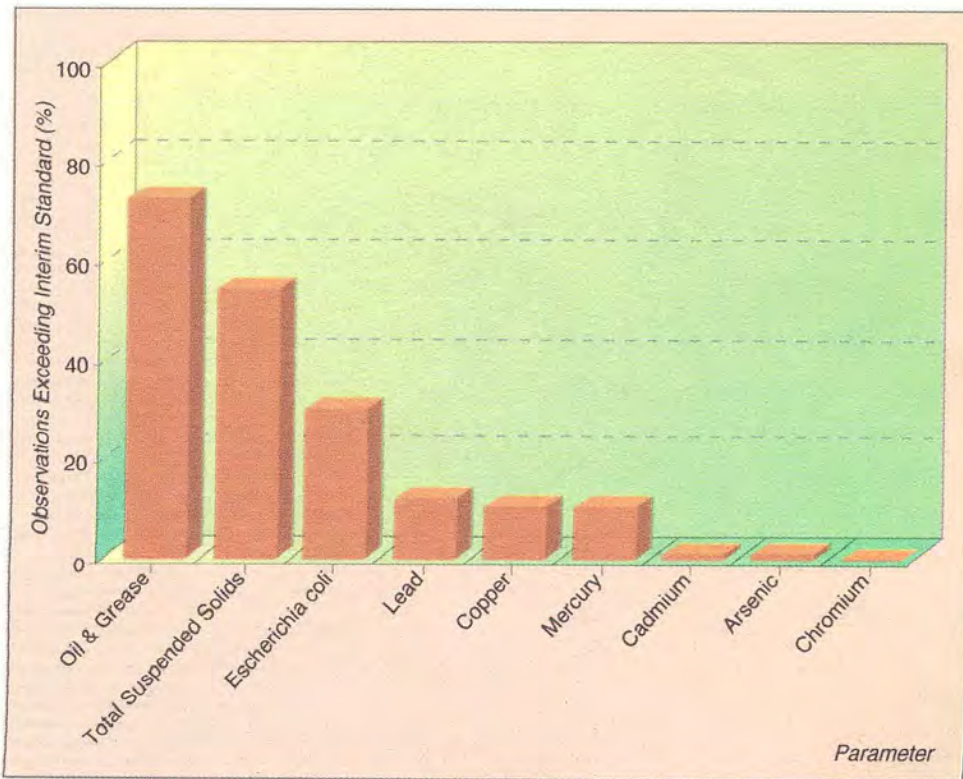


Figure 3.16 Malaysia: Status of Marine Environmental Quality, 1996

Sarawak and Kedah/Perlis the levels were comparatively low. The prevalence of *E. coli* in coastal waters could be attributed to untreated or partially treated domestic sewage and animal wastes.

Total Suspended Solids

The contamination by TSS was evident in the coastal waters off all States except Johor. Values exceeding the Proposed Interim Standard of 50 mg/l were noted,

Heavy Metals

No occurrence of lead and copper levels exceeding the Proposed Interim Standard of 0.1 mg/l was recorded in Pahang, Kelantan, Negeri Sembilan, Terengganu and Selangor. The percentage of both heavy metals exceeding the interim standard ranged from 1.5% to 40% in Johor, Kedah/Perlis, Pulau Pinang, Perak, Sabah and Sarawak. Mercury levels exceeding the Proposed Interim Standard of 0.001 mg/l were most frequently observed in the coastal waters off Kedah/Perlis, Negeri Sembilan and Pulau Pinang. Cadmium, chromium and arsenic levels were within the interim standards

(Table 3.2). The overall quality of marine waters was still very much influenced by the degree of discharge of partially treated or untreated industrial wastes and other land-based sources.

Tarballs

Except for some beaches in Johor, the majority of beaches were free from tarballs. The presence of tarballs was an indication of intentional or accidental discharge activities of oil sludges or oily wastes from passing vessels and fishing boats especially between the months of April to September.

Produced Water From Oil Platforms

Monitoring of the use of water based mud as well as oil based mud systems at oil production platforms operated by Shell, Esso and Petronas did not show any significant impact on the marine environment. The overall results of produced water quality (oil content) from existing oil platforms were found to be below the stipulated offshore effluent discharge limit of 100 mg/l (Figure 3.17). The effluent discharge quality was monitored daily for the oil-in-water content.



In-situ measurement of marine environmental quality

Table 3.2 Malaysia: Status of Marine Water Quality, 1996



State	No. of Stations	No. of Samples	Parameter Exceeding Interim Standards (%)								
			Total Suspended Solids	Oil and Grease	<i>E. Coli</i>	Cad-mium	Chro-mium	Mercury	Lead	Arsenic	Copper
Pahang	17	53	53.8	53	17.3	0	0	0	0	1.9	0
Johor	43	86	11.4	55.6	33.3	0.76	0	2.3	1.5	0	0
Kedah/Perlis	16	69	93.5	84.4	5.2	0	0	38.9	31.2	0	38.9
Kelantan	12	40	90	97.5	30	0	0	0	0	0	0
Negeri Sembilan	10	21	50	100	65	0	0	35	0	0	0
Pulau Pinang	25	152	56.3	47.5	0	2.5	0	20.2	10.1	0	12.6
Perak	14	29	40.7	25	66.7	0	0	7.4	33.3	0	14.8
Sabah	32	87	17.4	50	4.6	0	0	0	6.9	0	0
Sarawak	11	22	44	100	16	0	0	0	40	0	40
Terengganu	16	32	77.4	93.5	16.1	0	0	0	0	0	0
Selangor	6	6	57.1	85.7	71.4	0	0	0	0	0	0
Melaka	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	202	597									
Average (%)			53.8	72	29.6	0.3	0	9.4	11.2	0.2	9.6

Note:
NA : Not Available

Marine Interim Standards

TSS (50 mg/l)	OG (0 mg/l)	E-coli (100 MPN/100 ml)	Cd (0.1 mg/l)	Cr (0.5 mg/l)	Hg (0.001 mg/l)	Pb (0.1 mg/l)	As (0.1 mg/l)	Cu (0.1 mg/l)
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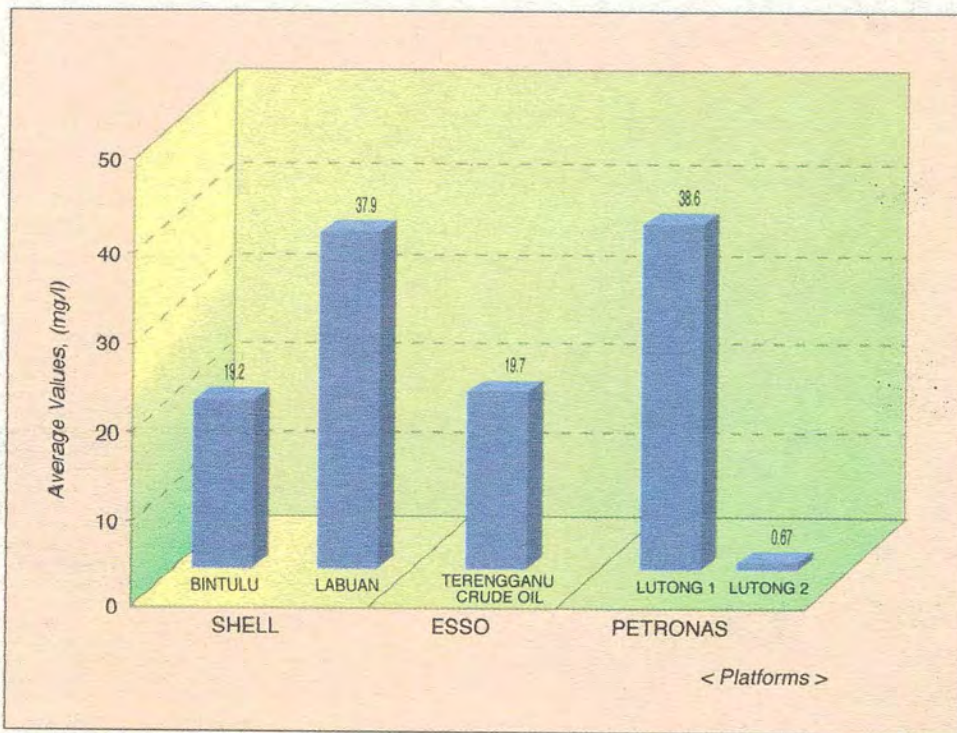


Figure 3.17 Produced Water Quality for Offshore Platforms in Malaysia, 1996

GROUNDWATER QUALITY MONITORING PROJECT

The Groundwater Monitoring and Reporting Network in Peninsular Malaysia was established by DOE in 1996.

The project was designed to evaluate the status and extend of groundwater contamination throughout the country as well as to:

- (i) identify sites with high risk of groundwater contamination caused by human activities;
- (ii) prioritize activities based on information collected from site visits, sampling of soils

and groundwater in selected areas and available reports;

- (iii) design a network of monitoring wells;
- (iv) construction of monitoring wells; and
- (v) analysis of groundwater samples collected periodically from such wells.

From a total of 126 sites identified throughout the country, 42 sites consisting of 69 wells were selected for detailed monitoring of water quality. The distribution of these sites among the States and activities are presented respectively in Table 3.3 and Figure 3.18.

Through this project DOE would be able to monitor the status of groundwater in the country and institute measures necessary for the protection of groundwater contamination.

Table 3.3 Distribution of the 42 sites selected for the monitoring network

State	Land Use/Source of Pollution								Total number of site
	Agriculture	Urban/ Suburban	Industrial	Solid Waste Landfill	Toxic/Radio-Active Landfill	Rural	Golf course	Salt Water Intrusion	
Kelantan	D15, D6-1	D11-3 D21-1	D6-2	D8-2, D6-3	-	D7-2, D11-2	D3, D6-4	(D21-1)	11
Terengganu	T8	T1-1	T15, T16	T10-2	-	T14	-	-	6
Pahang	C7	C13-1	-	C2	-	-	-	C18	4
Johor	-	-	-	J5	J4, J3	-	-	-	3
Negeri Sembilan	-	-	N4	N3, N5	-	-	-	-	3
Selangor/KL	-	S13	S8, S9	S11	-	-	S12, (S13)	-	5
Perak	-	-	-	A11	A12-1	-	-	-	2
Kedah	K2, KV1	-	K3	-	-	-	-	-	3
Perlis	R	3-2	R4	-	-	-	-	-	2
Pulau Pinang	-	-	P1, P2	-	-	-	-	-	2
Melaka	-	-	M1	-	-	-	-	-	1
Total		8	5	11	10	1	3	3	142



Groundwater sampling at a Monitoring Wells

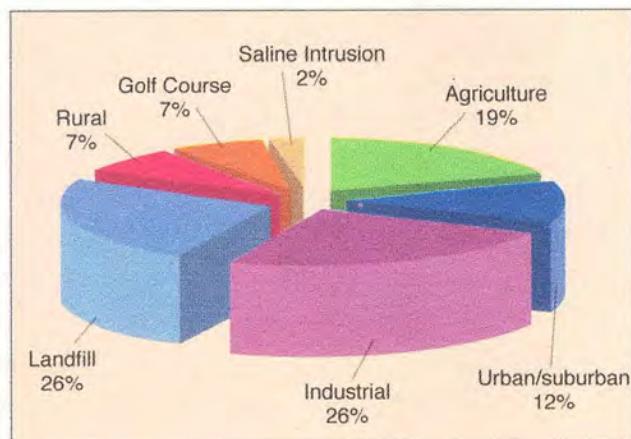
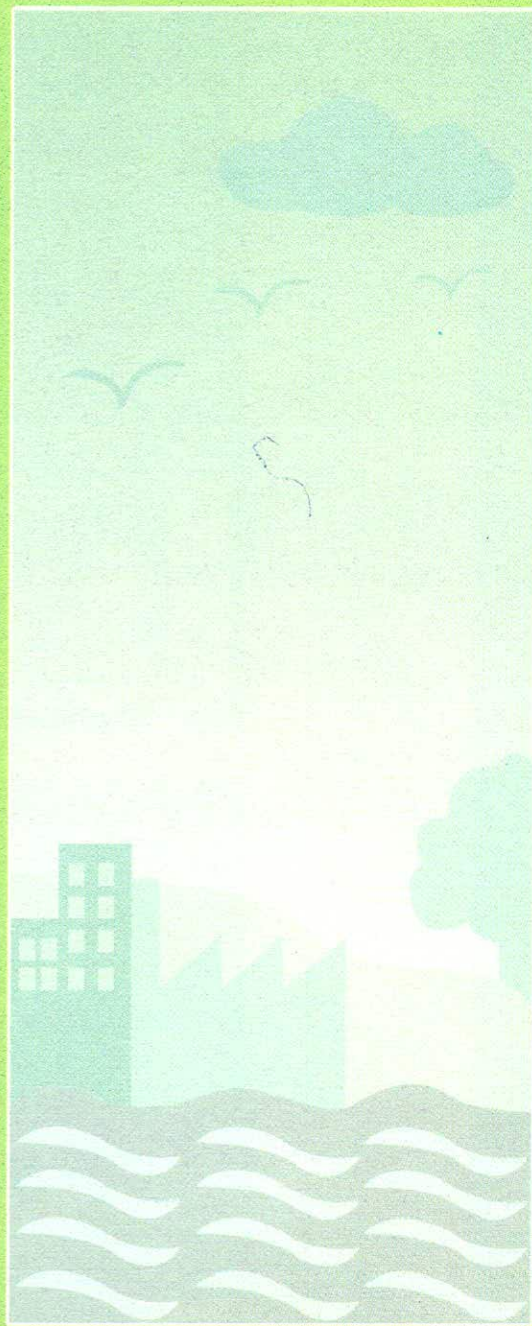


Figure 3.18 Distribution of groundwater monitoring network (42 sites).

Pollution Abatement

Chapter 4



CONTROL OF AGRO-BASED PRESCRIBED PREMISES

Prescribed premises are premises or factories which are being prescribed by the Minister under Section 18 of the Environmental Quality Act 1974. These premises are licenced directly by DOE. Crude palm oil mills and the raw natural rubber factories are termed prescribed premises and are licenced by DOE.

In 1996, a total of 282 crude palm oil mills (CPO) and 150 raw natural rubber (RNR) factories

were licenced under the Environmental Quality (Prescribed Premises)(Crude Palm Oil) Regulations, 1977 (Amendment) (1982) and Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations 1978, respectively, an increase of one CPO mill and a decrease of 6 RNR factories. Of the 282 CPO mills, 185 were licenced to discharge their effluents into watercourses, 185 onto land and 12 to both watercourses and land.

Figure 4.1a and 4.1b illustrate the distribution of Crude Palm Oil Mills and Raw Natural Rubber Factories in 1996.

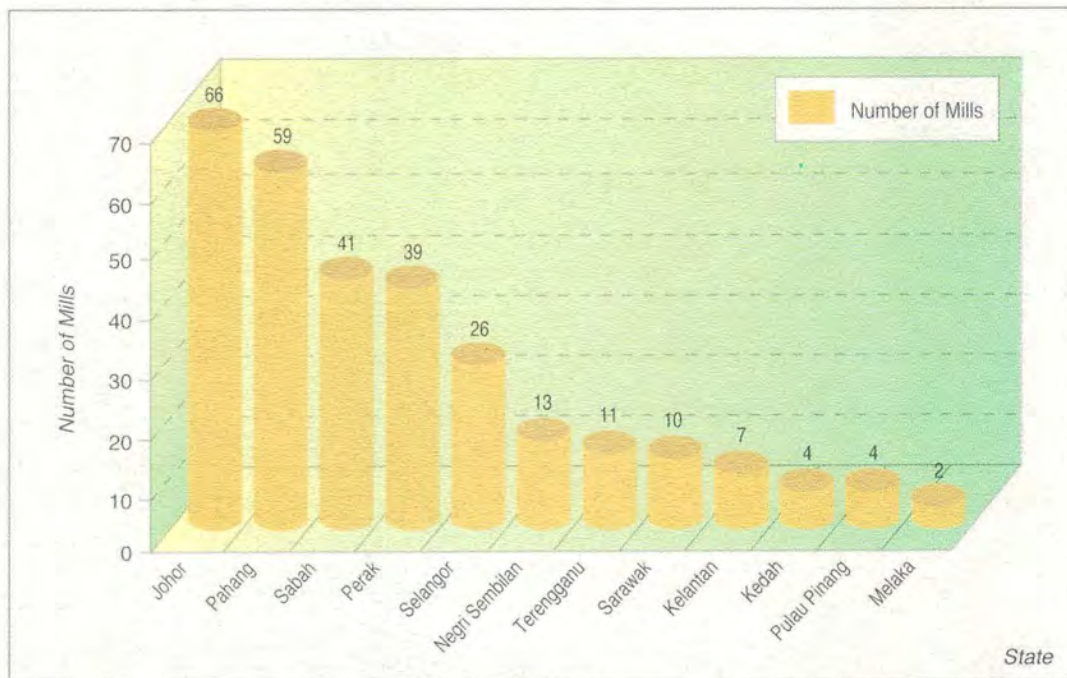


Figure 4.1a Malaysia: Number of Palm Oil Mills, 1996

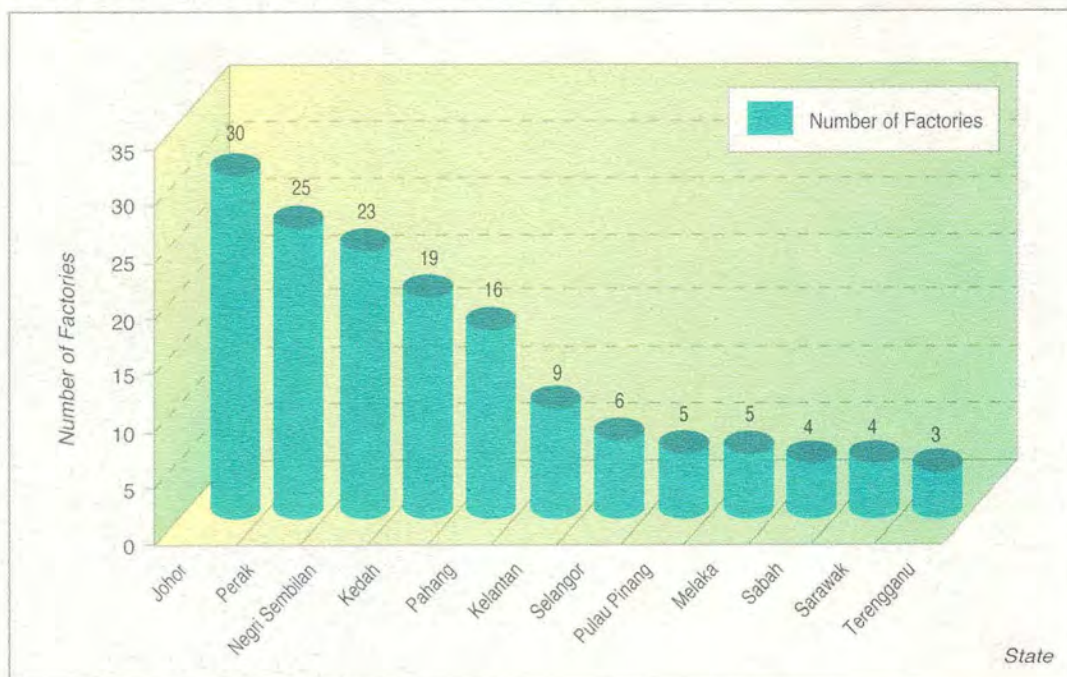


Figure 4.1b Malaysia: Number of Raw Natural Rubber Factories, 1996

Status of Compliance with the Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations, 1977 and the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations, 1978.

The status of compliance for CPO mills and RNR factories in 1996 were 78.3% and 88.6% respectively, an incremental 3.3% and 9.2%

compliance for CPO and RNR compared to 1995. Four CPO mills and 4 RNR factories had their licences temporarily suspended. Thirty one RNR factories were taken to court for not complying fully with the limits for effluent discharges as stipulated in their licences. The suspensions were lifted only after the problem had been rectified.

The breakdown of the offences is as shown in Figure 4.2 and 4.3.

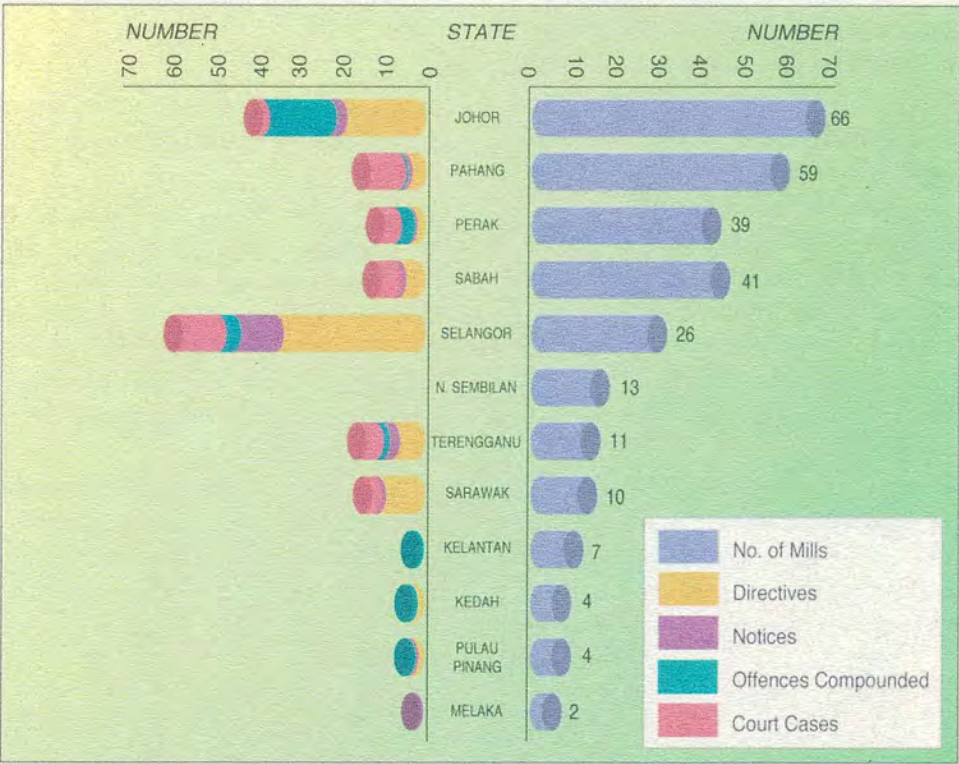


Figure 4.2 Malaysia: Legal Action Taken Against Palm Oil Mills, 1996



Figure 4.3 Malaysia: Legal Action Taken Against Raw Natural Rubber Factories 1996

CONTROL OF NON-PRESCRIBED PREMISES

Status of Compliance with the Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979

Throughout 1996 a total of 1562 enforcement visits relating to industrial effluent discharges were carried out, out of which 1289 (82.5%) were found to have complied with the Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979.

Figure 4.4 shows that machinery and plastic industries achieved 100% compliance. However, industries like metal finishing and electroplating, food and beverage, textile, rubber-based, cement, vehicle assembly, paper as well as leather industries still had difficulties complying with the requirements of the Regulations with only less than 85% compliance.

The parameters that most industries could not comply with were biochemical oxygen demand (BOD), chemical oxygen demand (COD), suspended solids (SS), oil and grease (O&G) and certain heavy metals. Among the main reasons for

non-compliance were inefficient operation of effluent treatment plants as a result of increase in production and absence of effluent treatment plants especially for the small and medium-sized industries.

However, as a result of intensified enforcement, steps have been taken by the industries concerned to improve the situation by upgrading existing treatment systems and constructing new treatment plants.

Status of Compliance with the Environmental Quality (Clean Air) Regulations, 1978

Overall industrial compliance with the Environmental Quality (Clean Air) Regulations, 1978, was generally satisfactory as shown in Figure 4.4. This was based on compliance of 3238 (83.3%) premises out of 3887 sources visited during 1996. The leather industry achieved 100% compliance whilst compliance by the wood industry was only 73%.

Generally, dust was the main air pollutant due to poor operation and maintenance of pollution control equipment such as dust collectors, bag filters, water sprinklers and cyclones.

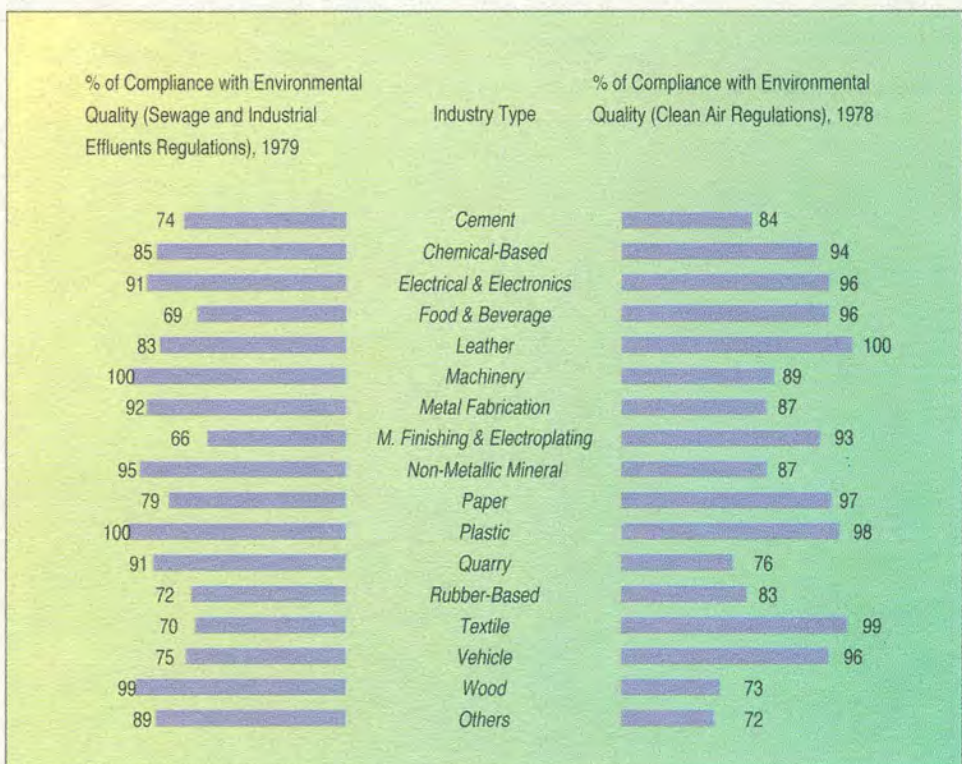


Figure 4.4 Compliance Status of Manufacturing Industries, 1996.

CONTRAVENTION LICENCE

The Environmental Quality Act, 1974 provides for contravention licences to be issued under certain situations such as industries having genuine difficulties in complying with discharge standards and other stipulated conditions of the rule Act. However, these licences the exception rather than the rule and are only issued after thorough examination of the facts presented.

Figure 4.5 shows the total number of applications for contravention licences received since 1986 under Sections 22(1) and 25(1) of the Act to emit air pollutants and discharge effluents exceeding prescribed standards. The number of applications for contravening Section 22(1) had

decreased from 45 in 1995 to 14 in 1996. Applications for Section 25(1) to contravene effluent discharge standards had also decreased from 69 in 1995 to 40 in 1996.

Figure 4.6a and 4.6b shows the status of application for contravention licences under Section 22(1) by activity. The figures indicate that 93% of applications were for open burning of wastes.

Figures 4.7a and 4.7b show the status of application for contravention licences under Section 25(1) according to the type of industry. Thirty eight licences were approved under Section 25(1) of the Act, while fifteen were rejected due to inadequate information and other reasons. Of the 11 approvals gave for contravention licences, the metal finishing, textile and food industries comprised the most number.

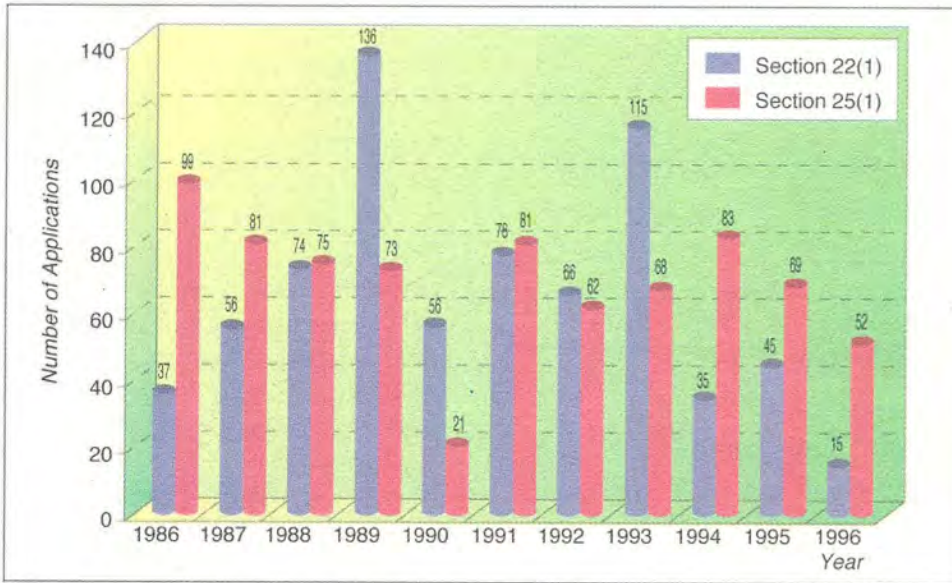


Figure 4.5 Malaysia: Number of Applications for Contravention Licence under Sections 22(1) and 25(1), Environmental Quality Act 1974 (1986-1996)

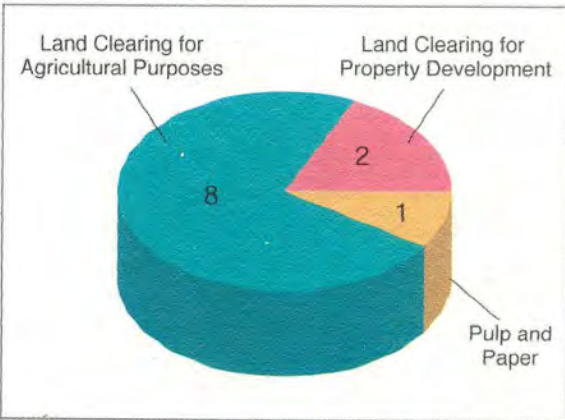


Figure 4.6a Malaysia: Number of Contravention Licences Approved under Section 22(1)

Figure 4.6b Malaysia: Number of Contravention Licences Rejected under Section 22(1)

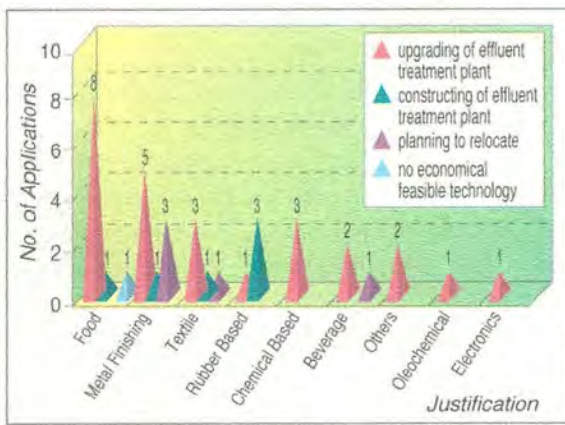


Figure 4.7a Malaysia: Number of Contravention Licences Approved under Section 25(1), Environmental Quality Act 1974

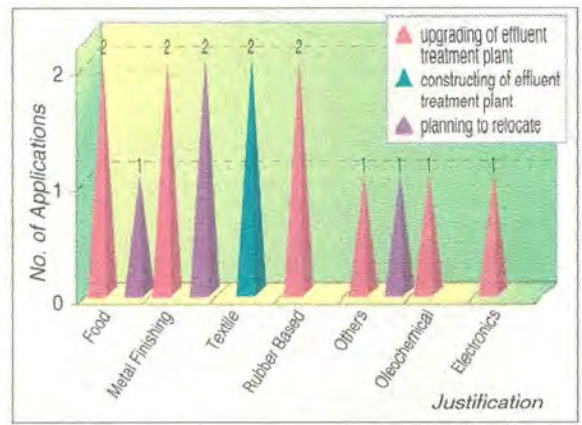


Figure 4.7b Malaysia: Number of Contravention Licences Rejected under Section 25(1), Environmental Quality Act 1974

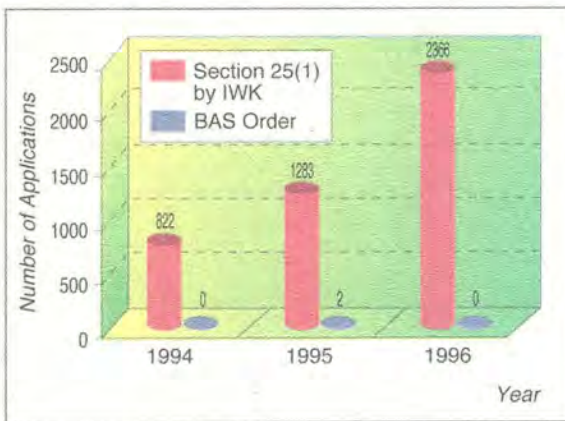


Figure 4.7c Malaysia: Number of Applications for Contravention Licences under Section 25(1), Environmental Quality Act 1974 and BAS Order (1994-1996)

Sewage Treatment and Disposal

DOE also received applications for contravention licences under Section 25(1) from Indah Water Konsortium Sdn. Bhd. (IWK), the Consortium that is responsible for the development, operation and maintenance of sewerage treatment facilities throughout the country under a privatisation agreement as shown in Figure 4.7c. The number of contravention licences applied by IWK to upgrade existing facilities increased from 1283 in 1995 to 2366 in 1996. Eighty two per cent of the applications were for renewal of existing licences while the other 18% were for new applications. The increase was due to the increase in the number of sewerage facilities handed over by the Local Authorities to IWK.

A Technical Working Group which comprised the DOE, the Sewerage Services Department (SSD) and IWK was established in July 1996 to discuss the various environmental and operational issues faced by IWK. The main objective of this Working Group is to facilitate compliance with the Environmental Quality Act, 1974 and

Sewerage Services Act 1993. The Working Group also agreed to:

- (i) Adoption of Guidelines on Sludge Disposal Sites Selection Criteria for use by State DOE and SSD; and
- (ii) Finalization of a Procedure for the application of written approval for disposal of sludge.

The Working Group also identified four of the most polluted river basins to be monitored by IWK which included Sungai Buloh, Sungai Perai, Sungai Dondang and Sungai Kelang. The parameters monitored were BOD₅, SS, NH₃-N and pH. The frequency of monitoring was once a month starting from the month of November 1996.

AIRBORNE SURVEILLANCE

The Joint Airborne Surveillance Programme between the Department of Environment and the Police Air Wing continued to provide useful and speedy surveillance information on activities violating of the Environmental Quality Act, 1974. A joint surveillance was also conducted, to investigate the occurrence of haze in March and August 1996.

Airborne surveillance on pollution activities were carried out in the States of Selangor, Negri Sembilan, Melaka, Johor, Pahang and the Federal Territory of Kuala Lumpur to detect excessive smoke emission from industries, open burning such as at dumping grounds and forest fires. The aerial surveillance helped to strengthen ground enforcement on open burning and stack emissions from industries.

Besides the Police Air Wing, the Air Force Unit of the Ministry of Defence also regularly assisted

the Department on detection of illegal oil or waste discharges in the Melaka Straits and the South China Sea.

Due to the success of this programme, a multipurpose airborne surveillance project to cover monitoring and surveillance of air, water and marine pollution is under consideration.



A typical aerial shot during the DOE - Royal Malaysian Police (Air Wing) airborne surveillance

SCHEDULED WASTES MANAGEMENT

Integrated Scheduled Wastes Treatment and Disposal Facility

The construction of the Integrated Scheduled Wastes Disposal and Treatment Facility in Bukit Nanas, Negeri Sembilan undertaken by Kualiti Alam Sdn Bhd (KA) intensified in 1996.

Scheduled Wastes Management

To ensure that implementation of the project proceed smoothly scheduled, the following Committees had been established:

- (i) Task Force on the Bukit Nanas Integrated Hazardous Waste Treatment Facility, chaired by the Deputy Secretary General I of MOSTE.

- (ii) Working Group on Bukit Nanas Integrated Hazardous Waste Treatment Facility, chaired by the Director, DOE Negeri Sembilan; and
- (iii) Inspection Team on Bukit Nanas Integrated Hazardous Waste Treatment Facility, chaired by the Deputy Director General of DOE.

For the year in review, the committees managed to facilitate and solve the following issues:

- (i) Land acquisition problem between Kualiti Alam Sdn Bhd and Kumpulan Guthrie Bhd;
- (ii) Temporary Certificate of Fitness (TCF) for Kualiti Alam's facilities;



Construction of Secured Landfill Cell at Bukit Nanas, Negri Sembilan in progress.

- (iii) Licences for transportation, temporary storage and secured landfill;
- (iv) Emergency Response Plan (ERP) for transportation of scheduled wastes;
- (v) Approvals from relevant government and utility agencies for the proper operation of the facility;
- (vi) Insurance of proper construction of the secured landfill according to specifications and quality assurance requirements;
- (vii) Environmental monitoring programme; and
- (viii) Fee structure for the use of Kualiti Alam's facility.

Protection Agency especially with regard the design requirements and quality assurance.

Written Permission/Enquiries/Licences To Handle Scheduled Wastes

In 1996, a total of 165 licences for the setting up of scheduled waste facilities and transportation were issued by the Department. The breakdown of facilities approved in 1996 compared to 1995, 1994 and 1993 is as shown in Figure 4.8. Figure 4.9 indicates the distribution of licences for hazardous waste treatment and disposal facilities issued according to States. An estimated amount of 331,000 tonnes of scheduled wastes were handled by these facilities.

The Inspection Team, in the course of its work, was assisted by a team from the US Environmental

Notification of Scheduled Waste Generation

The number of waste generators that complied with the notification requirement as mandated under regulation 3 of the Environmental Quality (Scheduled Wastes) Regulations, 1989, increased from 1061 in 1995 to 2252 in 1996. Figure 4.10 shows the overall compliance of industries in terms of notification of waste generation. Figures 4.11 shows the distribution of scheduled wastes generated according to State and Figure 4.12 shows the distribution of scheduled wastes generated according to waste category.



Storage Facilities of Scheduled Waste at Bukit Nanas, Negri Sembilan.

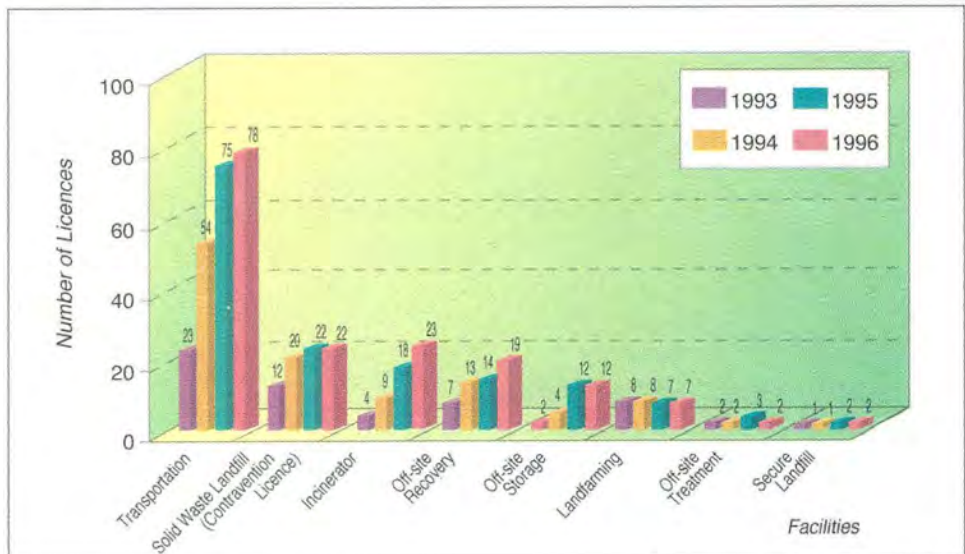


Figure 4.8 Malaysia: Types of Licences for Hazardous Waste Treatment and Disposal Facilities Issued by the Department of Environment, 1993-1996.

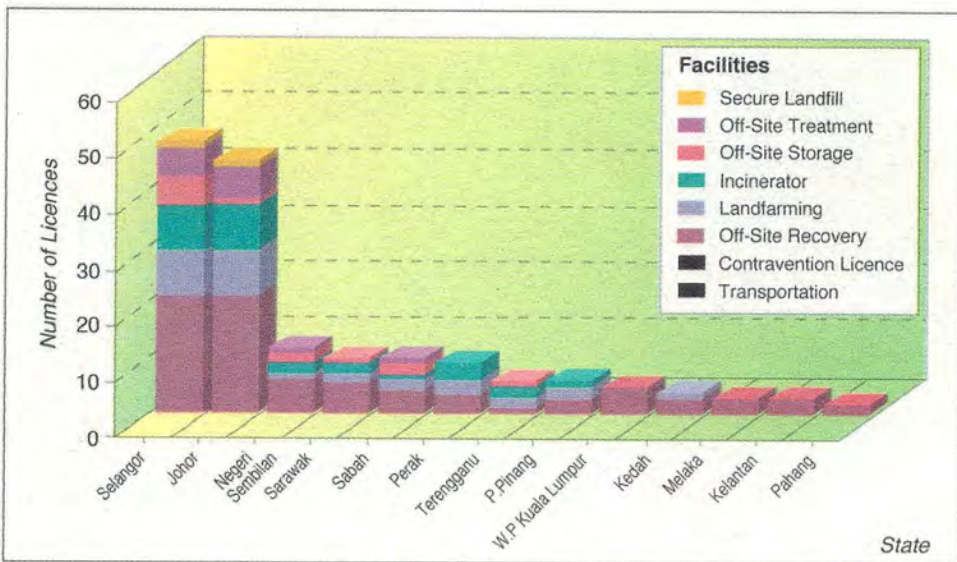


Figure 4.9 Malaysia: Distribution of Licences for Hazardous Waste Treatment and Disposal Facilities Issued by DOE according to State, 1996

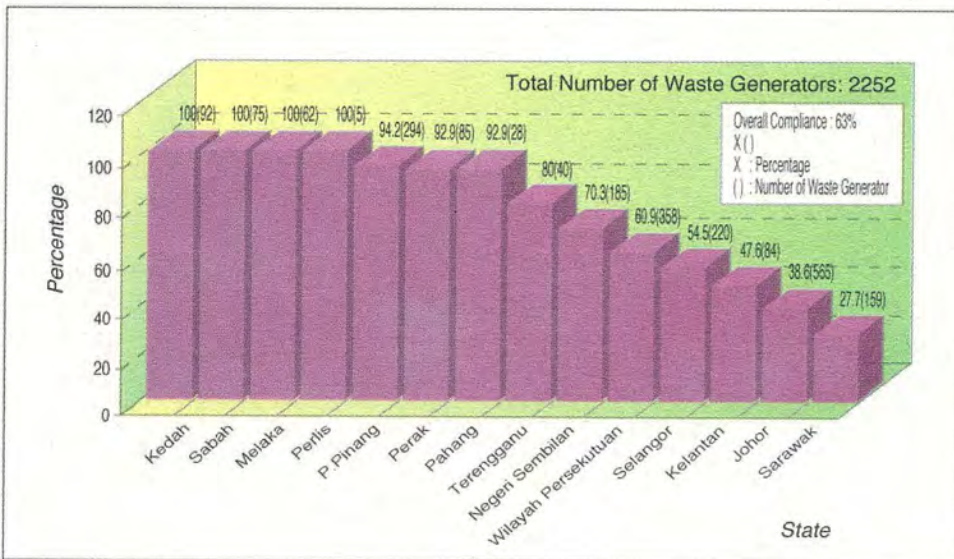


Figure 4.10 Malaysia: Status of Compliance to Notification of Scheduled Waste by State, 1996

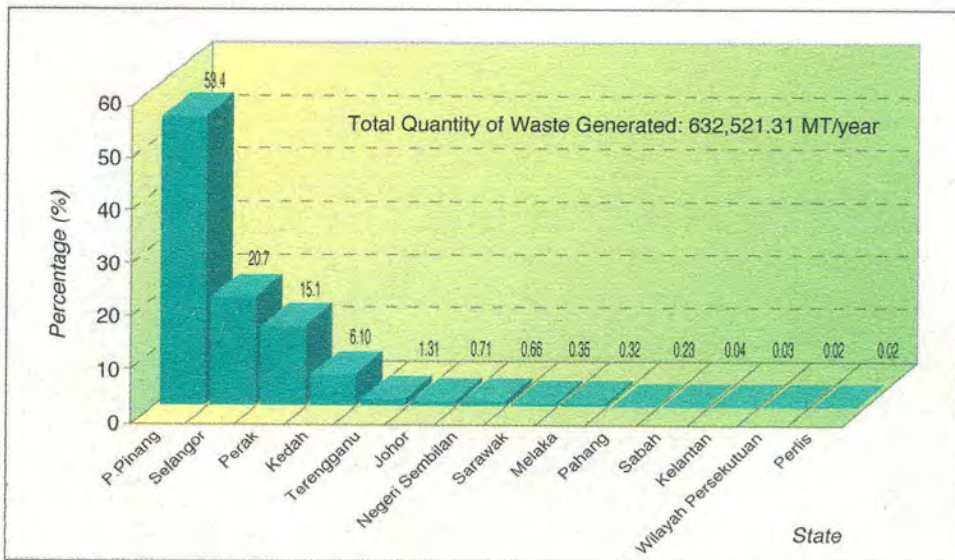


Figure 4.11 Malaysia: Distribution of Scheduled Wastes generated according to State, 1996

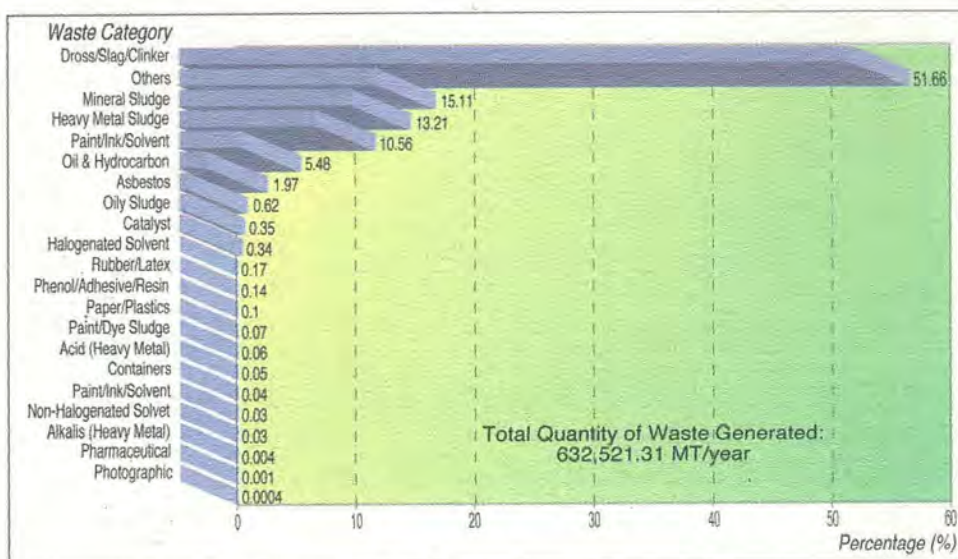


Figure 4.12 Malaysia: Quantity of Scheduled Wastes generated according to Waste Category, 1996

In addition, Guidelines for Export, Import and Storage of Scheduled Wastes in Malaysia were made available in the CD-ROM format. These guidelines aimed at assisting waste generators and waste handlers in applying for a written approval from the Director General of Environment as well as to indicate storage requirements for scheduled wastes.

A review of the Environmental Quality (Scheduled Wastes) Regulations 1989 was undertaken by the DOE in collaboration with a consultant from the Argonne National Laboratory, USA, and the Institute for Strategic and International Studies (ISIS). The project was funded by the United Nations Development Programme (UNDP). The review was aimed at improving waste definition and categorization, guidelines for waste sampling and analysis and waste minimization.

In April 1996, the DOE launched the MAWAR (Malaysian Agenda for Waste Reduction) Programme with the objective of encouraging industries to formulate a strategy for waste reduction. The initial response from the industries was not encouraging and follow-up activities would be undertaken in 1997.

A National Contingency Plan for transportation, storage and disposal of toxic and hazardous wastes was developed to deal with accidents and spillages involving such wastes. The development of the plan was in line with the setting up of the Integrated Facility for Treatment and Disposal of Scheduled Wastes that will be fully operational by 1998.

IMPLEMENTATION OF THE BASEL CONVENTION

In 1996, Malaysia continued to play an active role in the implementation of the Basel Convention. A total of 34 applications were processed during 1996 for the export of scheduled wastes, a 5-fold increase from the previous year. However, only 68% of this applications were approved (Figure 4.13). Eight applications were received for the import of scheduled wastes and 88% were approved (Figure 4.14). In November 1996, the special pilot project which started in late 1995 to implement a computerized system for the processing of export and import applications using the electronic data interchange (EDI) system was completed. It was anticipated that by using this system processing time and paperwork needed for these applications could be reduced.

In view of the requirements under the Basel Convention, more stringent control measures for the export and import of wastes had to be implemented. Potential exporters were required to declare fully to the DOE the characteristics, recoverable rate and the costs involved for wastes destined for recovery at overseas facilities. In addition, details of the directorship of foreign "waste broker firms" were obtained and their respective embassies in Malaysia were informed of their activities.

To further strengthen the regulatory provisions for the handling of scheduled wastes particularly those destined for import or export, an amendment to the Environmental Quality Act 1974 that came

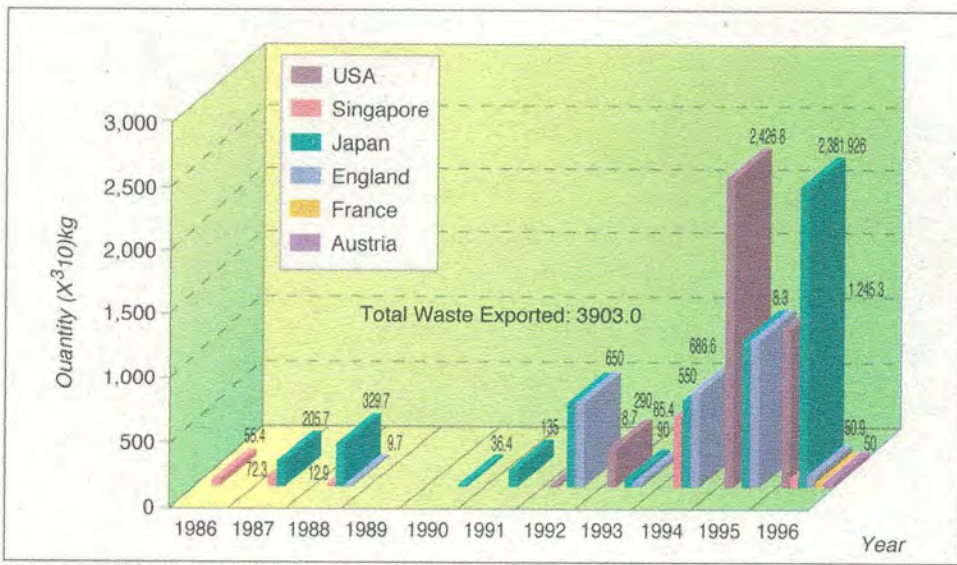


Figure 4.13 Malaysia: Quantity of Scheduled Waste Exported to Various Countries According to Year, 1986-1996

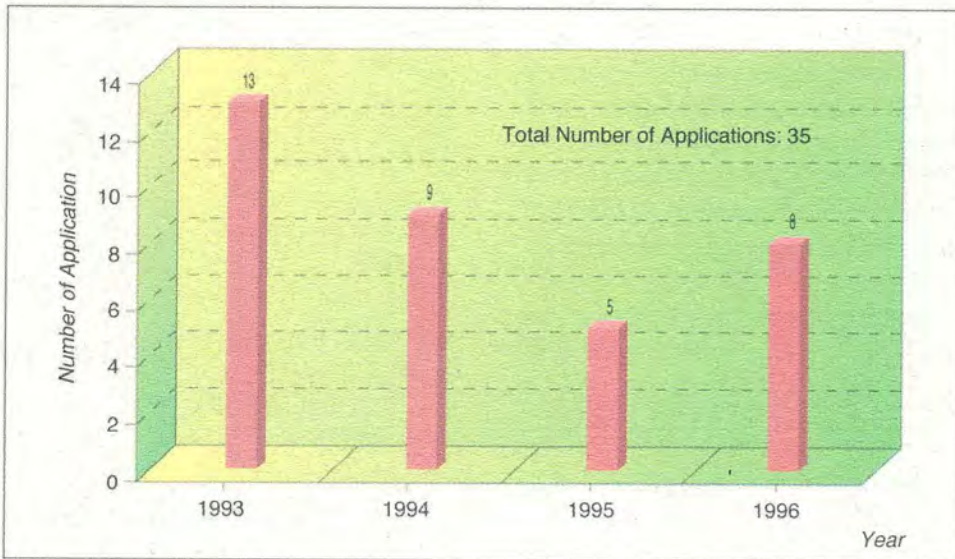
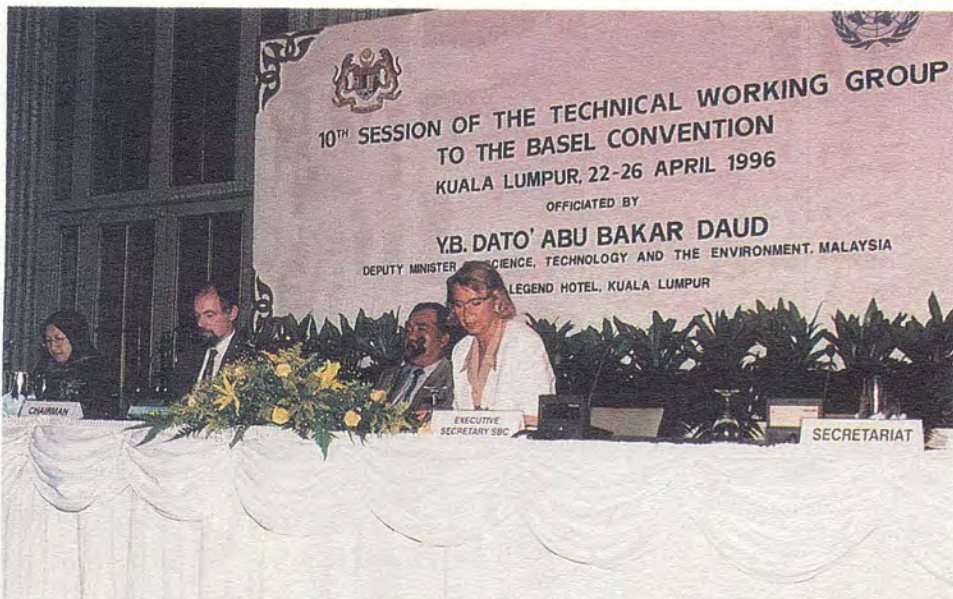



Figure 4.14 Malaysia: Number of Application to Import Scheduled Waste to Malaysia According to Year, 1993-1996



The 10th Session of the Technical Working Group to the Basel Convention officiated by the Deputy Minister of Science, Technology and the Environment on April 22-26, 1996



into force from 1 August 1996 was made, whereby a new Part IVA was inserted which specified prohibition of movements, transit or receipt of scheduled wastes unless with prior written approval from the DG. In addition, the new amendment makes it an offence for illegal trafficking in scheduled wastes. These amendments complemented the control requirements already enforced under the Customs Act 1967. The amendment also gave the DG the power to seal and confiscate any vehicles or vessels involved in illegal trafficking of scheduled waste and penalties had been increased to a maximum of RM 500,000 or 5 years' jail or both.

The Tenth Session of the Technical Working Group (TWG) of the Basel Convention was held in Kuala Lumpur from 22 to 26 April 1996. At the Kuala Lumpur meeting and the Eleventh Meeting held in Manchester, United Kingdom from 9 to 13 September 1996, the TWG made considerable progress in the modification of the list of hazardous wastes as mandated by the Third Meeting of the Conference of the Parties (COP) in September 1995, with the view to implement the ban on the shipments of hazardous wastes from OECD to non-OECD that would take effect from 1 January 1998.

Annexes I and II have been sub-divided into three lists:

- **List A** wastes: waste streams which are hazardous in nature and subject to the ban and are only exempted if they are proven not to contain Annex III hazardous characteristics.
- **List B** wastes: not covered by the ban because they are considered as not exhibiting hazardous characteristics or because they contain Annex I constituents at less than specific concentrations which would then caused them to be categorized as hazardous.
- **List C** wastes: waste which are yet to be classified under List A or B. As of September 1996, ten categories of wastes remained or were added to List C for future consideration.

The TWG also considered the issue of *de minimis* concentrations for certain waste streams such as polychlorinated biphenyls (PCBs) at less than 50 mg/kg, but minimum levels for dioxins and dibenzofurans were not determined. The *de minimis* levels for metals and contaminants in certain instances were found to be impractical. The TWG also recommended some changes to the draft technical guidelines on physico-chemical and biological treatment

of wastes, and its position paper on hazards characterization and classification of wastes under the Convention.

In another development, the Legal and Technical Expert Group Meeting for the Drafting of a Protocol on Liability and Compensation for Damage as a Result of Transboundary Movements of Wastes which met in May 1996 in Geneva failed to reach agreement for the Draft Protocol as well as the establishment of the Compensation Fund. Many parties, whether from developed or developing countries, were at divergent views with regard to the major provisions of the proposed Protocol and many developed countries were against the establishment of the Compensation Fund. However, some progress had been made in the establishment of the Regional Centers, for Training and Technology Transfer under the Convention as agreed at the Third COP. For example, at the meeting in July 1996 in Beijing, China, countries in the Asia and Pacific Region agreed to the establishment of two centers, one each in China and Indonesia, for this Region. The proper functioning of those centers, however, would depend heavily on the readiness of the host countries to provide facilities and core personnel for the operation of the centers. Support from other countries and industries would be needed to sustain these centers financially due to the lack of funds from the Secretariat of the Basel Convention.

Malaysia also attended a Workshop on the Implementation of the Basel Convention held in Serpong, Indonesia which was organized by BAPEDAL Indonesia and funded by the Government of Netherlands from 28 to 31 October 1996. The Workshop managed to impart knowledge to the participants with respect to the basic principles and requirements of the Basel Convention; dealing with illegal trafficking; problems on the import and export of recoverables; trends in hazardous waste management in the Netherlands and the European Community; and cooperation between countries in the ASEAN region in information exchange and technology transfer on hazardous waste management.

CONTROL OF MOBILE SOURCES

By the end 1996, there were 7.7 million motor vehicles registered in Malaysia compared to 6.8 million in 1995, an increase of 0.9 million vehicles or 12% from the previous year.

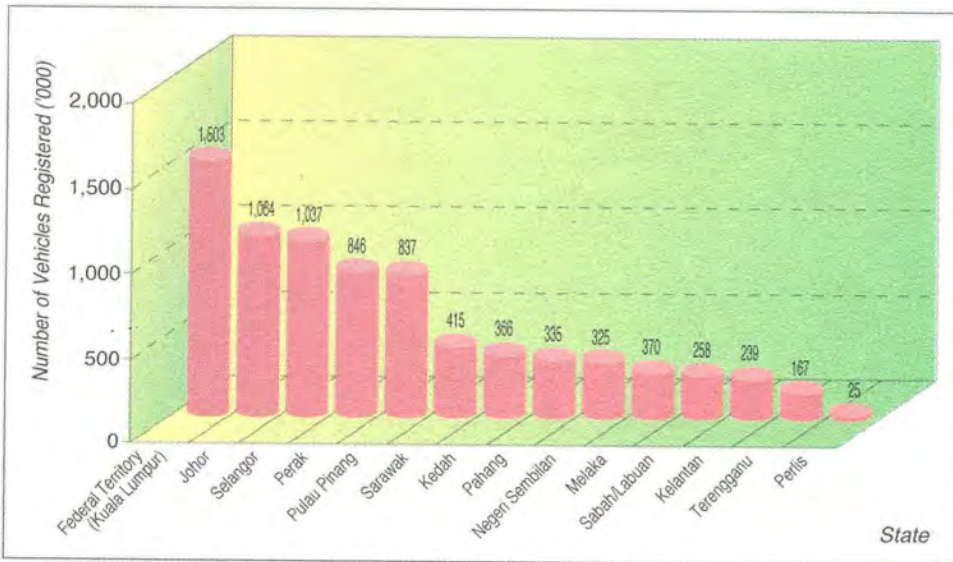


Figure 4.15 Malaysia: Distribution of Motor Vehicles Registered According to State, 1996

The distribution of motor vehicles according to States is given in Figure 4.15. Wilayah Persekutuan had the highest vehicle population, followed by Johor, Selangor, Perak and Pulau Pinang.

Motor vehicle had been identified as the major contributor to air pollution especially in urban areas by emitting 2.4 million tonnes of carbon monoxide, 457.9 thousand tonnes of hydrocarbon, 146.3 thousand tonnes of oxides nitrogen and 19 thousand tonnes of particulate matters into the environment each year.

Black Smoke Emissions

The Environmental Quality (Control of Emissions From Diesel Engines) Regulations 1996 was

gazetted on 1 September 1996 and the Motor Vehicles (Control of Smoke And Gas Emission) Rules 1977 were rescinded by the Ministry of Transport. The Environmental Quality (Control of Emission from Petrol Engines) Regulations 1996 came into force on 1st November 1996.

The above new regulations focused more on a preventive approach: i.e. control of vehicular emissions at the manufacturing or assembly stage. Beginning 1st January 1997, new models of motor vehicles would be required to comply to certain emission standards before they would be allowed to be in operation. The emission standards incorporated in the above new regulations were based on the European Economic Commission on Standards.

In 1996, the Department of Environment with the co-operation of the Royal Malaysian Police



Normal kerbside enforcement campaigns to check against intensive smoke emission from diesel-powered vehicles.

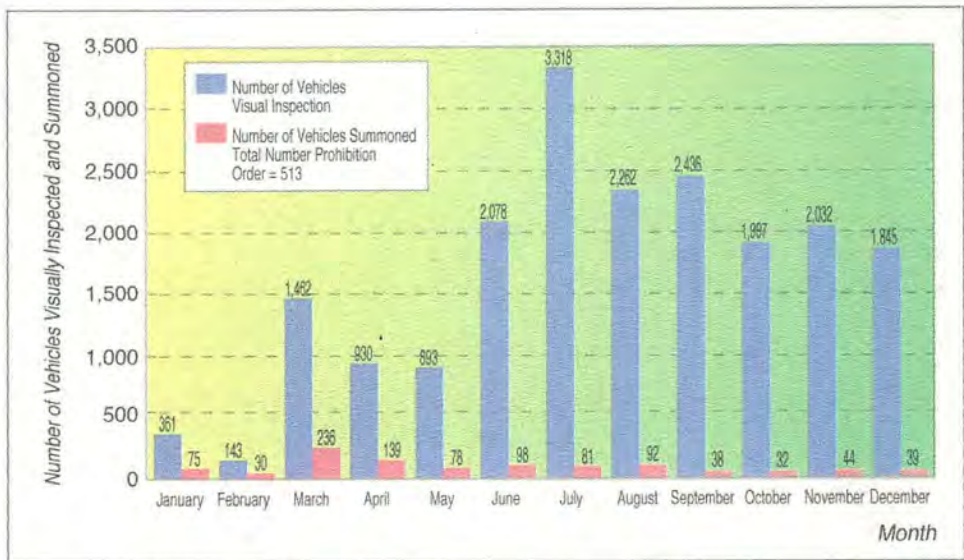


Figure 4.16 Malaysia: Enforcement of Motor Vehicles Visually Inspected and Summoned under the AWASI Programme, 1996

(Traffic Division) conducted 409 enforcement campaigns throughout the country. A total of 43,900 vehicles were tested, out of which 7,154 (16%) summons were issued for violating the permissible limit of 50 HSU. Compliance was 84%. The number of smoky vehicles summoned in 1996 had reduced due to the implementation of AWASI (Area Watch And Sanction Inspection) programme in 1996. Implementation of this programme was done by visually observing the motor vehicle exhausts by the Departments' mobile squad. This squad, equipped with a computer tracking system would be patrolling the streets and subsequently stopping and testing vehicles emitting excessive smoke. The implementation procedures for the AWASI Programme is given in Figure 4.14a. From the AWASI campaign conducted in 1996, a total of 20,137 vehicles were visually inspected, out of which 982 were summoned and 531 vehicles were issued with prohibition orders. These prohibited vehicles were allowed back on the road after undergoing repair and a smoke retest by the DOE.

Figure 4.16 shows the monthly statistics on the number of vehicles visually inspected, summoned and prohibited under the AWASI programme in 1996.

Since consultation resumed in November 1995, the motorcycle industries had continued to resist DOE's proposal to adopt more stringent standards similar to Taiwanese Stage 2 rather than the lax EU standard, while allowing existing models to phase out gradually, citing economic

considerations to continue with the special models produced to this part of the world, the lack of technology and higher cost.

Lead in Motor Gasoline

In 1996, all 168 samples of leaded petrol randomly collected nationwide from petrol kiosks were found to comply with the lead level of 0.15 grams per liter as specified under the Environmental Quality (Control of Lead Concentration in Motor Gasoline) Regulations 1985. All samples of unleaded petrol also complied with the MS Specifications.

Compared to 1995, the nationwide retail sale of unleaded gasoline (ULG) had increased from 68% to 76% in 1996 as shown in Figure 4.17. This figure is anticipated to increase in 1997 with the introduction of new Regulations for petrol engines.

Motor Vehicle Noise

In 1996, 151 kerbside enforcement campaigns were conducted by DOE State Offices with the co-operation of Royal Malaysian Police. Out of 7,337 motorcycles tested, 2149 or 71% were summoned for violating the permissible noise limits as prescribed under the Environmental Quality (Motor Vehicle Noise) Regulations 1987, compared to 1,535 motorcycles or 83% summoned from the 4,782 tested in 1995. Figure 4.18 shows the number of motorcycles tested according to States.

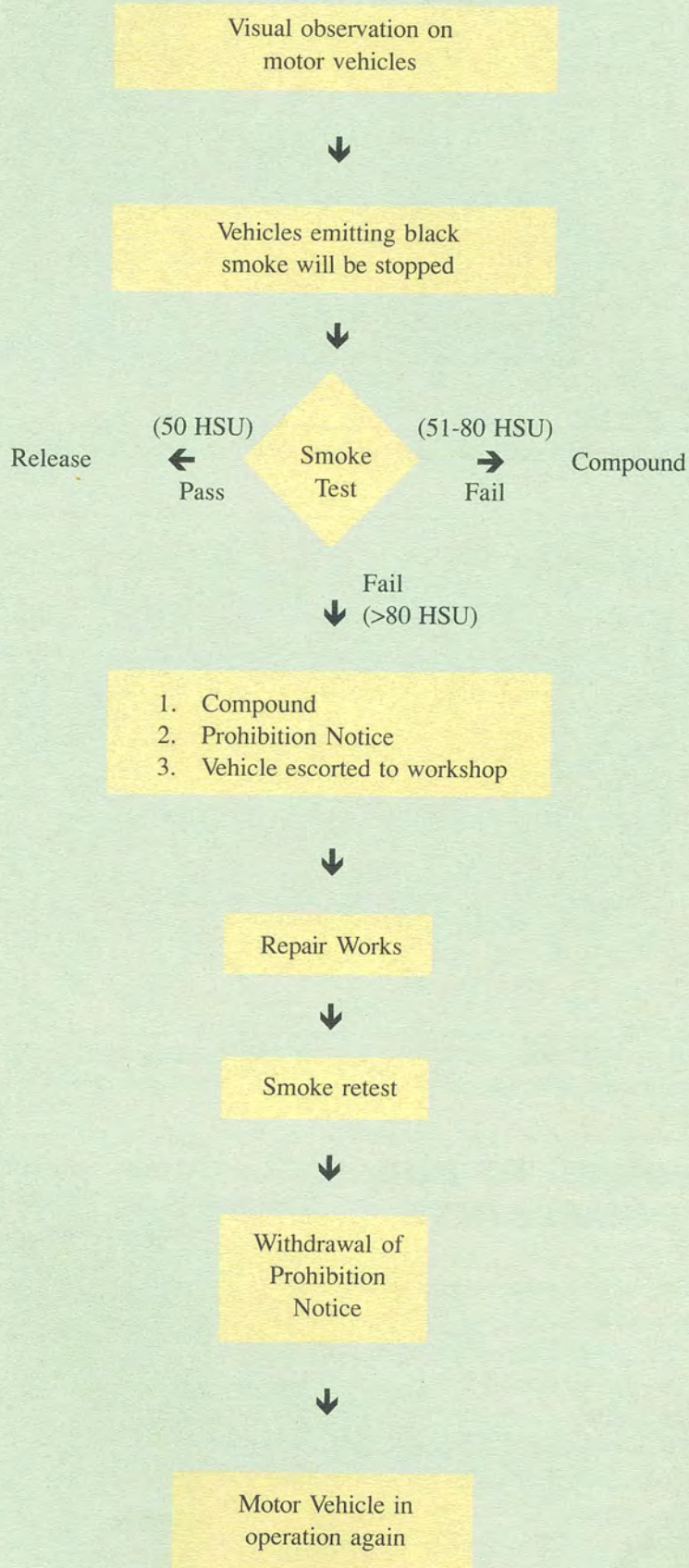


Figure 4.16a Flowchart on Implementation Procedure for AWASI Programme

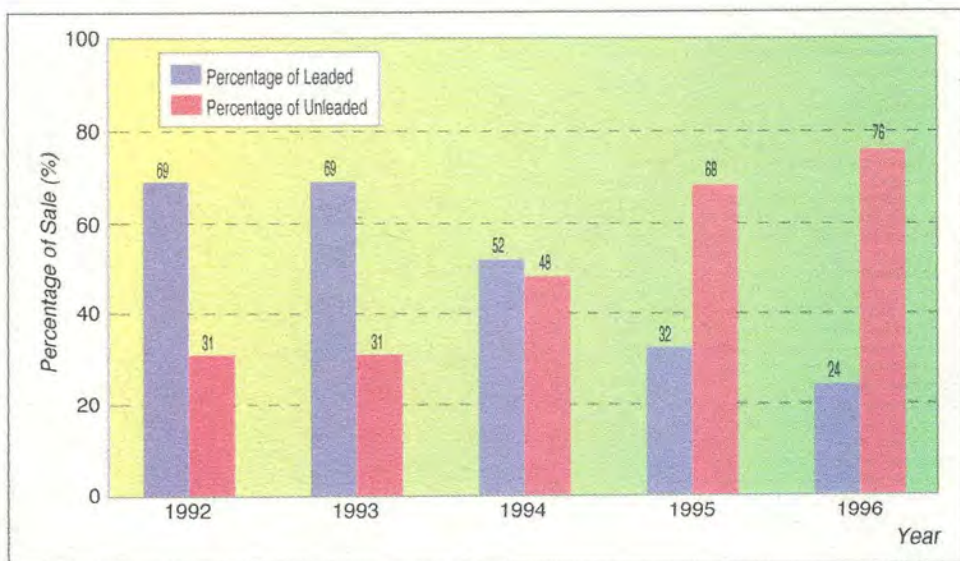


Figure 4.17 Malaysia: Percentage of Sale of Leaded and Unleaded Gasoline, 1992-1996

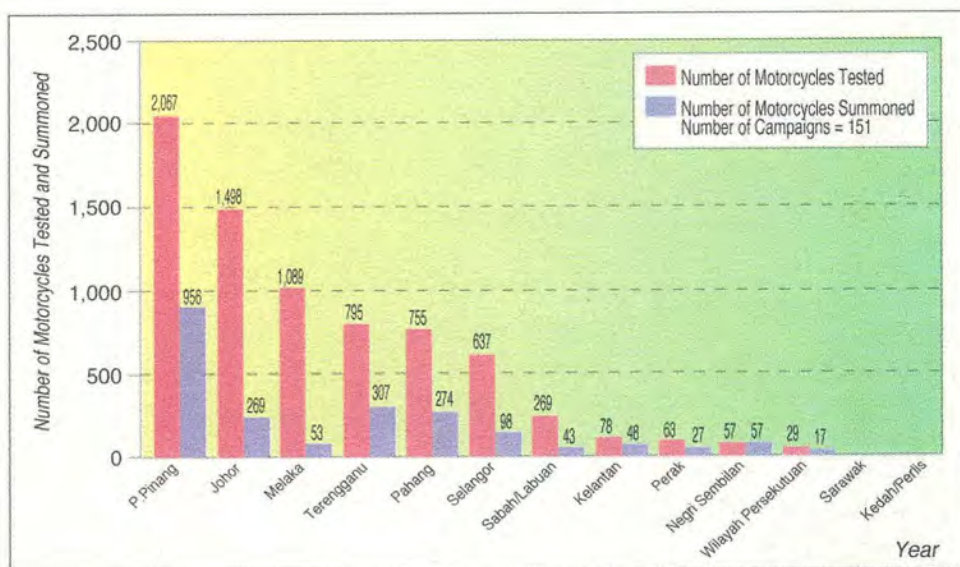


Figure 4.18 Malaysia: Enforcement of Environmental Quality (Motor Vehicle Noise) Regulations, 1987, number of Motorcycles tested and Summoned by State, 1996

RESPONSE TO PUBLIC COMPLAINTS

The Department of Environment places great priority on complaints received from the public, through the mass-media, from relevant agencies, non-governmental bodies as well as individuals. Pollution complaints can be used as an indicator of the effectiveness of enforcement programmes and public awareness of pollution problems.

In response to complaints, received in writing or through the telephone, investigations would be carried out by the State Offices of the Department and appropriate follow-up actions were taken according to the provisions under the Environmental Quality Act, 1974.

Public complains could be made to DOE through its Toll-Free Hotline 800-3434 even after office hours.

In the year 1996, a total of 3177 complaints were received by the Department of Environment including complaints received through the 'Hotline'. The yearly trend of complaints since 1986 is as shown in Figure 4.19. Analysis of the data received showed that the majority of the complaints were received from Selangor followed by the Federal Territory of Kuala Lumpur, Pulau Pinang and Johor. The detail breakdown of complaints received by States is as shown in Figure 4.20. Analysis of the complaints received showed that the nature, types and sources of alleged pollution were fairly similar to those of previous years as shown in Figure 4.21.

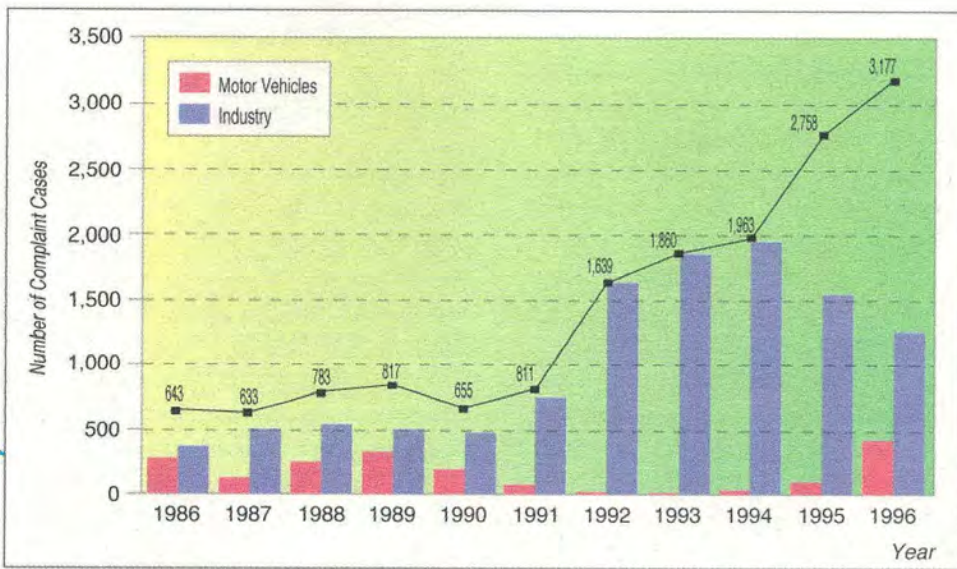


Figure 4.19 Malaysia: Trend in the Number of Complaints Cases Received by the Department of Environment, 1986-1996

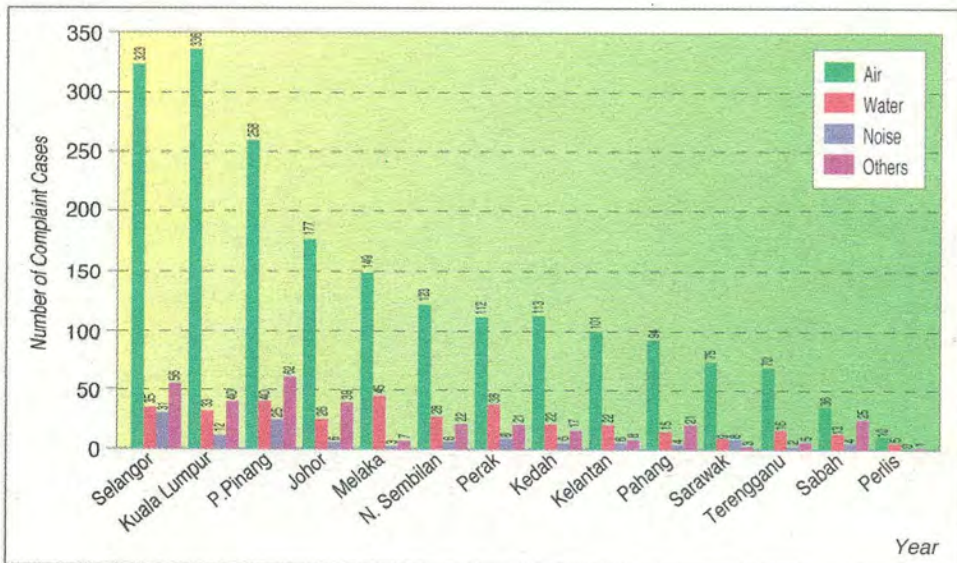


Figure 4.20 Malaysia: Nature of Pollution Complaints by State, 1996

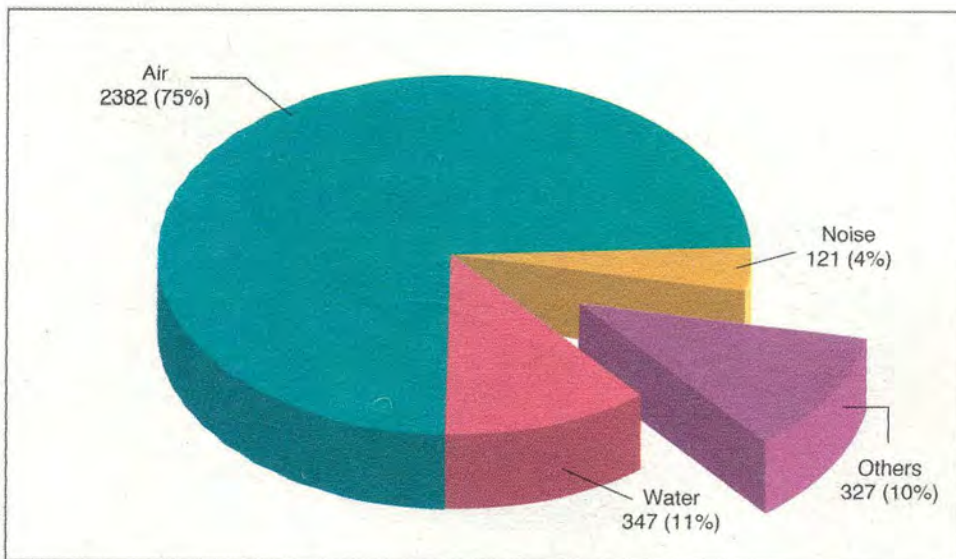


Figure 4.21 Malaysia: Nature of Complaints Received by the Department of Environment, 1996