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KEMENTERIAN SUMBER ASLI DAN ALAM SEKITAR MALAYSIA
DEPARTMENT OF ENVIRONMENT
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT MALAYSIA

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Abbreviations

Hidro Klorofluorokarbon	HCFC	Hydro Chlorofluorocarbon
Pengurusan Zon Pantai Bersatu	ICZM	Integrated Coastal Zone Management
Unit Asap Hartridge	HSU	Hartridge Smoke Unit
Institut Diplomasi & Hal Ehwal Luar	IDHL	Institute of Diplomacy & Foreign Relations
Indeks Kualiti Air Negara	IKAN	National Water Quality Index
Organisasi Maritim Antarabangsa	IMO	International Maritime Organization
Sistem Rujukan Antarabangsa Untuk Sumber-Sumber Maklumat Mengenai Alam Sekitar	INFOTERRA	International Referral System for Sources of Environmental Information
Institut Tadbiran Awam Negara	INTAN	National Institute of Public Administration
Program Antarabangsa Mengenai Keselamatan Bahan Kimia	IPCS	International Programme on Chemical Safety
Pendaftaran Antarabangsa Bagi Bahan Kimia yang Berpotensi Berbahaya	IRPTC	International Register of Potentially Toxic Chemicals
Institut Kajian Strategik dan Antarabangsa	ISIS	Institute of Strategic and International Studies
Agensi Kerjasama Antarabangsa Jepun	JICA	Japan International Co-Operation Agency
Jabatan Perkhidmatan Awam	JPA	Public Services Department
Jabatan Pengairan dan Saliran Malaysia	JPS	Department of Irrigation and Drainage Malaysia
Kementerian Sains, Teknologi dan Inovasi	MOSTI	Ministry of Science, Technology and Innovation
Kumbahan & Effluen-Effluen Perindustrian	KEEP	Sewage & Industrial Effluents
Kilang Kelapa Sawit Mentah	KKSM	Crude Palm Oil Mill
Penyaman Udara Kenderaan	MAC	Mobile Air Conditioning
Pusat "Remote Sensing" Malaysia	MACRES	Malaysia Centre of Remote Sensing
Minggu Alam Sekitar Malaysia	MASM	Malaysia Environment Week
Menteri dan Ahli Majlis Mesyuarat Kerajaan Negeri yang Bertanggungjawab ke Atas Alam Sekitar	MEXCOE	Ministers and State Executive Councillors Responsible for Environmental Matters
Dewan Perdagangan dan Industri Antarabangsa Malaysia	MICCI	Malaysian International Chamber of Commerce and Industry
Institut Penyelidikan Ekonomi Malaysia	MIER	Malaysian Institute of Economic Research
Institut Teknologi Nuklear Malaysia	MINT	Malaysia Institute of Nuclear Technology
Persatuan Pemasang Kenderaan Bermotor Malaysia	MMVAA	Malaysian Motor Vehicle Assemblers' Association
Persatuan Pencinta Alam Malaysia	MNS	Malaysian Nature Society
Kementerian Perdagangan Antarabangsa dan Industri	MITI	Ministry of International Trade and Industry
Pertubuhan Kelapa Sawit Malaysia	MPOA	Malaysian Palm Oil Association
Kementerian Pertanian	MOA	Ministry of Agriculture
Kementerian Kesihatan	MOH	Ministry of Health
Kementerian Pembangunan Sumber Manusia	MOHR	Ministry of Human Resources
Kementerian Pengangkutan	MOT	Ministry of Transport
Memorandum Persefahaman	MOU	Memorandum of Understanding
Majlis Pengeluar-Pengeluar Getah Malaysia	MRPC	Malaysian Rubber Products Manufacturers' Council
Jawatankuasa Bersama Malaysia – Singapura Mengenai Alam Sekitar	MSJCE	Malaysia – Singapore Joint Committee on the Environment
Pertubuhan Bukan Kerajaan	NGO	Non-Governmental Organisation

SINGKATAN
Abbreviations

Bank Pembangunan Asia	ADB	Asian Development Bank
Tahun Alam Sekitar ASEAN	AEY	ASEAN Environment Year
Akta Kualiti Alam Sekeliling	AKAS	Environmental Quality Act
Mesyuarat Menteri-Menteri ASEAN Mengenai Alam Sekitar	AMME	ASEAN Ministerial Meeting on the Environment
Pertubuhan Negara-Negara Asia Tenggara	ASEAN	Association of South East Asian Nations
Pegawai-Pegawai Kanan Alam Sekitar ASEAN	ASOEN	ASEAN Senior Officials on the Environment
Area Watch and Sanction Inspection	AWASI	Area Watch and Sanction Inspection
Buangan Terjadual	BT	Scheduled Wastes
Brunei – Indonesia – Malaysia – Filipina	BIMP	Brunei – Indonesia – Malaysia – Philippines
Keperluan Oksigen Biokimia	BOD	Biochemical Oxygen Demand
Bahan Pemusnah Ozon	BPO	Ozone Depleting Substance
Udara Bersih	CA	Clean Air
Pusat Alam Sekitar, Teknologi dan Pembangunan Malaysia	CETDEM	Centre for Environment, Technology and Development Malaysia
Klorofluorokarbon	CFC	Chlorofluorocarbon
Majlis Industri Kimia Malaysia	CICM	Chemical Industries Council of Malaysia
Pusat Pengurusan Pantai	CMC	Coastal Management Centre
Badan Penyelaras Mengenai Laut Asia Timur	COBSEA	Co-ordinating Body for the Seas of East Asia
Keperluan Oksigen Kimia	COD	Chemical Oxygen Demand
Kelapa Sawit Mentah	CPO	Crude Palm Oil
Desibel	dB	Decibel
Jabatan Alam Sekitar	DOE	Department of Environment
Sistem Pengurusan Dokumen	DOKUMAS	Document Management System
Kawasan Pertumbuhan ASEAN Timur	EAGA	East ASEAN Growth Area
Escherichia coli	*E.coli*	*Escherichia coli*
Zon Ekonomi Eksklusif	EEZ	Exclusive Economic Zone
Penilaian Kesan Kepada Alam Sekeliling	EIA	Environmental Impact Assessment
Persatuan Pelindungan Alam Sekitar Malaysia	EPSM	Environment Protection Society of Malaysia
Unit Perancang Ekonomi	EPU	Economic Planning Unit
Majlis Kualiti Alam Sekeliling	EQC	Environmental Quality Council
Laporan Kualiti Alam Sekeliling	EQR	Environmental Quality Report
Pesuruhjaya Ekonomi & Sosial Asia Pasifik	ESCAP	Economic & Social Commission for Asia and the Pacific
Institut Alam Sekitar Malaysia	EIMAS	Environment Institute of Malaysia
Ahli Mesyuarat Kerajaan Negeri	EXCO	Executive Councillors
Persatuan Pekilang-Pekilang Malaysia	FMM	Federation of Malaysian Manufacturers
Persekutuan Pertubuhan Pengguna-Pengguna Malaysia	FOMCA	Federation of Malaysian Consumers' Association
Institut Penyelidikan Hutan Malaysia	FRIM	Forest Research Institute of Malaysia
Kemudahan Alam Sekitar Global	GEF	Global Environment Facility
Sistem Maklumat Geografik	GIS	Geographical Information System

SINGKATAN
Abbreviations

Kementerian Sumber Asli dan Alam Sekitar	NRE	Ministry of Natural Resources and Environment
Ammonikal Nitrogen	NH_3N	Ammoniacal Nitrogen
Pertubuhan Kerjasama Ekonomi dan Pembangunan	OECD	Organisation for Economic Co-operation and Development
Pertubuhan Kerjasama Alam Sekitar bagi Laut Asia Timur	PEMSEA	Partnership in Environmental Management for the Seas of East Asia
Kebenaran Maklumat Awal	PIC	Prior Informed Consent
Persatuan Pekilang-Pekilang Minyak Kelapa Sawit Malaysia	POMA	Palm Oil Millers' Association
Institut Penyelidikan Minyak Kelapa Sawit	PORIM	Palm Oil Research Institute of Malaysia
Ringgit Malaysia	RM	Ringgit Malaysia
Institut Penyelidikan Getah Malaysia	RRIM	Rubber Research Institute of Malaysia
Urusetia Konvensyen BASEL	SBC	Secretariat for BASEL Convention
Institut Standard dan Penyelidikan Industri Malaysia	SIRIM	Standard Industrial Research Institute of Malaysia
Udara Bersih	UB	Clean Air
Universiti Islam Malaysia	UIA	International Islamic University
Universiti Kebangsaan Malaysia	UKM	Universiti Kebangsaan Malaysia
Universiti Malaya	UM	Universiti Malaya
Persidangan Bangsa-Bangsa Bersatu Mengenai Alam Sekitar dan Pembangunan	UNCED	United Nations Conference on Environment and Development
Program Pembangunan Bangsa-Bangsa Bersatu	UNDP	United Nations Development Programme
Universiti Tenaga Malaysia	UNITEN	Universiti Tenaga Malaysia
Unit Perancang Ekonomi	UPE	Economic Planning Unit
Universiti Putra Malaysia	UPM	Universiti Putra Malaysia
Universiti Sains Malaysia	USM	Universiti Sains Malaysia
Yang Berhormat	Y. B.	The Honorable
Polis Diraja Malaysia	PDRM	Polis Diraja Malaysia
Kompaun Organik Meruap	VOC	Volatile Organic Compound
Wilayah Kualiti Air	WQR	Water Quality Region

Dato' Hajah Rosnani Ibarahim

Ketua Pengarah / Director General Kualiti Alam Sekeliling Malaysia / Environmental Quality Malaysia

Jabatan Alam Sekitar dengan sukacitanya membentangkan Laporan Tahunan 2006 yang merangkumi ruang lingkup kerja dan pencapaian pada tahun tersebut.

Penguatkuasaan yang merupakan tugas utama Jabatan Alam Sekitar terus diberikan penekanan. Pemeriksaan ke atas premis industri terutamanya melibatkan buangan bahan terjadual dengan menggunakan prosedur audit alam sekitar telah dimulakan untuk meningkatkan jejak pergerakan bahan buangan dari premis pengeluar buangan ke tempat pelupusan akhir. Bagi meningkatkan keberkesanan penguatkuasaan dalam pelepasan asap hitam kenderaan, pendekatan alternatif menggunakan video kamera di lokasi-lokasi strategik bagi merakam pesalah. Jabatan juga telah mendapatkan bantuan dari pihak RELA dalam usaha penguatkuasaan, terutamanya dalam mengenalpasti kes-kes pembakaran terbuka yang menyumbang masalah jerebu kepada negara. 362 kes perlanggaran Akta Kualiti Alam Sekeliling 1974 telah berjaya dibicarakan pada tahun 2006 melibatkan denda sebanyak RM 2,750,100. Sejumlah 7,244 kompoun juga dikeluarkan untuk pelbagai kesalahan alam sekitar.

Prosedur Penilaian Kesan Kepada Alam Sekeliling (EIA) diteruskan sebagai strategi asas pencegahan yang dikuatkuasakan oleh Jabatan bagi mengurangkan kesan kepada alam sekeliling dari projek pembangunan. Sejumlah 278 laporan telah diluluskan dalam tahun 2006. Tambahan pula, sejumlah 3,965 kebenaran bertulis dan kelulusan telah dikeluarkan dan 10,940 penilaian awal tapak telah dijalankan.

Sebanyak 56 Kebenaran Bertulis telah diluluskan oleh Ketua Pengarah untuk pembinaan kemudahan pengolahan dan pelupusan buangan terjadual. Kebenaran Bertulis berkenaan telah diberi kepada 30 kemudahan pemerolehan kembali separa (e-waste), satu (1) kemudahan pemerolehan kembali penuh (e-waste),

The Department of Environment wishes to present the 2006 Annual Report which provides an account of its work and achievement in the year.

Enforcement being the core business of the Department of Environment continues to be given emphasis. Inspection of industrial establishments especially those that handle scheduled wastes, using the environmental audit procedures was initiated to further improve on tracking the movement of wastes from the premises of waste generators to its final destination. Alternative approaches were studied to further enhance the effectiveness of vehicular black smoke emission enforcement work including use of video camera at various strategic locations to record the culprit. The assistance of RELA was sought after in its enforcement efforts to detect cases of persistent open burning in fire prone areas that could contribute to problem of haze in the country. 362 cases of violation the Environmental Quality Act 1974 were successfully prosecuted in 2006 resulting in fines of RM 2,750,100. A total of 7, 244 compound fines were also issued for various environmental offences.

Environmental Impact Assessment (EIA) procedure continued to be the main preventive strategy enforced by the DOE to mitigate the environmental impacts from project development. A total of 278 EIA reports were approved in 2006. Additionally 3,965 written permissions and approvals were issued and 10,940 preliminary site assessments were conducted.

56 Written Permissions were granted by the Director General for the construction of treatment and disposal facility for scheduled wastes; namely 30 off-site partial recovery plants (e-waste), one (1) off–site full recovery plant (e-waste), 17 off-site recovery plants (non-e-waste); 7 scheduled wastes incinerators and one (1) off-site storage

17 kemudahan pemerolehan kembali (bukan e-waste), 7 kemudahan penunu buangan terjadual dan satu kemudahan penstoran luar tapak. Sejumlah 394 lesen diluluskan kepada kemudahan baru dan kemudahan sediada untuk pemerolehan kembali luar tapak, penstoran luar tapak-pengangkutan, penunu buangan terjadual, pengolahan atas tanah, pengolahan luar tapak dan tapak pelupusan selamat.

facility. A total of 394 licenses were issued for both existing and new facilities for off-site recovery, off-site storage, transportation, scheduled wastes incinerators, land treatment, off-site treatment and secured landfills.

Jabatan juga menyediakan maklumat dan pendidikan kepada orang awam dari aspek penjagaan dan peningkatan kualiti alam sekitar. Di antara program yang telah dilaksanakan pada tahun 2006 adalah Kem Kesedaran Alam Sekitar untuk pelatih-pelatih guru, Sekolah Lestari-Anugerah Alam Sekitar dan Bandar Lestari-Anugerah Alam Sekitar. Sejumlah 677,800 naskah bahan bercetak telah diedarkan kepada orang awam melalui pameran, kempen, perpustakaan awam, sekolah, hospital dan institut pengajian tinggi. Jabatan juga telah memulakan program usahasama telefon bimbit dan bateri telefon bimbit dengan pengeluar utama telefon bimbit dan penyedia perkhidmatan pada tahun 2006 untuk kitar semula telefon bimbit dengan meletakkan tong-tong pengumpulan di lokasi-lokasi strategik seperti kompleks membeli-belah dan institusi pengajian tinggi.

The Department continued to provide information and education to the general public on the protection and enhancement of the environment. Among the programs implemented in 2006 were the environmental awareness camps to trainee teachers, Sekolah Lestari Environmental Award and Bandar Lestari Environmental Award. A total of 677, 800 copies of printed material were distributed to members of the public through exhibitions, campaigns, public libraries, schools, hospitals and institutes of higher learning. The Department initiated in 2006 a collaborative program with major hand-phone manufacturers and service providers to recycle hand-phones and hand-phone batteries by placing collection bins at strategic locations such as shopping malls and higher learning institutions.

Menyedari kepentingan perlunya kakitangan JAS mempunyai kemahiran dalam aspek pengurusan alam sekitar, pelbagai program-program latihan untuk kakitangan JAS termasuk pihak industri telah pun diadakan seperti latihan pemeriksaan peralatan, pemantauan prestasi, pemantauan berterusan pelepasan, keperluan penyimpaan rekod dan lain-lain lagi. Program sijil kompetensi untuk pekerja industri juga diperkenalkan untuk meningkatkan pengurusan alam sekitar dalam industri dan meningkatkan pematuhan undang-undang. Beberapa dokumen garis panduan teknikal juga telah diterbitkan untuk panduan kakitangan JAS dan industri.

Taking cognizance of the importance of having skilled manpower in environmental management, various training programs for the DOE staff as well as for the industries were conducted including training for equipment inspection, performance monitoring, continuous emission monitoring, record keeping requirement, etc. Competency certification program for industry personnel was also introduced to enhance environmental management in the industry thus improving regulatory compliance. Several technical guidance documents on pollution control were also published for the guidance of the DOE staff and the industries.

Pemuliharaan Alam Sekitar, Tanggungjawab Bersama

Environmental Responsibility, Our Shared Responsibility

Dato' Hajah Rosnani Ibarahim

Visi

Memastikan keunikan, kepelbagaian dan kualiti alam sekitar dikekalkan bagi menjamin kesihatan, kesejahteraan, keselamatan dan keselesaan hidup rakyat masa kini dan masa akan datang.

Misi

Menggalakkan, meningkatkan dan mengekalkan pengurusan alam sekitar yang baik dalam proses pembangunan negara.

Fungsi

Mentadbir dan menguatkuasa Akta Kualiti Alam Sekeliling, 1974 dan Bahagian IV, Akta Zon Ekonomi Eksklusif, 1984.

Strategi

- Kawalan dan pencegahan pencemaran
- Pembangunan lestari melalui pemuliharaan sumber semulajadi
- Integrasi faktor alam sekitar dalam perancangan pembangunan
- Promosi pendidikan dan kesedaran alam sekitar
- Penyertaan orang ramai
- Kerjasama antara agensi dan persekutuan negeri
- Kerjasama dan hubungan dua hala, serantau dan antarabangsa

Vision

That the uniqueness, diversity and quality of the environment are conserved towards maintaining health, prosperity, security and well-being for the present and future.

Mission

To promote, ensure and sustain sound environmental management in the process of nation building.

Function

To administer and enforce the Environmental Quality Act, 1974 and Section IV of the Exclusive Economic Zone Act, 1984.

Strategies

- Pollution control and prevention
- Sustainable development through conservation of resources
- Integration of environmental factors in development planning
- Promotion of environmental education and awareness
- Public participation
- Inter-agency and federal-state cooperation
- Bilateral, regional and international cooperation.

BAB 1 | CHAPTER 1

MAJLIS KUALITI ALAM SEKELILING (EQC)
ENVIRONMENTAL QUALITY COUNCIL (EQC)

Pada tahun 2006, Majlis Kualiti Alam Sekeliling telah bermesyuarat sebanyak 2 kali:

- Mesyuarat bilangan ke 95 telah diadakan pada 28 Mac 2006
- Mesyuarat bilangan ke 96 telah diadakan pada 27 November 2006

Semua mesyuarat tersebut telah diadakan di Ibu Pejabat Jabatan Alam Sekitar (JAS) di Putrajaya dan telah dipengerusikan oleh Y. Bhg. Dato' Kok Wee Kiat.

Perlantikan ahli-ahli EQC bagi penggal ke 12 telah dibuat oleh Y.B. Menteri Sumber Asli dan Alam Sekitar bagi penggal bermula pada 1 April 2006 dan tamat pada 31 Mac 2009. Semua ahli sedia ada telah dilantik semula dan dua ahli giliran baru telah dilantik bagi mewakili Industri Getah dan Industri Kelapa Sawit (Jadual 1.1).

Antara perkara yang diberi perhatian oleh EQC dalam tahun 2006 adalah:-

Mesyuarat EQC ke 95 (28 Mac 2006)

1. Kertas EQC Bil.1/95/2006
   Kertas oleh Jabatan Alam Sekitar
   - Status Pengurusan Buangan Terjadual

2. Kertas EQC Bil. 2/95/2006
   Kertas oleh Jabatan Alam Sekitar
   - Cadangan Peraturan-Peraturan Kualiti Alam Sekeliling (Pembawa Yang DiTetapkan), 200_

3. Kertas EQC Bil. 3/95/2006
   Kertas oleh Jabatan Alam Sekitar
   - Cadangan Peraturan-Peraturan Kualiti Alam Sekeliling (Tapak Pelupusan Perbandaran), 200_

The Environmental Quality Council (EQC) had 2 meetings in 2006 :

- 95th meeting was held on 28 March 2006
- 96th meeting was held on 27 November 2006

All the meetings were held at the Head office of the Department of Environment (DOE) in Putrajaya and were chaired by Y. Bhg. Dato' Kok Wee Kiat.

The appointment of EQC members for the 12th term was made by the Minister of Natural Resources and Environment for the period from 1st April 2006 till 31st March 2009. All existing members were reappointed and two new alternative members were also appointed to represent the Rubber and Oil Palm Industries (Table 1.1).

Among the matters brought for EQC's attention in 2006 were:-

95th EQC Meeting (28 March 2006)

1. EQC Paper No. 1/95/2006
   Paper by Department of Environment
   - Status of Scheduled Wastes Management

2. EQC Paper No. 2/95/2006
   Paper by Department of Environment
   - Proposal for Environmental Quality (Prescribed Conveyance) Regulations, 200_

3. EQC Paper No. 3/95/2006
   Paper by Department of Environment
   - Proposal for Environmental Quality (Municipal Landfill Sites) Regulations, 200_

Mesyuarat EQC ke 96 (27 November 2006)

1. Kertas EQC Bil.1/96/2006
   Kertas oleh Jabatan Alam Sekitar
   Peraturan Audit Alam Sekeliling

2. Kertas EQC Bil. 2/96/2006
   Kertas oleh Jabatan Alam Sekitar
   Skim Pendaftaran Juruperunding EIA

96th EQC Meeting (27 November 2006)

1. EQC Paper No. 1/96/2006
   Paper by Department of Environment
   Environmental Audit Regulations

2. EQC Paper No. 2/96/2006
   Paper by Department of Environment
   Scheme for Registration of EIA Consultants

Jadual 1.1 JAS : Majlis Kualiti Alam Sekeliling, 2006
Table 1.1 DOE : Environmental Quality Council, 2006

Bil./ No	Perwakilan / Representative	Nama / Name
1	Pengerusi EQC EQC Chairman	Y. Bhg. Dato' Kok Wee Kiat
2	Ketua Setiausaha, Kementerian Sumber Asli dan Alam Sekitar Secretary-General, Ministry of Natural Resources and Environment	Y. Bhg. Dato' Suboh Bin Mohd. Yassin
3	Wakil Ketua Setiausaha, Kementerian Perdagangan Antarabangsa dan Industri Representative of Secretary-General, Ministry of Trade & Industry	Puan Hiswani Binti Harun
4	Wakil Ketua Setiausaha, Kementerian Perdagangan Dalam Negeri dan Hal Ehwal Pengguna Representative of Secretary-General, Ministry of Domestic Trade & Consumers' Affairs	Encik Masri Bin Misran
5	Wakil Ketua Setiausaha, Kementerian Pertanian dan Industri Asas Tani Representative of Secretary-General, Ministry of Agriculture and Agro-Based Industries	Puan Noraisah Binti Spahat
6	Wakil Ketua Setiausaha, Kementerian Sumber Manusia Representative of Secretary-General, Ministry of Human Resources	Tuan Haji Mohamad Bin Jamil

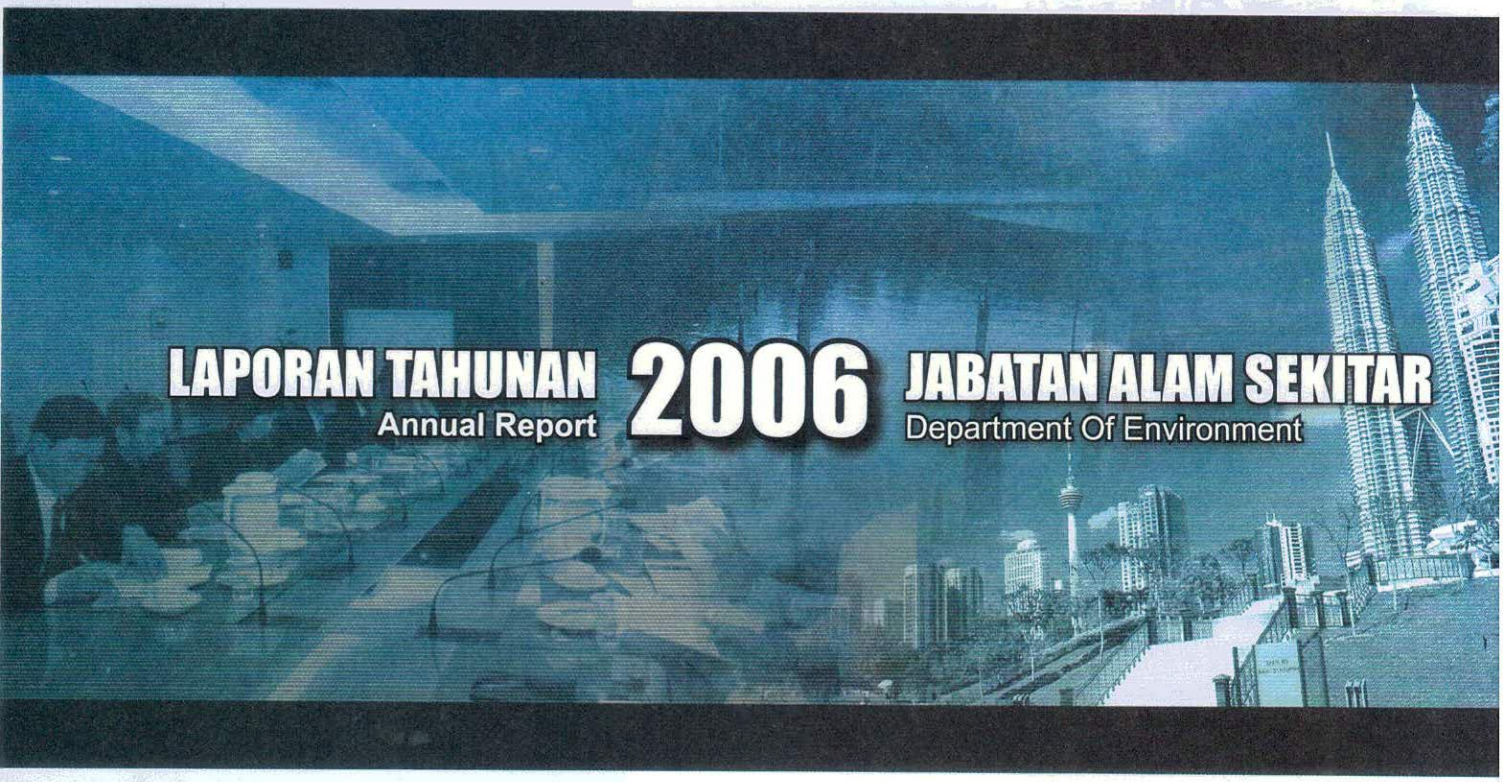
Jadual 1.1 JAS : Majlis Kualiti Alam Sekeliling 2006
Table 1.1 DOE : Environmental Quality Council 2006

Bil./ No	Perwakilan / Representative	Nama / Name
7	Wakil Ketua Setiausaha, Kementerian Pengangkutan Representative of Secretary-General, Ministry of Transport	Tuan Haji Zakaria Bin Bahari
8	Wakil Ketua Pengarah, Kementerian Kesihatan Malaysia Representative of Director General, Ministry of Health	Y. Bhg. Datuk Ir. Dr. Mukundan Sugunan Pillay
9	Wakil Kerajaan Negeri Sabah Representative of the Sabah State Government Ahli Giliran Alternate Member	Y. Bhg. Datuk Monica Chia Mui Foong Y. Bhg. Datuk Eric Juin
10	Wakil Kerajaan Negeri Sarawak Representative of the Sarawak State Government Ahli Giliran Alternate Member	Y. Bhg. Datuk Wan Alwi Bin Dato' Seri Wan Hashim Encik Chong Ted Tsuing
11	Wakil Industri Petroleum Representative from the Petroleum Industry Ahli Giliran Alternate Member	Encik Iqbal Bin Abdullah Dr. Foo Say Moo
12	Wakil Industri Kelapa Sawit Representative from the Oil Palm Industry Ahli Giliran Alternate Member	Encik Teo Leng Encik Chew Jit Seng
13	Wakil Persekutuan Pekilang-Pekilang Malaysia Representative from the Federation of Malaysian Manufacturers Ahli Giliran Alternate Member	Y. Bhg. Tan Sri Datuk Clifford Francis Herbert Cik Grace Choo Sor Mooi

Jadual 1.1 JAS : Majlis Kualiti Alam Sekeliling 2006
Table 1.1 DOE : Environmental Quality Council 2006

Bil./ No	Perwakilan / Representative	Nama / Name
14	Wakil Industri Getah Representative from the Rubber Industry	Encik Lim Sum Teck
	Ahli Giliran Alternate Member	Encik Chin Hon Meng
15	Wakil Kakitangan Akademik Representative from the Academic Staff of Universities/ Colleges in Malaysia	Prof. Dr. Muhamad Bin Awang
	Ahli Giliran Alternate Member	Prof. Madya Dr. Mohd. Nasir Bin Hassan
16	Wakil Pertubuhan Berdaftar yang mempunyai pengetahuan dan mempunyai kepentingan dalam perkara berhubung dengan alam sekitar Representative from Registered Societies knowledgeable and having interests in matters pertaining to the environment	Y. Bhg. Dato' Dr. Salleh Bin Mohd. Nor
	Ahli Giliran Alternate Member	Y.Bhg. Dato' Dr. Mikaail Kavanagh Abdullah
17	Wakil Pertubuhan Berdaftar yang mempunyai pengetahuan dan mempunyai kepentingan dalam perkara berhubung dengan alam sekitar Representative from Registered Societies knowledgeable and having interests in matters pertaining to the environment	Ir. Gurmit Singh K. S.
	Ahli Giliran Alternate Member	-

BAB 2 | CHAPTER 2



PENGURUSAN SUMBER MANUSIA DAN KEWANGAN
HUMAN RESOURCE MANAGEMENT AND FINANCIAL MANAGEMENT

Sumber Manusia

Pada tahun 2006, urusan pengisian perjawatan telah dibuat secara progresif bagi memenuhi keperluan tenaga kerja Jabatan pada masa kini dan masa akan datang.

Sehingga 31 Disember 2006, jumlah kakitangan di Ibu Pejabat JAS, Putrajaya adalah seramai 326 orang berbanding 318 orang pada 2005. Jumlah tenaga kerja di pejabat-pejabat negeri dan cawangan pula adalah seramai 1170 orang berbanding 1106 orang pada 2005, menjadikan jumlah tenaga kerja Jabatan Alam Sekitar secara keseluruhannya pada 31 Disember 2006 seramai 1496 orang. (Rajah 2.1.)

Daripada jumlah ini, seramai 329 (22.0%) orang adalah pegawai Kumpulan Pengurusan dan Profesional, 929 (62.1%) orang kakitangan Kumpulan Sokongan I dan 238 (15.9%) orang adalah kakitangan Kumpulan Sokongan II (Rajah 2.2 dan 2.3).

Sepanjang tahun 2006, urusan kenaikan pangkat serta pemangkuan bagi penyandang Gred C41, C48, C27, C32, J17, J22, N11 dan N1 telah dilaksanakan. Pengambilan jawatan Pegawai Kawalan Alam Sekitar Gred C41 dan Penolong Pegawai Kawalan Alam Sekitar Gred C27 adalah melalui Suruhanjaya Perkhidmatan Awam (SPA).

Pegawai-pegawai dan kakitangan baru telah diberi latihan asas yang relevan agar prestasi sistem penyampaian Jabatan dapat dikekal dan disempurnakan dengan baiknya.

Peruntukan Kewangan dan Perbelanjaan

JAS telah menerima peruntukan sebanyak RM119,406,600.00 bagi tahun 2006. Daripada jumlah tersebut, RM104,965,700.00 (87.9%) adalah peruntukan untuk perbelanjaan pengurusan, sementara RM14,440,900.00 (12.1%) merupakan peruntukan perbelanjaan pembangunan. Prestasi perbelanjaan pengurusan dan pembangunan bagi tahun 2005 masing-masing pada tahap 99.5% dan 99.8% (Rajah 2.4 dan 2.5).

Human Resources

In 2006, new staff were progressively recruited to fulfill the present and future needs of the Department.

As of 31st December 2006, the total number of personnel at DOE Head Office in Putrajaya were 326 compared to 318 in 2005, while the number of personnel at the State and Branch Offices were 1170 compared to 1106 last year. Hence, the total strength of DOE as of 31 December 2006 was 1496 (Figure 2.1).

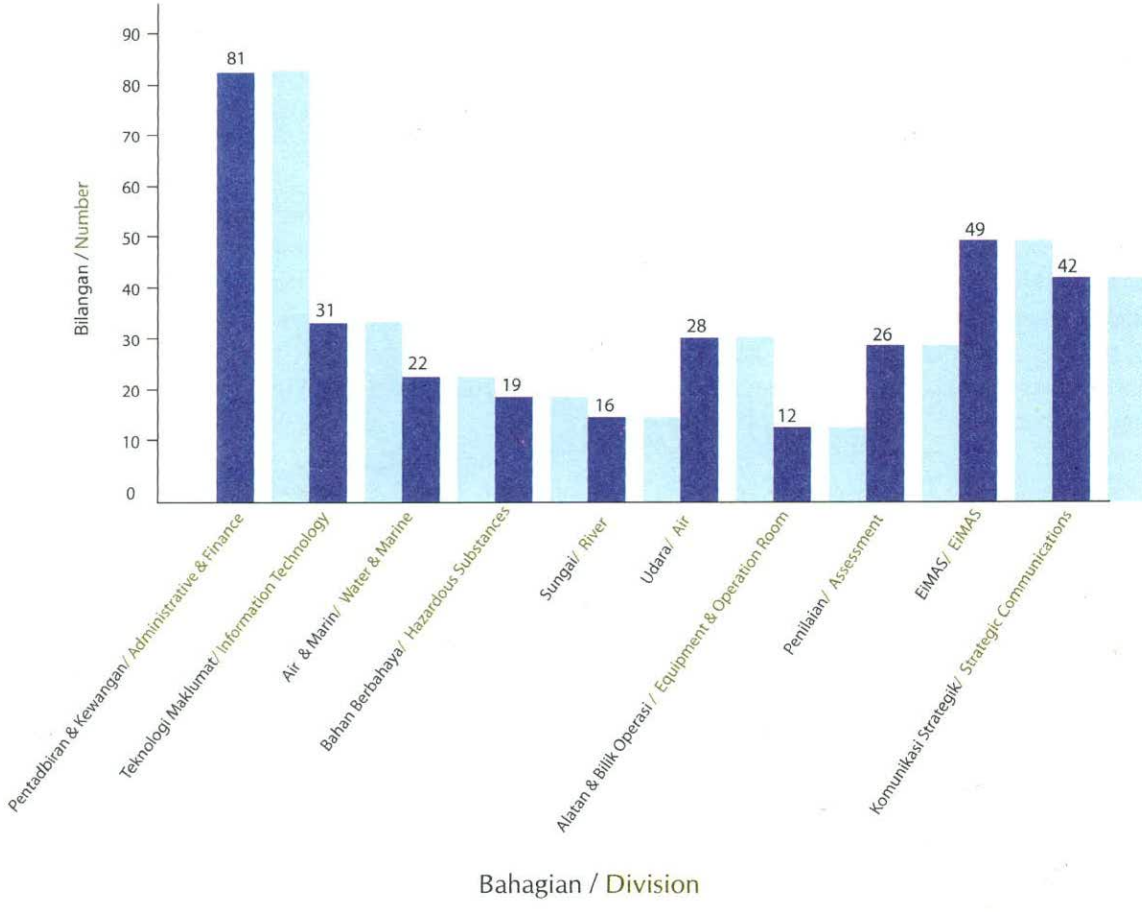
Of this total, 329 (22.0%) were from the Management and Professional Group, 929 (62.1%) from Support I Group and 238 (15.9%) from Support II Group (Figures 2.2 and 2.3).

Throughout 2006, promotion exercises were conducted for Grade C41, C48, C27, C32, J17, J22, N11 and N1. The recruitment of Enviromental Control Officers and Assistant Enviroment Control Officers was done by the Public Services Commission.

New officers and staff recruited were provided with relevant basic training to ensure that the DOE's delivery system would be maintained and further enhanced.

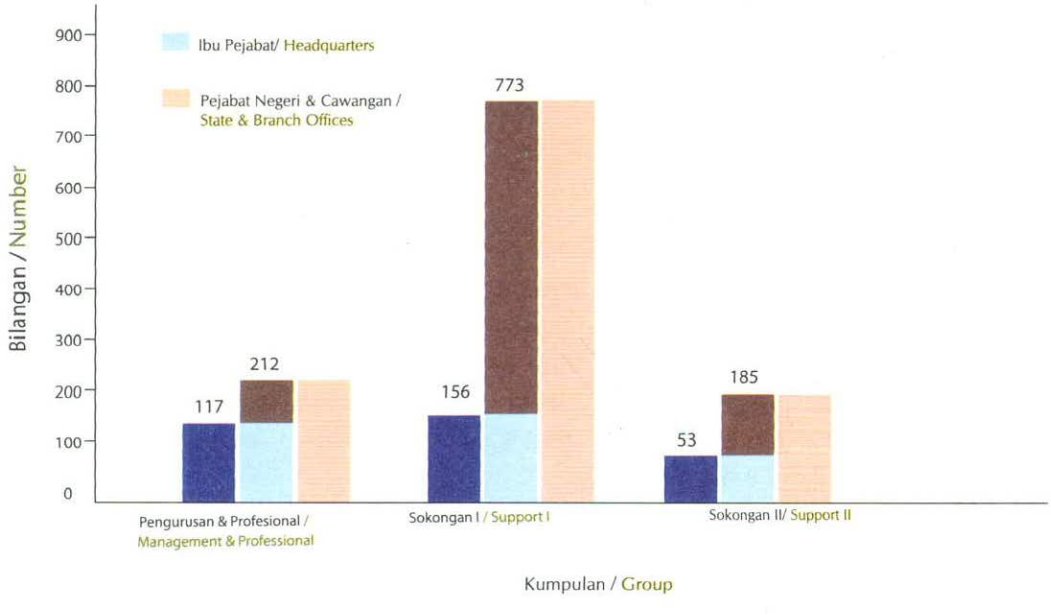
Allocation and Expenditure

DOE received a total budget allocation of RM119,406,600.00 for 2006. Of this amount, a sum of RM104,965,700 (87.9%) was allocated for operational expenditure, while RM14,440,900.00 (12.1%) was for development expenditure. Performance for the operational and development budget in 2006 was 99.5% and 99.8% respectively (Figures 2.4 and 2.5).



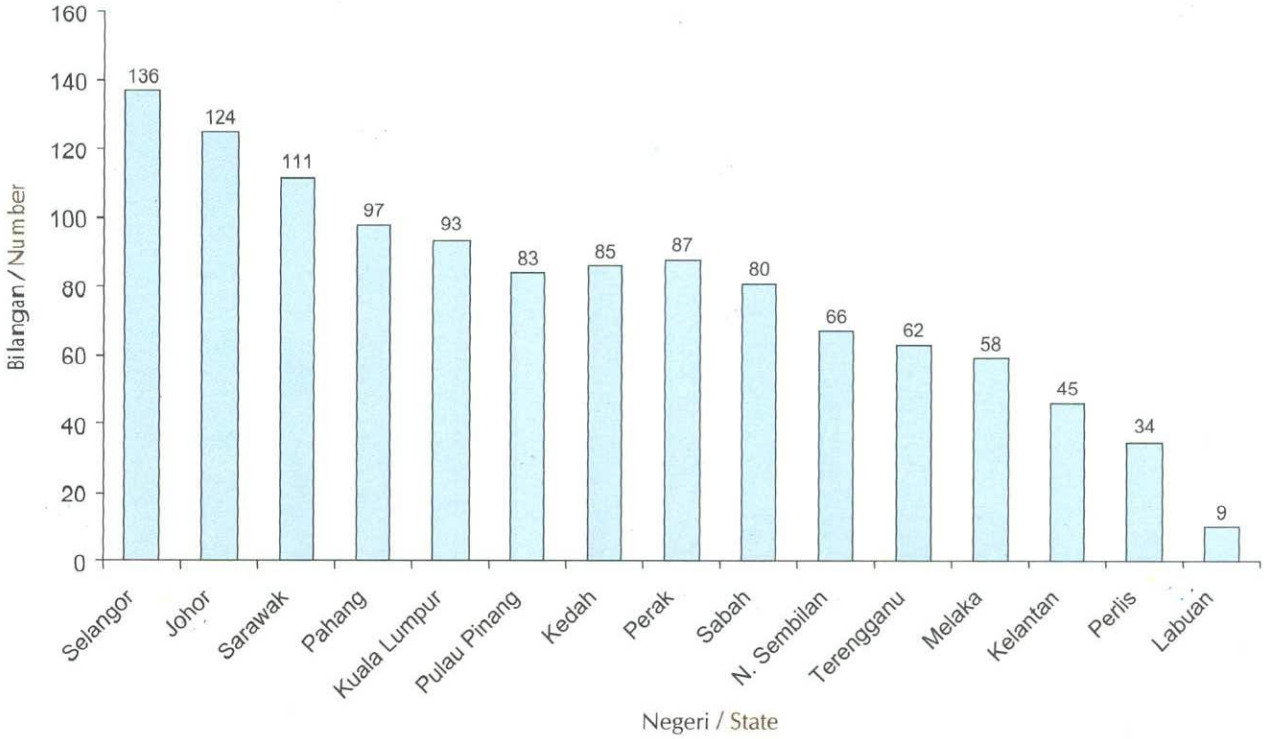
Rajah 2.1 JAS : Taburan Tenaga Kerja

Figure 2.1 DOE : Manpower Distribution at DOE Head Office

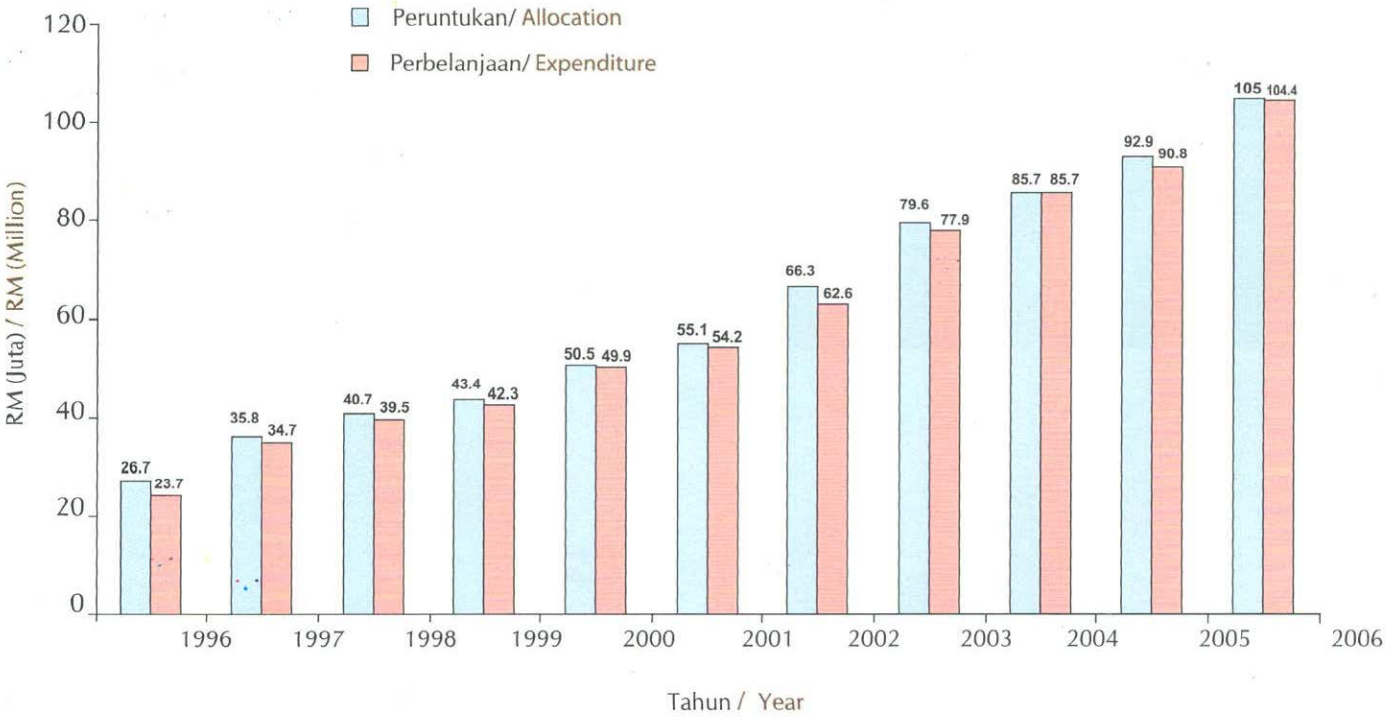


Rajah 2.2 JAS : Pecahan Tenaga Kerja Mengikut Kumpulan

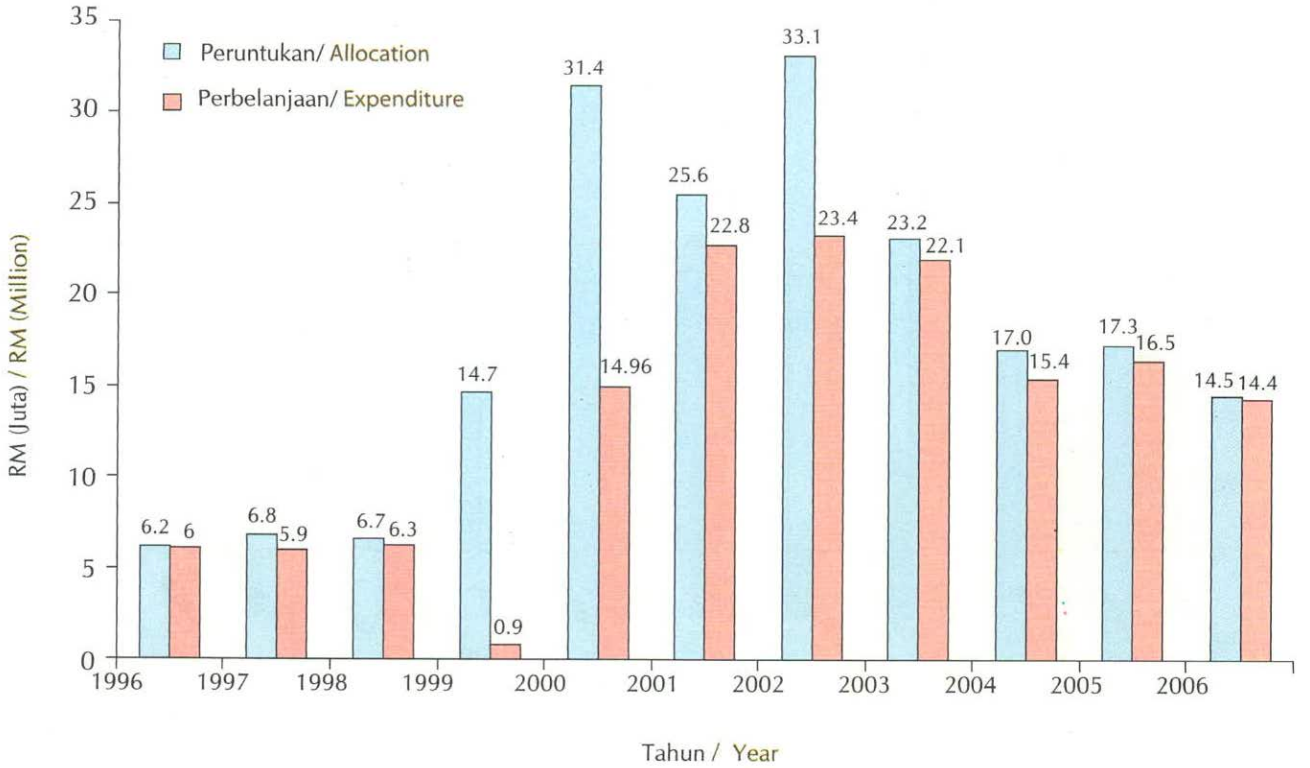
Figure 2.2 DOE : Manpower Distribution



Rajah 2.3 JAS : Pecahan Taburan Tenaga Kerja Mengikut Negeri
Figure 2.3 DOE : Manpower Distribution by State

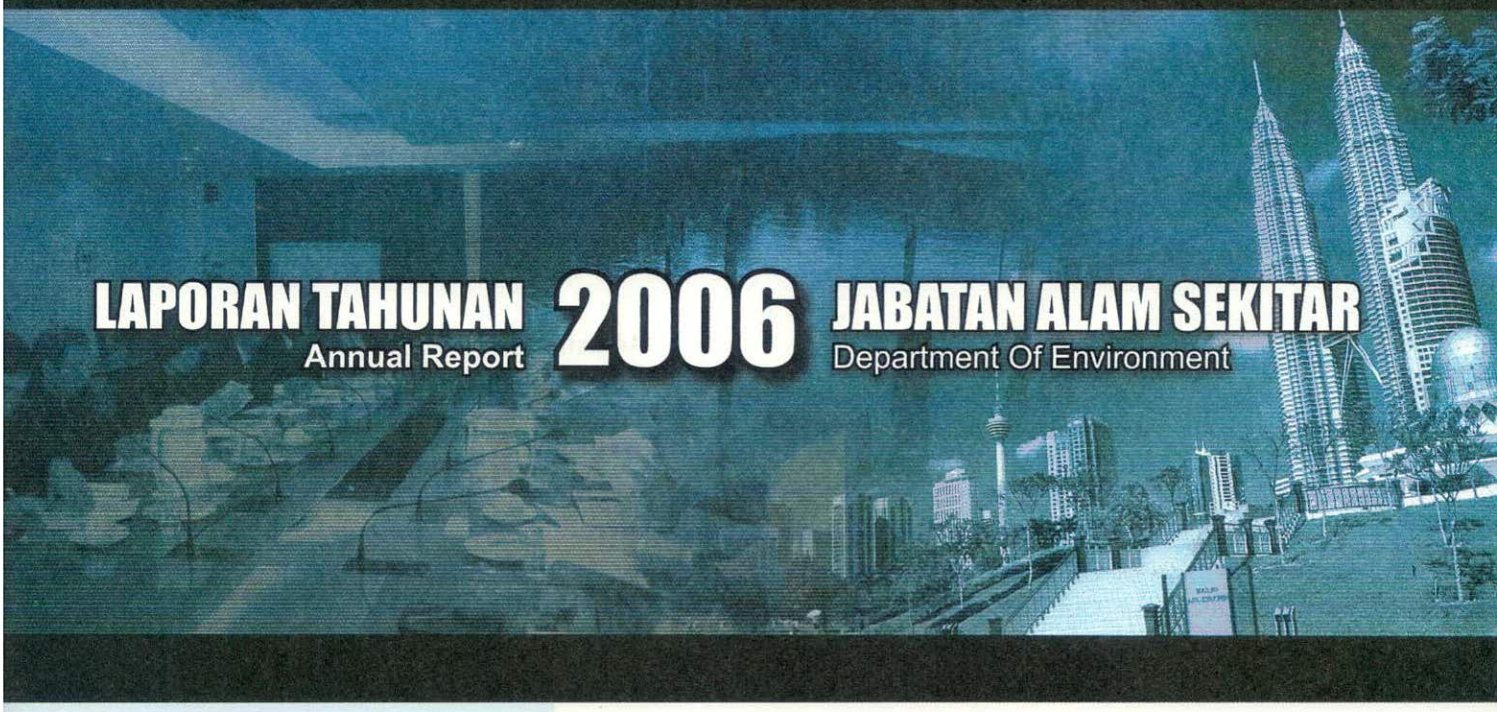


Rajah 2.4 JAS : Peruntukan Pengurusan
Figure 2.4 DOE : Operational Allocation



Rajah 2.5 JAS : Peruntukan Pembangunan (1996 - 2006)
Figure 2.5 DOE : Development Allocation (1996 - 2006)

BAB 3 | CHAPTER 3



PENILAIAN KESAN KEPADA ALAM SEKELILING DAN INPUT UNTUK PEMBANGUNAN
ENVIRONMENTAL IMPACT ASSESSMENT AND INPUT FOR DEVELOPMENT

Penilaian Kesan Kepada Alam Sekeliling (EIA) merupakan satu alat perancangan untuk mengelakkan dan mengurangkan masalah-masalah akibat tindakan pembangunan. Ianya juga dapat mengelakkan kesilapan dan kerugian besar semasa projek dilaksanakan serta dapat meminimumkan kos projek.

Di Malaysia, EIA adalah sebagai alat untuk menggabungkan pertimbangan alam sekitar di dalam perancangan, yang mana apabila disepadukan dalam perancangan sedia ada dan proses membuat keputusan akan memberikan maklumat tambahan untuk membuat keputusan yang lebih baik.

Laporan EIA 2006

Sebanyak 263 laporan telah diterima pada tahun 2006. Daripada jumlah ini, 254 merupakan laporan awal EIA dan 9 laporan EIA terperinci (Rajah 3.1). Negeri Johor menerima bilangan laporan EIA tertinggi pada tahun 2006 diikuti dengan Negeri Selangor (Rajah 3.2).

Lawatan Penguatkuasaan Projek EIA

Sejumlah 574 lawatan penguatkuasaan telah dijalankan pada tahun 2006 untuk mengenalpasti status pembangunan dan pematuhan projek-projek EIA (Rajah 3.3). Daripada lawatan-lawatan tersebut, sebanyak 196 notis atau surat arahan dan sebanyak 25 kompaun telah dikeluarkan manakala lima (5) kes telah didakwa di mahkamah kerana tidak mematuhi syarat-syarat kelulusan.

Input Alam Sekitar Kepada Perancangan Pembangunan

Pada tahun 2006, sejumlah 61 input alam sekitar telah diberikan kepada agensi-agensi luar yang berkaitan dengan Penyelarasan Perancangan Pembangunan, Polisi Zon Persisiran Pantai Kebangsaan, Pelan Tempatan dan kajian-kajian lain seperti langkah-langkah kawalan banjir, air bawah tanah, permonitoran pulau-pulau dan aktiviti-aktiviti tanah tinggi.

Environmental Impact Assessment (EIA) is essentially a planning tool for preventing environmental problems arising from development activity. It also seeks to avoid costly mistakes in project implementation as well as minimizing project cost.

In Malaysia, EIA is used as a tool to incorporate environmental considerations into project planning which when integrated into existing planning and decision-making processes provides additional information for better decision-making.

EIA Reports 2006

A total of 263 reports were received in 2006. Of these, 254 were preliminary EIA and 9 detailed EIA (Figure 3.1) reports. Johor received the highest number of EIA reports in 2006, followed by Selangor (Figure 3.2).

EIA Enforcement Visits

A total of 574 enforcement visits were conducted in 2006 to check on the progress of projects and compliance of EIA approval conditions (Figure 3.3). Consequently, 196 notices or written directives, and 25 compounds were served and five (5) cases were charged in court for non-compliance.

Environmental Input For Development Planning

In 2006, a total of 61 environmental inputs were provided to other agencies in connection with Development Planning Coordination, National Coastal Zone Policy, Local Plans and other studies regarding flood-mitigating measures, ground water, island monitoring and highland development activities.

Pendaftaran Jururunding EIA

Salah satu cabaran utama dalam menjalankan kajian EIA ialah mengawal kualiti laporan EIA. Bagi mempertingkatkan kualiti laporan EIA tersebut, Jabatan Alam Sekitar telah menyemak semula kriteria pendaftaran jururunding EIA yang telah berdaftar dengan Jabatan Alam Sekitar. Jururunding EIA adalah merupakan wakil kepada penggerak projek bagi mematuhi Seksyen 34A, Akta Kualiti Alam Sekeliling, 1974 dan bertanggungjawab kepada perkara berikut:

- Menghasilkan laporan EIA yang lengkap, jelas dan informatif; dan
- Mempastikan maklumat yang dikemukakan di dalam laporan EIA adalah sahih bagi membantu pihak yang meluluskan projek membuat keputusan.

Mengikut kriteria baru pendaftaran jururunding EIA, individu hendaklah mempunyai:

- Pengalaman luas dan sentiasa menjalankan kajian EIA;
- Faham proses EIA, peraturan-peraturan berkaitan alam sekitar dan perancangan alam sekitar;
- Ijazah pengetahuan asas dalam pengurusan alam sekitar serta mahir dalam teknik kajian kesan kepada alam sekitar dan langkah-langkah kawalan; dan
- Kompetensi dan pengkhususan dalam bidang tertentu.

Penilaian Awal Tapak Projek

Bagi projek-projek pembangunan yang tidak termaktub di bawah Perintah-Perintah Kualiti Alam Sekeliling (Aktiviti Yang Ditetapkan)(Penilaian Kesan Kepada Alam Sekeliling) 1987, Penilaian Awal Tapak (PAT) dijalankan untuk menentukan kesesuaian tapak projek. Ini dapat membantu mengenalpasti isu-isu yang akan timbul pada masa hadapan, di samping pemantauan ke atas sesuatu projek dapat dilaksanakan.

Registration Of EIA Consultants

One of the challenges of EIA in Malaysia is to monitor the quality of EIA reports. Thus to enhance the quality of EIA reports, the Department of Environment had revised the registration criteria of EIA consultants. The registered consultants would act on behalf of the project proponent to comply with Section 34A of the Environmental Quality Act, 1974 and is also responsible to:

- to produce comprehensive, clear and informative reports; and
- to ensure the relevant approving authorities are provided access to all pertinent information.

Under the revised registration criteria, individuals must possess:

- Broad experience and conducts regular EIA studies;
- Understanding of the EIA process, environmental regulations and environmental planning;
- Tertiary education, basic environmental management knowledge and familiar with environmental assessment techniques and mitigating measures; and
- Competency and specialization in specific areas.

Project Pre-Siting Evaluation

Where development projects were not subjected to the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987, pre-siting evaluation and suitability of proposed sites were carried out. This would help to identify issues that could potentially arise in future besides complementing project monitoring.

Pada tahun 2006, sejumlah 8,263 permohonan telah diterima kebanyakkan daripada Pihak-Pihak Berkuasa Tempatan dan Pejabat-Pejabat Tanah di mana Negeri Johor mencatat permohonan PAT (1651) paling tinggi, diikuti oleh Selangor (1360) dan lain-lain negeri (Rajah 3.4). Input teknikal diberikan untuk pertimbangan sewajarnya di dalam membuat keputusan.

In 2006, a total of 8,263 such applications were received, mainly from Local Authorities and Land Offices. Johor recorded the highest number (1651), followed by Selangor (1360) and other States (Figure 3.4). Technical environmental inputs were provided for consideration to facilitate decision making.

Kebenaran Dan Kelulusan Bertulis

Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan dan Effluen-Effluen Perindustrian) 1979 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978 menghendaki supaya kebenaran dan kelulusan bertulis diperolehi terlebih dahulu daripada Ketua Pengarah Alam Sekitar (KPAS) sebelum apa-apa loji rawatan sisa kumbahan dan alat kawalan pencemaran udara dibina. Pada tahun 2006, sebanyak 687 permohonan bagi pembinaan loji rawatan sisa kumbahan (Rajah 3.5) dan 1771 permohonan bagi pemasangan alat kawalan pencemaran udara (Rajah 3.6). Selain daripada itu, 1128 permohonan bagi kelulusan bertulis untuk pemasangan alat pembakaran bahan api seperti dandang dan alat janakuasa diproses (Rajah 3.7).

Written Permission And Approval

The Environmental Quality (Sewage and Industrial Effluents) Regulations 1979 and the Environmental Quality (Clean Air) Regulations 1978 require written permission and approvals to be obtained from the Director-General of Environment before construction of wastewater treatment plants and installation of air pollution control systems. In 2006, 687 such applications were received for construction of effluent treatment plants (Figure 3.5) and 1771 applications for installation of air pollution control equipment (Figure 3.6). In addition 1128 applications for written approvals for installation of fuel burning equipment such as boilers and generator sets were processed (Figure 3.7).

Sistem Maklumat Geografik (GIS)

Di bawah Rancangan Malaysia Ke–Sembilan (RMK9), program pembangunan GIS di JAS merupakan sambungan dari RMK8, bertujuan supaya teknologi GIS dapat dimanfaatkan sepenuhnya dalam pengurusan alam sekitar di Malaysia.

Pada tahun 2006, semua pejabat JAS termasuk di JAS Negeri dan Cawangan telah dilengkapi dengan perkakasan dan perisian GIS. Data-data spatial seperti punca-punca pencemaran, stesen-stesen pengawasan alam sekitar, projek-projek pembangunan dan premis-premis yang tertakluk di bawah Akta Kualiti Alam Sekeliling (AKAS) 1974 dikemaskini.

Latihan berterusan berkenaan GIS kepada pegawai-pegawai JAS telah dilaksanakan. GIS juga digunakan untuk memberi maklumat setiap hari berhubung lokasi titik panas bagi tujuan pemantauan kebakaran terbuka.

Geographical Information System (GIS)

Under the Ninth Malaysia Plan (RMK9), the GIS development programme in DOE was an extension from RMK8, so as to ensure that the GIS technology could be fully utilized for environmental management in Malaysia.

In 2006, all DOE offices including State and Branch offices had been equipped with GIS hardware and software. Spatial data such as pollution sources, environmental monitoring stations, development projects and prescribed premises under the Environmental Quality Act (EQA) 1974 were updated.

Continuous training on GIS had been provided to DOE personnel. GIS had also been used to supply daily information on hotspot locations in the monitoring of open burning.

Di samping itu, penggunaan GIS juga dapat memberikan input yang berkaitan dengan maklumat spatial yang diperlukan oleh Bahagian-Bahagian di Ibu Pejabat, JAS Negeri/Cawangan atau agensi luar juga diberikan (contoh Rajah 3.8).

Besides that, GIS also provided input relating to spatial information required by the various Divisions in the Headquarters Office, State/Branch Offices and other agencies (example Figure 3.8).

Pusat Khidmat Nasihat JAS Di MIDA

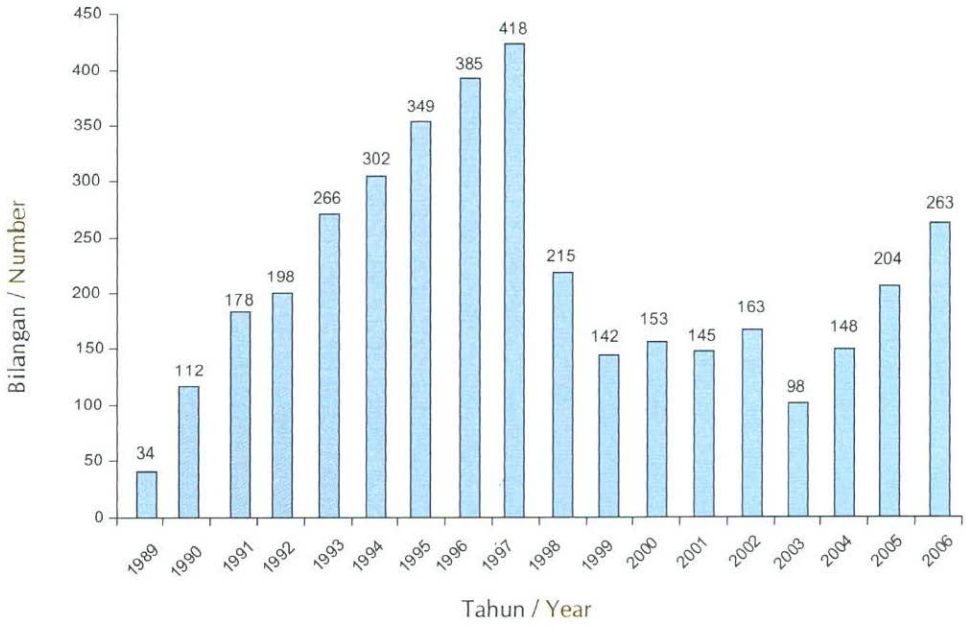
Pusat Khidmat Nasihat JAS di MIDA memberi penerangan dan maklumat serta nasihat kepada bakal pelabur dari dalam dan luar negara mengenai keperluan alam sekitar di dalam pembangunan projek industri.

Pada tahun 2006, Pusat Khidmat ini mengendalikan sebanyak 220 ulasan bertulis, 50 pertanyaan melalui telefon dan 25 bilangan temujanji. Pertanyaan yang diterima adalah berkaitan dengan kesesuaian kedudukan tapak premis, zon penampan, kepakaran jururunding alam sekitar dan polisi kerajaan mengenai sisa buangan.

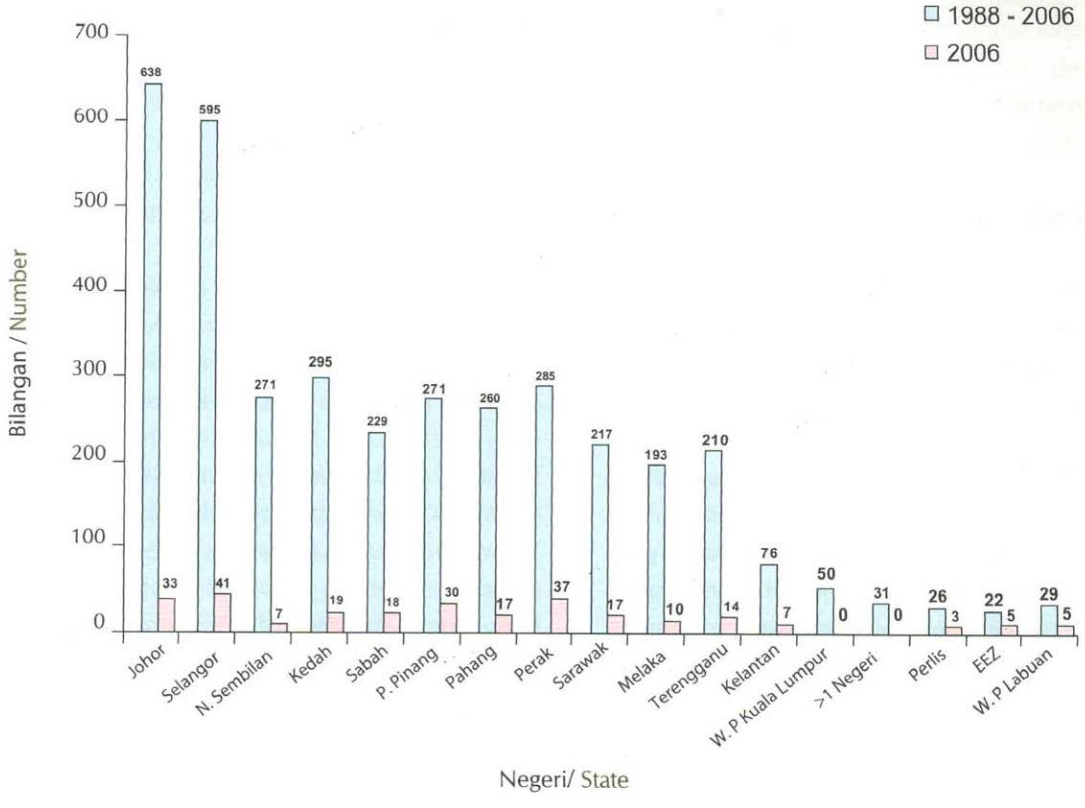
DOE Advisory Services Desk At MIDA

The DOE Advisory Services Desk at the Headquarters Office of the Malaysian Industrial Development Authority (MIDA) serves to provide environmental information and advice to prospective local and foreign investors.

In 2006, 220 written comments were provided to MIDA, 50 telephone enquiries were attended to and 25 meetings with investors were held. Most of the enquiries received pertained to project site suitability, buffer zones, expertise of environmental consultants and government policy in waste management.

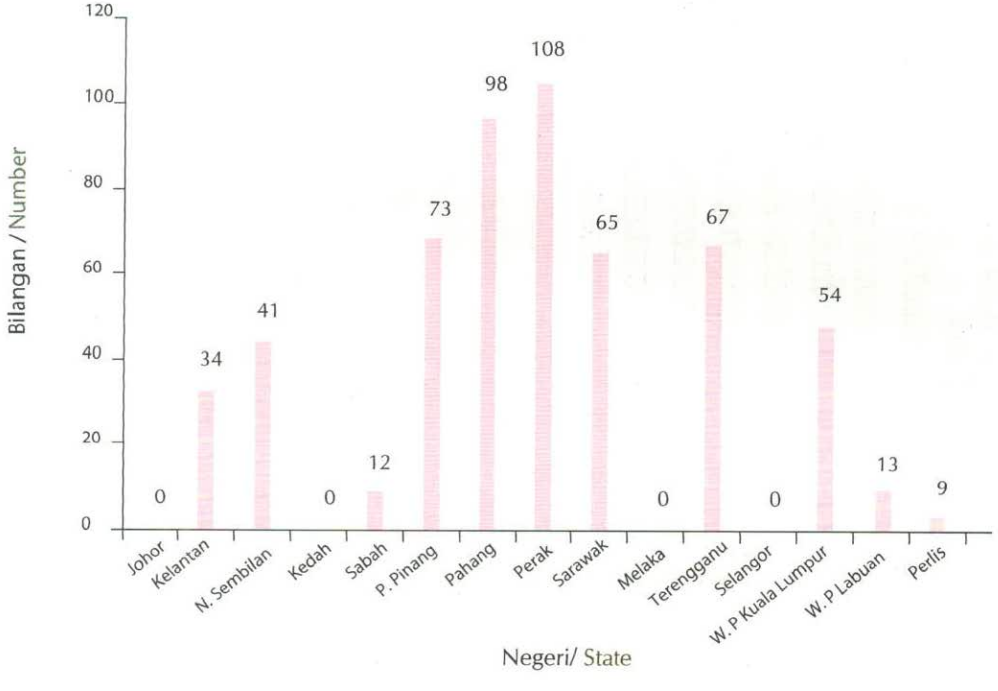


Rajah 3.1 JAS : Bilangan Laporan EIA Yang Diterima Mengikut Tahun, 1989 - 2006
Figure 3.1 DOE : Number of EIA Reports Received by Year, 1989 - 2006



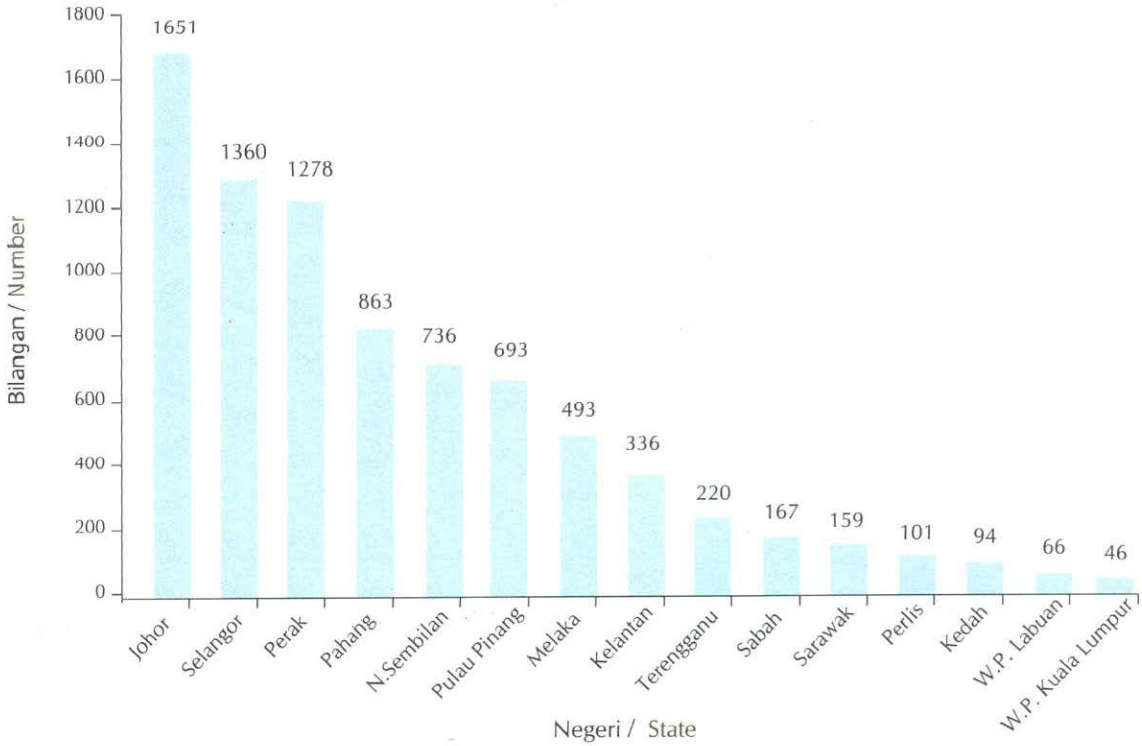
Rajah 3.2 JAS : Bilangan Laporan EIA Yang Diterima Mengikut Negeri, 1988 - 2006

Figure 3.2 DOE : Number of EIA Reports Received by Year, 1988 - 2006

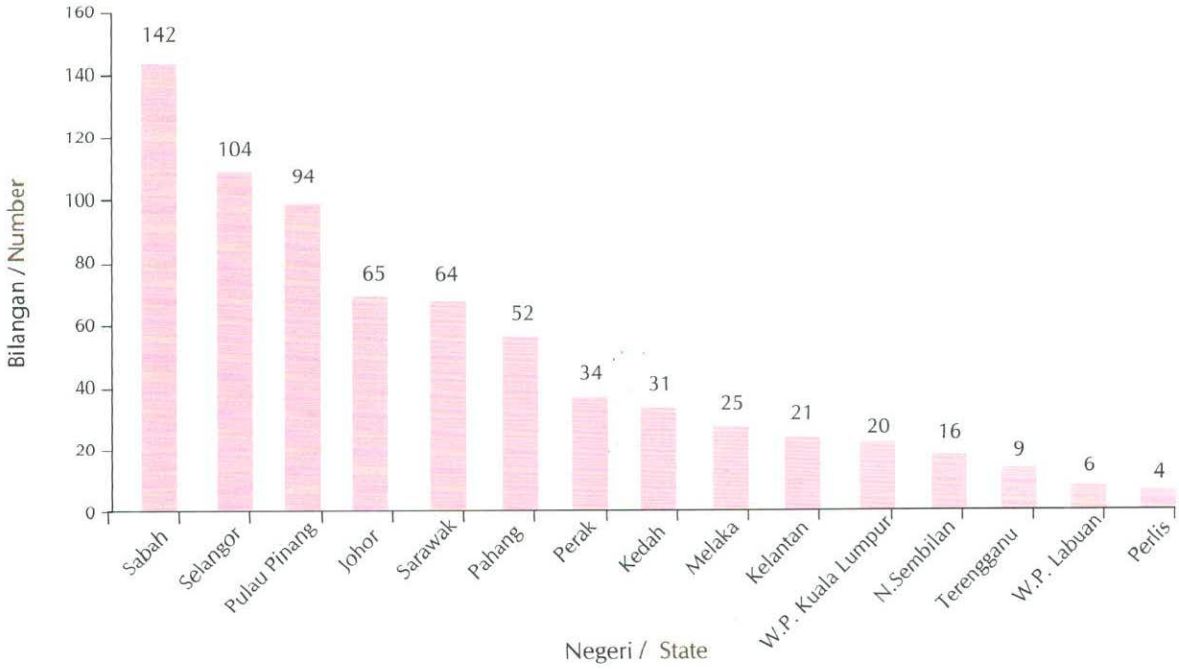


Rajah 3.3 JAS : Lawatan Penguatkuasaan EIA, 2006

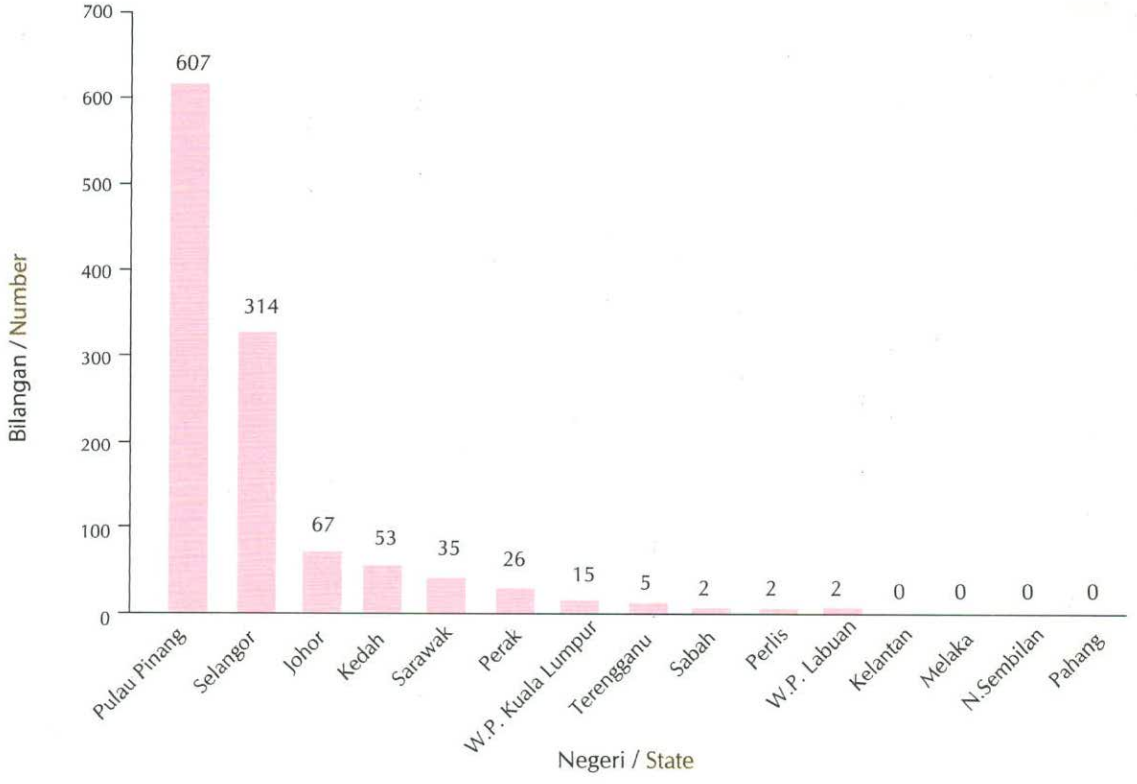
Figure 3.3 DOE : Post EIA Enforcement Visits, 2006



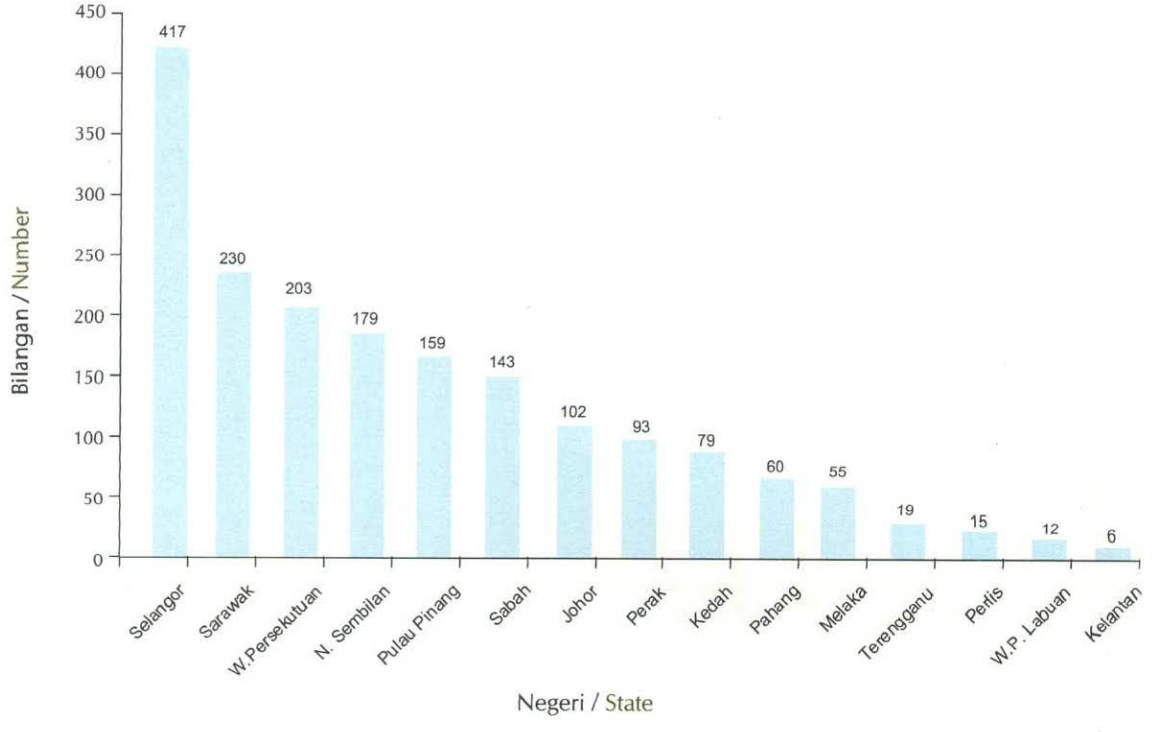
Rajah 3.4 JAS : Penilaian Awal Tapak Untuk Projek-Projek Pembangunan Mengikut Negeri, 2006
Figure 3.4 DOE : Pre-Sitting Evaluation of Development Projects by State, 2006



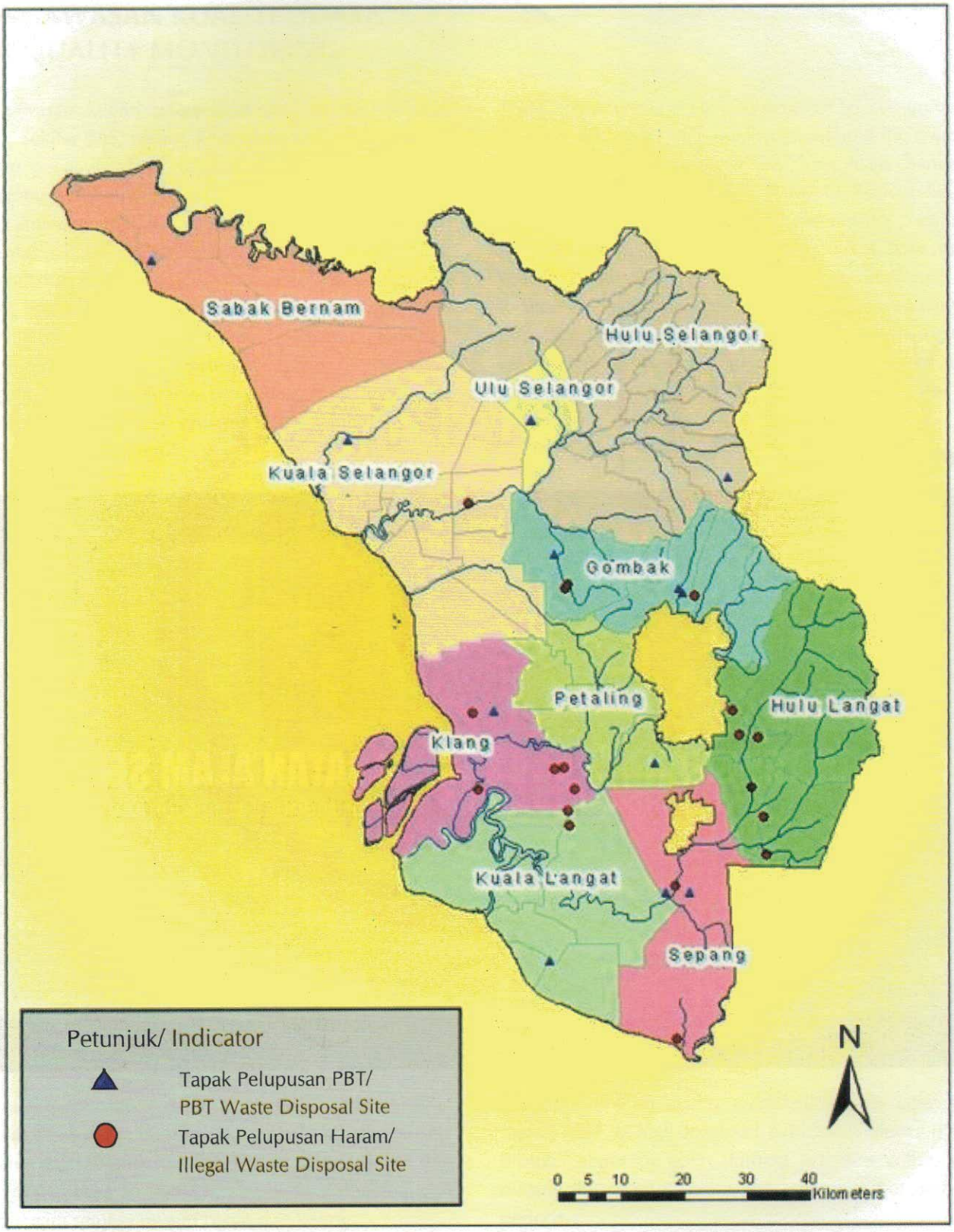
Rajah 3.5 JAS : Permohonan Bagi Kebenaran Bertulis Untuk Pembinaan Kemudahan Pengolahan Effluen Mengikut Negeri, 2006
Figure 3.5 DOE : Application For Construction of Wastewater Treatment Plants by State, 2006



Rajah 3.6 JAS : Permohonan Bagi Pemasangan Alat Kawalan Pencemaran Udara Mengikut Negeri, 2006
Figure 3.6 DOE : Application For Installation of Air Pollution Control Equipment by State, 2006



Rajah 3.7 JAS : Permohonan Bagi Pemasangan Alat Kawalan Pencemaran Bahanapi Mengikut Negeri, 2006
Figure 3.7 DOE : Application For Installation of Fuel Burning Equipment by State, 2006



Rajah 3.8 JAS : Lokasi Tapak Pelupusan Sampah di Selangor
Figure 3.8 DOE : Waste Disposal Sites In Selangor

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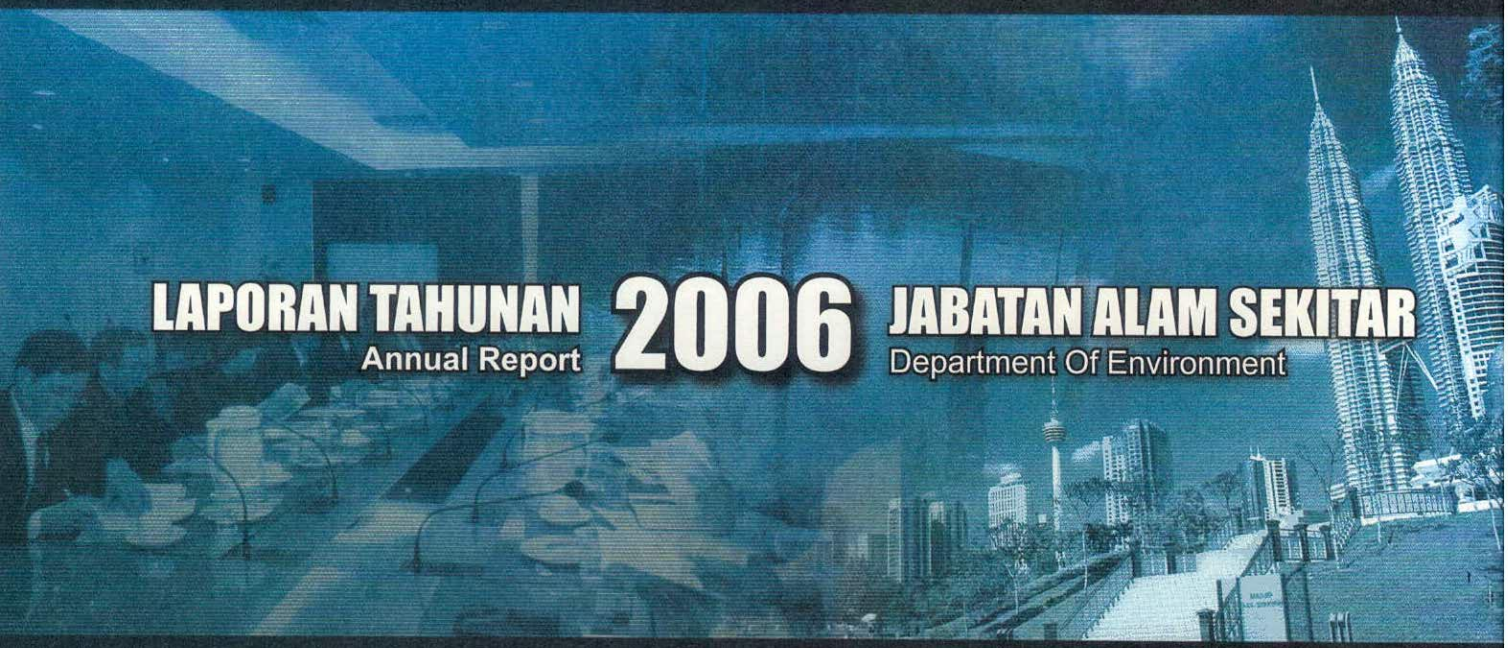


PENGAWASAN KUALITI UDARA
AIR QUALITY MONITORING

Pengawasan kualiti udara dilaksanakan oleh Jabatan Alam Sekitar (JAS) secara berterusan menerusi 51 buah stesen pengawasan di seluruh negara bagi memantau sebarang perubahan ketara kepada status kualiti udara yang mungkin memberi kesan kepada kesihatan awam dan alam sekitar. Stesen-stesen pengawasan kualiti udara ditempatkan di lokasi-lokasi strategik (Peta 4.1 dan 4.2) bagi memenuhi objektif program pengawasan yang spesifik. Kebanyakan stesen ditempatkan di kawasan perumahan bagi menentupasti tahap pendedahan pencemar udara kepada penduduk dan selebihnya ditempatkan di dalam kawasan industri dan kawasan yang padat dengan trafik.

Rangkaian Stesen Pengawasan Kualiti Udara Kebangsaan ini turut dilengkapi dengan stesen-stesen pengawasan kualiti udara manual yang ditempatkan di 19 buah lokasi yang berbeza. Pengawasan di stesen-stesen manual melibatkan parameter-parameter seperti pepejal terampai, habuk halus bersaiz kurang dari 10 mikron (PM_{10}) dan beberapa jenis logam berat termasuk plumbum yang dipantau sekali bagi tempoh enam hari menggunakan alat "High Volume Samplers".

Status Kualiti Udara Bagi 2006

Secara keseluruhan, status kualiti udara di seluruh negara pada tahun 2006 merosot sedikit berbanding tahun sebelumnya. Walau bagaimanapun, status kualiti udara pada kebanyakan masa masih berada pada tahap baik dan sederhana. Beberapa hari yang tidak sihat telah dicatatkan di beberapa kawasan di Lembah Kelang, Pantai Barat dan Pantai Timur Semenanjung serta di Negeri Sarawak dan Sabah.

Status kualiti udara pada tahap tidak sihat tersebut adalah disebabkan oleh kepekatan habuk halus bersaiz kurang dari 10 mikron (PM_{10}) yang tinggi akibat dari aktiviti pembakaran terbuka yang berlaku di dalam dan luar negara semasa musim panas dan kering.

Dalam tahun 2006, Malaysia telah mengalami beberapa episod singkat jerebu pada tahap sederhana iaitu pada bulan Julai, Ogos, September dan Oktober akibat daripada pencemaran jerebu merentas sempadan. Kebakaran tanah dan hutan yang berlaku di beberapa

The Department of Environment (DOE) continuously monitors ambient air quality throughout the country at 51 locations to detect any significant change in air quality which may cause harm to human health and the environment. These monitoring stations are strategically located (Maps 4.1 and 4.2) to meet specific monitoring objectives. Most stations are located in residential areas to facilitate determination of population exposure level to air pollution, while the rest are located within industrial areas and areas with high traffic volume.

The National Air Quality Monitoring Network is also complemented by manual air quality monitoring stations located at 19 different sites. At these sites, total suspended particulate, particulate matter with size of less than 10 micron (PM_{10}) and several heavy metals including lead are measured at intervals of six days using High Volume Samplers.

Air Quality Status in 2006

The overall air quality status for Malaysia throughout 2006 decreased slightly compared to the previous year. Nevertheless, the air quality was between good to moderate level most of the time, except for a number of unhealthy days recorded at various locations in the Klang Valley, the West and East Coast of Peninsular Malaysia and in the State of Sarawak and Sabah.

The unhealthy air quality recorded in those areas was mainly due to high levels of particulate matter (PM_{10}) brought about by open burning activities within and outside the country during the prolonged hot and dry periods.

In 2006, Malaysia experienced a short period of moderate haze episodes i.e. in the months of July, August, September and October, mainly due to transboundary pollution. The land and the forest fires in

wilayah di Sumatera, Indonesia seperti yang dilaporkan oleh "ASEAN Specialised Meteorological Centre (ASMC)" dan pengaruh angin monsun barat daya menyumbang kepada episod kemerosotan kualiti udara di kawasan Pantai Barat Semenanjung Malaysia. Di samping itu, kebakaran yang berlaku di Wilayah Kalimantan, Indonesia dan pengaruh angin monsun barat daya telah menyebabkan keadaan sedikit berjerebu di bahagian selatan negeri Sarawak dan Sabah.

several provinces in Sumatera, Indonesia as reported by the ASEAN Specialised Meteorological Centre (ASMC), and the direct influence of the south-westerly winds contributed to the deterioration of air quality in the west coast of Peninsular Malaysia. The fires in the Kalimantan Province, Indonesia and the south-westerly winds also gave rise to hazy conditions in the southern part of Sarawak and Sabah.

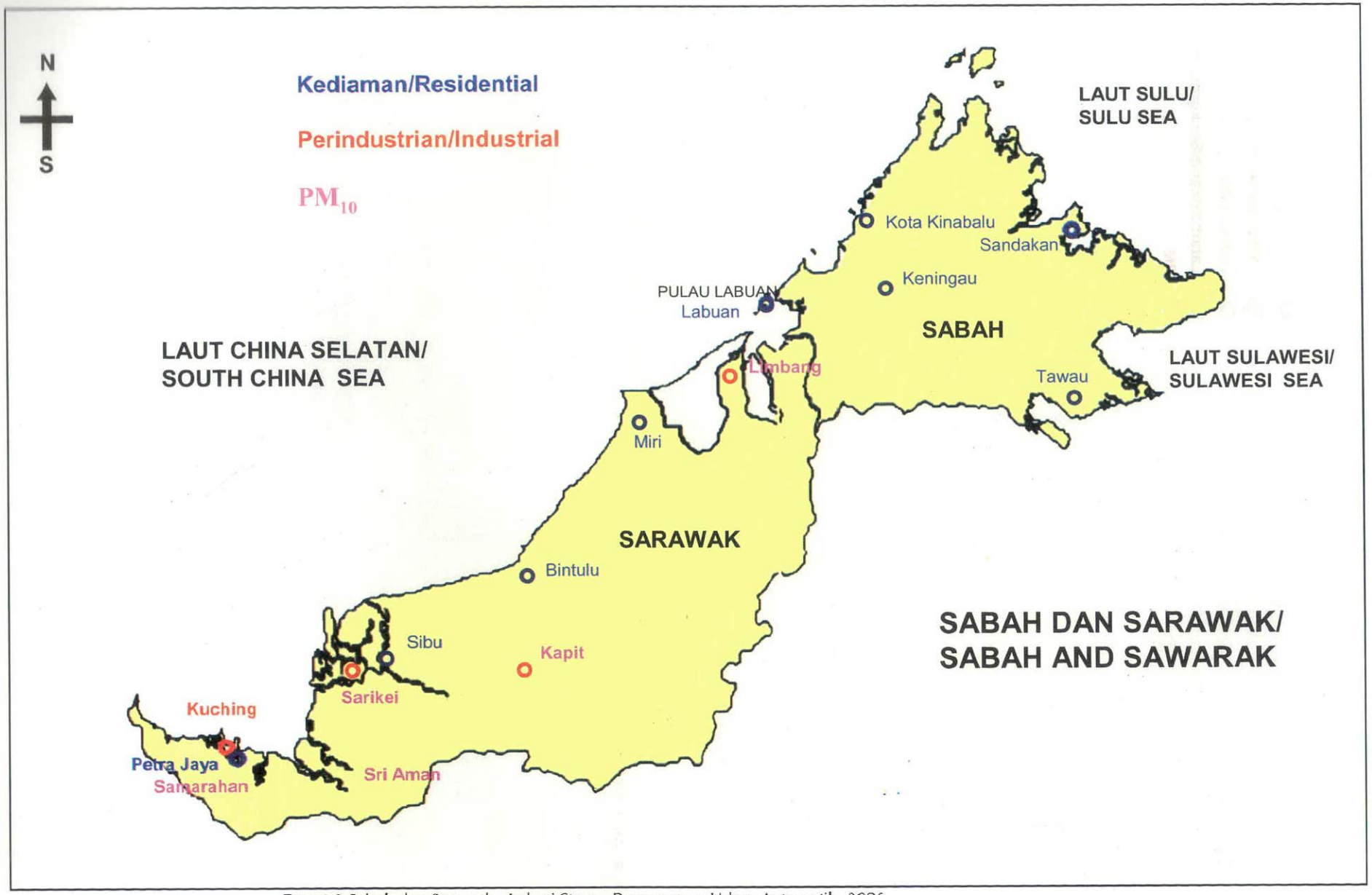
Habuk halus bersaiz kurang dari 10 mikron (PM_{10}) dan ozon di permukaan bumi (O_3) merupakan pencemar udara utama yang dikesan di seluruh negara pada tahun 2006.

Particulate matter (PM_{10}) and ground level ozone (O_3) remained the prevailing air pollutants in the country in 2006.

Episod Kejadian Jerebu di Putrajaya, Ogos 2006
Haze Episode in Putrajaya, August 2006

Peta 4.1 Malaysia : Lokasi Stesen Pengawasan Udara Automatik, 2006

Map 4.1 Malaysia : Location of Continuous Air Quality Monitoring Stations, 2006



Peta 4.2 Sabah dan Sarawak : Lokasi Stesen Pengawasan Udara Automatik, 2006

Map 4.2 Sabah dan Sarawak : Location of Continuous Air Quality Monitoring Stations, 2006

PENGAWASAN BUNYI BISING AMBIEN
AMBIENT NOISE MONITORING

Punca Pencemaran Bunyi Bising dan Kesannya

Aktiviti pembangunan, perindustrian dan trafik menyebabkan bunyi bising yang berlebihan. Pencemaran bunyi boleh menjejaskan kesihatan dan mengurangkan produktiviti. Selain daripada menjadi kacauganggu terhadap kehidupan sosial, ianya juga boleh memusnahkan struktur binaan, sekiranya disertai oleh getaran yang kuat seperti letupan batu dari aktiviti kuari.

Program Pengawasan Bunyi Bising Kebangsaan

Mulai Jun 2006, Jabatan Alam Sekitar telah melaksanakan Program Pengawasan Bunyi Bising Kebangsaan. Sebagai permulaan, pengukuran paras bunyi ambien adalah tertumpu kepada trafik jalanraya (23 stesen) dan kawasan perindustrian (9 stesen) (Jadual 4.1).

Pematuhan bunyi bising ambien adalah berdasarkan had-had yang disyorkan dalam "The Planning Guidelines for Environmental Noise Limits and Control" (2004). Didapati kebanyakan kawasan trafik mencatatkan bacaan bunyi bising yang melebihi standard yang ditetapkan dalam garispanduan tersebut.

Satu buku panduan bertajuk "Panduan Pengukuran Bunyi Bising Ambien" juga telah disediakan untuk kegunaan semua pejabat JAS Negeri.

Bengkel dan Kolokium

Satu Bengkel Pemakaian Garispanduan Kawalan Bunyi Bising Ambien dan Getaran telah diadakan untuk kakitangan JAS dan Pihak-Pihak Berkuasa Tempatan Perak, Pulau Pinang, Kedah, dan Perlis. Lima (5) siri Kolokium berkaitan cara-cara penggunaan peralatan "Sound Level Meter", juga diadakan di Ibu Pejabat JAS untuk pegawai-pegawai JAS Negeri.

Sources and Effects of Noise Pollution

Activities such as industrial, development and transportation projects generate excessive noise. Noise pollution has an impact on health and reduces productivity. Besides being a nuisance to the public, noise together with vibrations of very high amplitudes from activities such as blasting of rocks during quarrying can cause damage to infrastructure such as roads and buildings.

National Ambient Noise Monitoring Programme

Beginning from June 2006, the Department of Environment started the National Ambient Noise Monitoring Programme. For the initial phase, the ambient noise monitoring was conducted at 23 road traffic stations and 9 industrial stations (Table 4.1).

Noise level compliance was based on the limits recommended in "The Planning Guidelines for Environmental Noise Limits and Control (2004)". The results showed that most areas close to heavy traffic areas recorded noise level exceeding the guideline limits.

A guidebook entitled "Guide On Ambient Noise Measurement" had been prepared for use by DOE State Offices.

Workshops and Colloquiums

A workshop to facilitate the implementation and application of "The Planning Guidelines for Environmental Noise Limits and Control" was conducted for the staff of DOE and the Local Authorities of Perak, Pulau Pinang, Kedah dan Perlis . Also five (5) series of Sound Level Meter Equipment Colloquiums on proper handling of Sound Level Meter were held at the DOE Head Office for DOE State Officers.

Jadual 4.1: Pengawasan Bunyi Bising Ambien, 2006
Table 4.1 : Ambient Noise Monitoring, 2006

Kategori *Categories*	**Lokasi** / *Location*	**Bilangan Pengukuran/** *No. Measurement*	**Peratus Pematuhan (%)/** *Compliance (%)*
Trafik/*Traffic*	**Sabah**		
	Jalan Tunku Abdul Rahman/ *Tunku Abdul Rahman Road*	4	75
	Jalan Sulaman/ *Sulaman Road*	2	100
	Wilayah Persekutuan Kuala Lumpur		
	Jalan di luar Sek. Men. Sri Saujana, Sri Petaling/ *Road outside Sek. Men. Sri Saujana, Sri Petaling*	4	0
	Jalan di luar Sek. Men. Keb. Taman Setiawangsa/ *Road outside Sek. Men. Keb. Taman Setiawangsa*	3	67
	Kelantan		
	Jalan Kuala Krai-Gua Musang/ *Kuala Krai-Gua Musang Road*	5	40
	Jalan Sultan Yahya Petra/ *Sultan Yahya Petra Road*	5	0
	Terengganu		
	Jalan Kijing/ *Kijing Road*	5	40
	Jalan hadapan Mahkamah Tinggi Kuala Terengganu/ *Road infront of High Court Kuala Terengganu*	4	0
	Pulau Pinang		
	Jalan Sultan Azlan Shah/ *Sultan Azlan Shah Road*	6	0
	Lebuhraya-Lingkaran Luar Butterworth/ *Butterworth Highway-Outside Ring Road*	6	100
	Pahang		
	Jalan Endau Rompin-Tg. Gemok/ *Endau Rompin-Tg. Gemok Road*	5	20
	Batu 3, Jalan Gambang-Kuantan/ *3rd mile, Gambang-Kuantan Road*	5	0
	Negeri Sembilan		
	Jalan Sri Pagi, Senawang/ *Sri Pagi Road, Senawang*	6	0
	Jalan Kuala Pilah - Seremban/ *Kuala Pilah - Seremban Road*	6	0
	Sarawak		
	Jalan Kuching-Serian/ *Kuching-Serian Road*	3	67
	Bulatan Matang/ *Matang Roundabout*	3	33
	Perlis		
	Km 14.2 Jalan Kangar-Kodiang/ *Km 14.2 Kangar-Kodiang Road*	2	50
	Km 3.2 Jalan Raja Syed Alwi/ *Km 3.2 Raja Syed Almi Road*	2	0
	Putrajaya		
	Kuarters Kerajaan, Presint 9/ *Government Quarters, Precint 9*	1	100
	Sekolah Presint 9/ *Precint 9 School*	1	100
	Pangsapuri Putra Harmoni di Presint 9/ *Putra Harmoni Apartment Precint 9*	1	100
	Jambatan Sri Wawasan/ *Sri Wawasan Bridge*	1	100
	Perumahan teres Presint 8 / *Terraced Housing, Precint 8*	1	100
	JUMLAH STESEN /*TOTAL STATIONS : 23*	81	

Jadual 4.1: Pengawasan Bunyi Bising Ambien, 2006
Table 4.1 : Ambient Noise Monitoring, 2006

Kategori/ *Categories*	**Lokasi/** *Location*	**Bilangan Pengukuran/** *No. of Measurement*	**Peratus Pematuhan (%)/** *Compliance (%)*
Kawasan Perindustrian/ *Industrial Areas*	**Sabah** Kawasan Perindustrian Inanam/ *Inanam Industrial Area*	1	100
	Kelantan Kawasan Perindustrian Gua Musang/ *Gua Musang Industrial Area*	5	100
	Terengganu Kawasan Perindustrian Gong Badak/*Gong Badak Industrial Area*	4	50
	Pulau Pinang Kawasan Perindustrian Bertam/ *Bertam Industrial Area*	6	83
	Pahang Kawasan Perindustrian Mentakab/ *Mentakab Industrial Area*	5	100
	Negeri Sembilan Kawasan Perindustrian di Taman Desa Ria, Nilai/ *Taman Desa Ria Industrial Area, Nilai*	6	100
	Kuala Lumpur Kawasan Industri dekat Kolej Islam Antarabangsa/ *Industrial Area near to Kolej Islam Malaysia*	4	75
	Sarawak Kawasan Perindustrian Demak Laut/ *Demak Laut Industrial Area*	3	100
	Putrajaya Tapak Pembinaan di Presint 11/ *Construction Site at Presint 11*	1	100
	JUMLAH STESEN /*TOTAL STATIONS : 9*	35	

PROTOKOL MONTREAL DAN PERLINDUNGAN LAPISAN OZON
MONTREAL PROTOCOL AND PROTECTION OF THE OZONE LAYER

Latarbelakang

Setelah ratifikasi Konvensyen Vienna bagi Perlindungan Lapisan Ozone dan Protokol Montreal pada 29 Ogos 1989, Malaysia dikategorikan sebagai Negara Artikel 5 di bawah Protokol Montreal untuk Bahan-Bahan Yang Menghapuskan Lapisan Ozon.

Pematuhan Terhadap Protokol Montreal

Bagi tahun 2006 kadar penggunaan Klorofluorokarbon (CFC) per kapita ialah sebanyak 0.047 kg setahun dan kuota import bahan-bahan pemusnah ozon (ODS) ialah sebanyak 766.62 metrik tan. Tren Penggunaan CFC bagi Malaysia (sebenar dan diunjurkan) adalah ditunjukkan dalam Rajah 4.1.

Pelan Kebangsaan Penghapusan Klorofluorokarbon (NCFCP) 2002 – 2010

Di bawah NCFCP 2002 – 2010, baki metil sebanyak 2,125 ton (termasuk Halon dan Metil Bromid) "ozone depleting potential (ODP)" akan dihapuskan dalam tempoh sembilan tahun. Peruntukan tambahan sejumlah USD11.5 juta (RM43.7 juta) telah diluluskan oleh "Multilateral Ozone Trust Fund" melalui Bank Dunia. Sehingga kini, terdapat beberapa projek bantuan teknikal dan program-program industri yang dijalankan oleh JAS, selaku agensi pelaksana, termasuklah :

- CFCs-Metered Dosed Inhaler (MDIs) Programme;
- Mobile Air Conditioning (MAC) Inspection
- Programme oleh PUSPAKOM;
- Custom-ODS Training Programme (COTP);
- MAC Servicing Sector Programme;
- ODS Solvent Sector Programme;
- Refrigeration Service Sector Programme;
- Foam Sector Programme; dan
- Public Awareness Programme.

Sepanjang tahun 2006, sejumlah USD2,003,110.68 (RM7,438,653.73) telah dibelanjakan bagi pelaksanaan projek-projek di bawah program (Jadual 4.2).

Background

Upon ratification of the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on 29 August 1989, Malaysia became an Article 5 country under the Montreal Protocol for Substances That Deplete The Ozone Layer.

Compliance to Montreal Protocol

In 2006, the national Chlorofluorocarbon (CFC) consumption per capita was 0.047 kg per annum and the import quota for ODS for 2006 was 766.62 metric tonnes. Malaysian CFC consumption trend (actual and projected) is show in Figure 4.1.

National Cholorofluorocarbons Phase Out Plan (NCFCP) 2002 - 2010

Under the NCFCP 2002 – 2010 the remaining 2,125 tonnes of metyl (including Halon and Methyl Bromide) of ozone depleting potential would be phased out over a period of nine years. An additional allocation of USD 11.5 million (RM43.7 million) had been approved for Malaysia under the Multilateral Ozone Trust Fund through the World Bank. To date various on-going technical assistance projects and industrial programmes undertaken by the implementing agency include the following :

- CFCs-Metered Dosed Inhaler (MDIs) Programme;
- Mobile Air Conditioning (MAC) Inspection
- Programme by PUSPAKOM;
- Custom-ODS Training Programme (COTP);
- MAC Servicing Sector Programme;
- ODS Solvent Sector Programme;
- Refrigeration Service Sector Programme;
- Foam Sector Programme; and
- Public Awareness Programme.

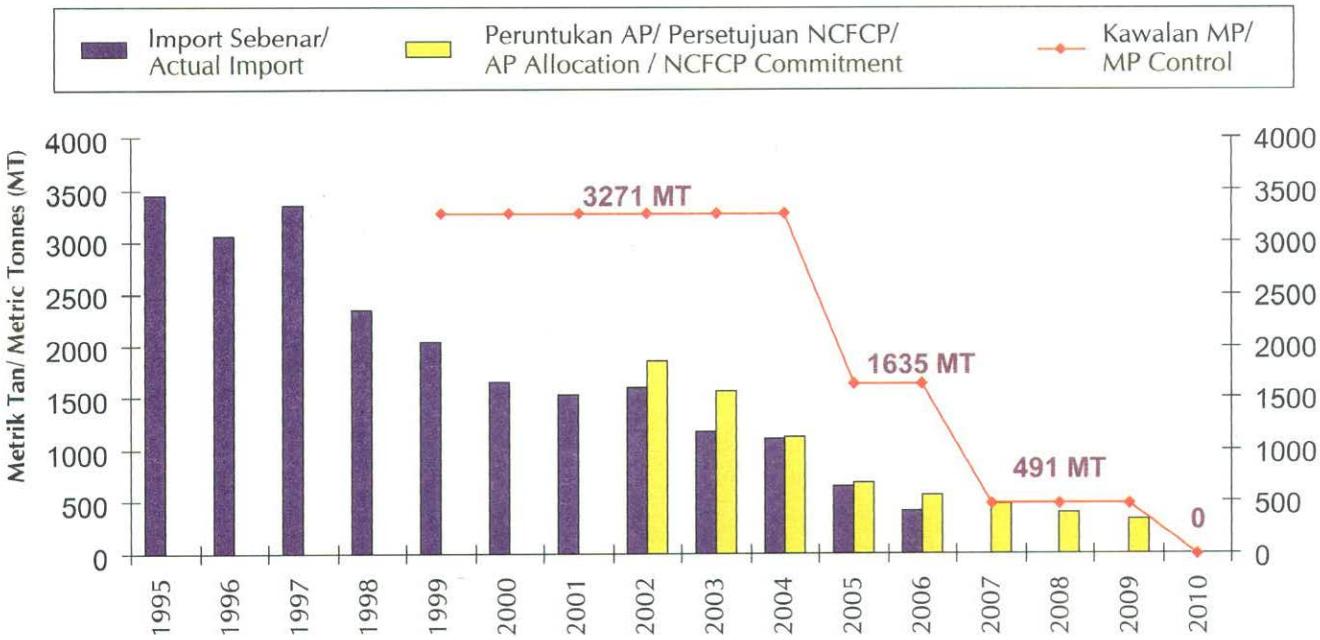
In 2006, a total of USD2,003,110.68 (RM7,438,653.73) was used up to implement projects under the programme (Table 4.2).

Pematuhan

Penggunaan CFC Malaysia (427.45 MT, pada Oktober 2006) adalah 74% di bawah had pematuhan (1,635 MT) di bawah Protokol Montreal untuk Bahan-Bahan Yang Menghapuskan Lapisan Ozon.

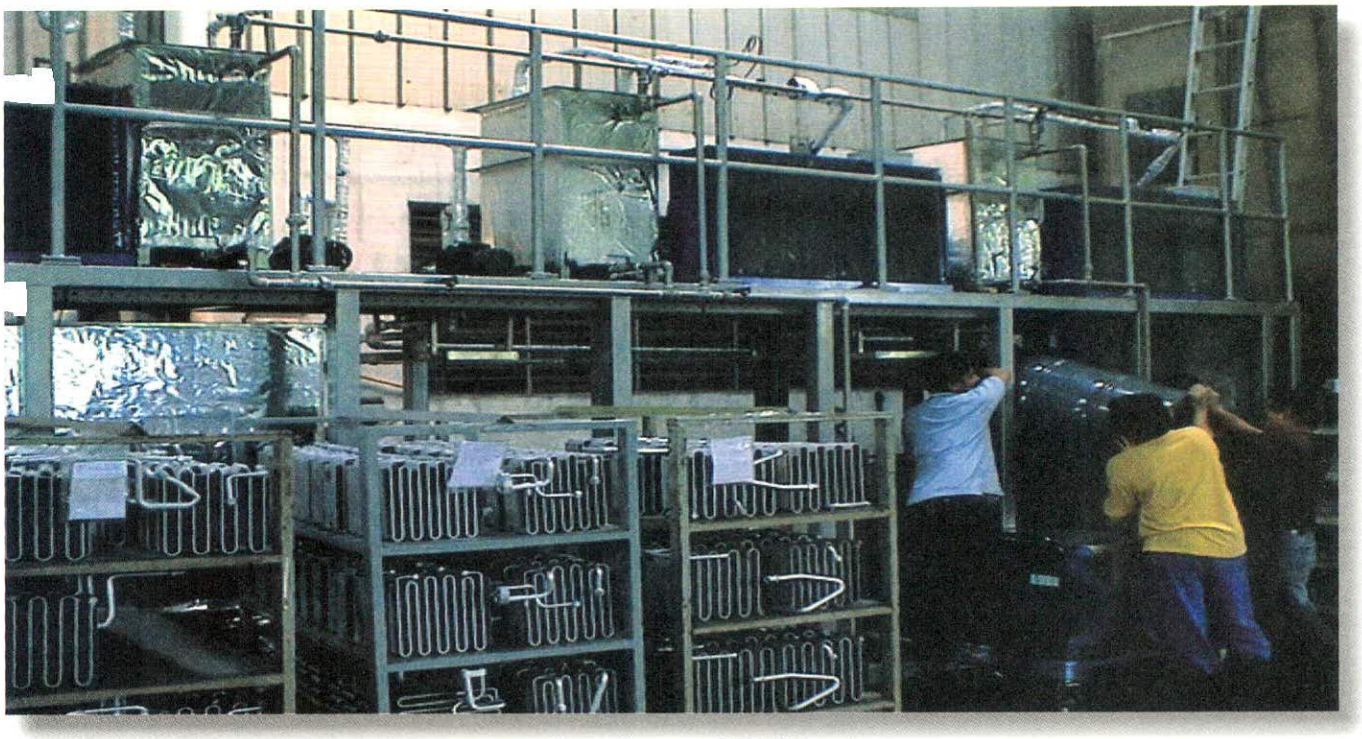
Compliance

Malaysia CFC Consumption (427.45 MT, as at October 2006) was 74 % below the compliance limit (1,635 MT) set under the Montreal Protocol on Substances That Deplete The Ozone Layer.



Rajah 4.1 JAS : Tren Penggunaan CFC di Malaysia, 1995 - 2010

Figure 4.1 DOE : Malaysia CFC Consumption Trend, 1995 - 2010



Projek Penghapusan ODS (Pelarut)

ODS (Solvent) Phase Out Project

Pengurusan Halon

Halon tidak lagi digunakan bagi pemasangan baru sistem mengawal kebakaran dan alat-alat pemadam api di Malaysia. Sebaliknya, karbon dioksida atau serbuk kimia kini digunakan sebagai alternatif. Namun demikian, kegunaan halon masih dibenarkan untuk tujuan terhad sistem keselamatan kawalan kebakaran tentera dan penerbangan awam sepertimana dipersetujui di bawah program Protokol Montreal. Halon yang diperolehkembali dan dikitarsemula disimpan di Pusat Bank Halon Kebangsaan di Kuala Kubu Bahru, Selangor.

Penghapusan Metil Bromid

Dana projek sebanyak USD 200,000 bagi bantuan teknikal "to install alternatives and phaseout all remaining non-quarantine and pre-shipment (non-QPS) uses of Methyl Bromide in Malaysia" disediakan oleh UNDP New York.

Penggunaan ODS dan Permit Kawalan Import

Kaedah utama untuk mengawal penggunaan ODS di Negara ini ialah melalui Sistem Permit Import (AP). Jumlah kuantiti ODS yang dibenarkan diimport setahun ditetapkan oleh Kementerian Perindustrian dan Perdagangan Antarabangsa setelah perundingan dengan JAS dan Jabatan Kastam.

Program dan Kempen Kesedaran

Sempena sambutan Hari Ozon Sedunia, pengumuman tentang Hari Ozon Sedunia telah dijalankan di stesen televisyen utama dan radio selama empat hari. Perincian program kesedaran yang dijalankan dalam tahun 2006 ditunjukkan di Jadual 4.3. Manakala Jadual 4.4 menunjukkan mesyuarat-mesyuarat berkaitan di peringkat serantau dan antarabangsa yang dihadiri JAS.

Halon Management

Halon is no longer used in Malaysia for new installation of fire protection system and fire extinguishers. Instead, carbon dioxide or chemical powder are now being used as alternatives. However, halon is still allowed for restricted use in military and civil aviation fire safety protection systems, as agreed under the Montreal Protocol. Recycled and recovered halon are stored at the National Halon Bank Centre at Kuala Kubu Bahru, Selangor.

Methyl Bromide Phase Out

A project grant of USD 200,000 for technical assistance to install alternatives to phase out all remaining non-quarantine and pre-shipment (non-QPS) uses of Methyl Bromide in Malaysia was provided by UNDP New York.

Consumption of ODS and Import Control Permit

The main instrument of control of ODS consumption in Malaysia is the Approved Permit (AP) System. The total quantity of ODS that can be imported in any year is set by the Ministry of International Trade and Industry (MITI) after consultations with DOE and the Customs Department.

Awareness Programme and Campaign

In conjunction with World Ozone Day, announcements were made via television and radio stations for four consecutive days. Overall awareness programme for 2006 is shown in Table 4.3. List of meetings at regional and international level attended by DOE Officers is shown in Table 4.4.

Jadual 4.2 JAS : Projek-Projek dan Aktiviti-Aktiviti di bawah NCFCP, 2006
Table 4.2 DOE : Projects and Activities Implemented Under NCFCP, 2006

Sektor/ Sector	Bil. Aktiviti Yang Selesai/ No. of Completed Activities	Bil. Lawatan Pemeriksaan/ No. of Inspection Visits
Metered Dosed Inhaler (MDI)	1	-
Program Pemeriksaaan Penghawa Dingin Kenderaan (MAC) oleh PUSPAKOM *Mobile Air Conditioning (MAC) Inspection Programme by PUSPAKOM*	Projek selesai (2004) *Project Completed (2004)*	-
Program Kursus Kastam-ODS (COTP) *Customs ODS Training Programme (COTP)*	1	-
Sektor MAC Servis *MAC Servising Sector* *Pensijilan Juruteknik Servis MAC (CSTP) *Certification MAC Service Technicians (CSTP)*	3220	-
*Baucer Alat-alat MAC *MAC Tools Voucher*	2830	-
*Lawatan Verifikasi ke bengkel terpilih *Verification visits to selected workshops*	1262	771
*Baucer Mesin Kitar-semula (R&R) *Recycle & Recovery (R&R) Machine Voucher*	689	-
Pelarut / *Solvent*	1	3
Sektor Servis Penghawa Dingin *Refrigeration Service Sector*		
Busar / *Foam*	-	-
*Projek Kumpulan *Group Sub-Project*	1 (14 Group)	28
*Sub-Projek Individu / *Individual Sub-Project*	26	48
Aktiviti Kesedaran / *Awareness Activity*	Rujuk Jadual 4.3/ *Refer Table 4.3*	-

Jadual 4.3 JAS : Aktiviti-Aktiviti Kesedaran NCFCP, 2006
Table 4.3 DOE : Public Awareness Activities NCFCP, 2006

Tarikh/ Date	Aktiviti & Program/ Activities & Programme	Tempat/ Venue
Februari 20 / *February 20*	Misi bank Dunia untuk ODS Phase Out Project *World Bank Mission on ODS Phase Out Project*	Bahagian Udara Air Division
April 24 & 29 / *April 24 & 29* Mei 1 / May 1	Jemputan menjadi *Authorized Training Center* untuk Sektor Servis Refrigeren (New Straits Times, Berita Harian, Sin Chew Jit Poh dan Utusan Malaysia) *Invitation to be Authorized Training Center for Refrigerent Sector in NST, Berita Harian, Utusan Malaysia and Sin Chew Jit Poh.*	
Ogos 22 / *August 22*	Bengkel status HCFC di Malaysia *Workshop on HCFC status in Malaysia*	Pusat Konvensyen Sime Darby, Kuala Lumpur *Sime Darby Convention Centre, Kuala Lumpur*
Ogos 28 & 29 / *August 28 & 29*	Pameran Kempen Kesedaran Perlindungan Ozon di Chemical Exhibition *Exhibition on Awareness Campaign on Ozone Protection at Chemical Exhibition*	KLCC, Kuala Lumpur
Ogos 29 & 30 / *August 29 & 30*	Sambutan Minggu Alam Sekitar dan Kursus RI yang dianjurkan oleh JAS Terengganu *Celebration of Environment Week & RI Course organized by Terengganu State DOE*	Hotel Primula Beach Resort, Kuala Terengganu *Primula Beach Resort Hotel, Kuala Terengganu*
September 6 – 10 / *September 6 – 10*	Pameran Kempen Kesedaran Perlindungan Ozon di 6th Malaysia International Trade & Consumer Fair *Exhibition on Awareness Campaign on Ozone Protection at 6th Malaysia International Trade & Consumer Fair*	PWTC, Kuala Lumpur
September 1 – Oktober 31 / *September 1 – October 31*	Iklan di bus Rapid KL sempena sambutan Hari Ozon Sedunia 2006 *Advertisement on Rapid KL bus in conjunction with World Ozone Day 2006*	
September 1, 2006 – Ogos 31, 2007 / *September 1, 2006 – August 31, 2007*	Iklan panel di tren LRT sempena sambutan Hari Ozon Sedunia 2006 *Advertisement on LRT train panel in conjunction with World Ozone Day 2006*	
September 8, 9 & 10 / *September 8, 9 & 10* September 9, 11 & 12 / *September 9, 11 & 12*	Jemputan menjadi pembekal Basic Tools dan R&R Machine untuk Sektor Servis Refrigeran (New Straits Times dan Utusan Malaysia) *Invitation to qualify as suppliers of Basic Tools and R&R Machine in NST and Utusan Malaysia*	
September 14 – 17 / *September 14 – 17*	Iklan 15 saat di televisyen (RTM 1, TV3 & ntv7) sempena sambutan Hari Ozon Sedunia 2006 *15 seconds advertisement on television (RTM 1, TV3 & ntv7) in conjunction with World Ozone Day 2006*	

Jadual 4.3 JAS : (Sambungan)
Table 4.3 DOE : (Continue)

Tarikh/ Date	Aktiviti & Program/ Activities & Programme	Tempat/ Venue
September 15 – 17 / *September 15 – 17*	Iklan sempena sambutan Hari Ozon Sedunia 2006 (Utusan Malaysia dan New Straits Times) *Advertisement in conjunction with World Ozone Day 2006 (Utusan Malaysia and New Straits Times)*	
September 25 – 29 / *September 25 – 29*	Misi Bank Dunia untuk ODS Phase Out Project *World Bank Mission on ODS Phase Out Project*	Bahagian Udara, JAS Ibu Pejabat *Air Division, DOE Headoffice*
November 8 & 9 / *November 8 & 9*	Bengkel Program Kesedaran Strategi Kebangsaan & Pelan Tindakan Program Kesedaran Bahan Pemusnah Ozon (ODS) NCFCP 2002 – 2010 *Workshop on NCFCP 2002 - 2010 Awareness Programme on Ozone Depleting Substances (ODS)*	Hotel Palace Of The Golden Horses, Seri Kembangan *Palace Of The Golden Horses Hotel, Seri Kembangan*
November 13 - 16 / *November 13 - 16*	Sambutan Minggu Alam Sekitar dan Kursus RI yang Dianjurkan oleh JAS Sarawak *Celebration of Environment Week & RI Course Organized by Sarawak DOE State*	Hotel Crowne Plaza, Kuching *Crowne Plaza Hotel, Kuching*
Disember 2 & 3 / *December 2 & 3*	Pameran Perlindungan Ozon di Pamera Pendidikan *Exhibition on Ozone Protection at Education Fair*	PWTC, Kuala Lumpur
Disember 18 – 20 / *December 18 - 20*	Latihan Kelayakan Menjadi Authorized Training Center Untuk Sektor Servis Refrigeran *Training to Become Authorized Training Center for Refrigerant Service Sector*	Hotel Grand Blue Wave, Shah Alam *Grand Blue Wave Hotel, Shah Alam*

Jadual 4.4 JAS : Mesyuarat-Mesyuarat Peringkat Serantau dan Antarabangsa
Table 4.4 DOE : Regional and International Meetings

Tarikh/ Date	Aktiviti & Program/ Activities & Programme	Tempat/ Venue
Mei 17 - 24 / May 17 - 24	2006 Main Meeting of South Asia and Southeast Asia Network of ODS Officers	Bangkok, Thailand
Mei 18 - 20 / May 18 - 20	10th Meeting of ASEAN Working Group On Multilateral Environmental Agreements (10th AWGMEA)	Bogor, Indonesia
Jun 27 - 28 / June 27 - 28	Tenth Annual Financial Agent Workshop	Washington D.C
Julai 3 - 6 / July 3 - 6	26th Meeting of Open-Ended Working Group of Parties to The Montreal Protocol/ Workshop on Consideration of Technology and Economic Assessment Panel and Intergovernmental Panel on Climate Change Assessment Reports	Montreal, Canada
Oktober 2 - 5 / October 2 - 5	Follow-up Meeting of SEAP Network of ODS Officers	Jakarta, Indonesia
Oktober 30 – November 3 / October 30 - November 3	The 18th Meeting of Parties (MOPs) to The Montreal Protocol	New Delhi, India

PENGAWASAN KUALITI AIR DARATAN (SUNGAI)
SURFACE WATER QUALITY MONITORING (RIVER)

Program Pengawasan Kualiti Air Kebangsaan telah dijalankan sejak tahun 1978. Walaubagaimanapun, mulai tahun 1995 program ini telah diswastakan kepada pihak Alam Sekitar Malaysia Sdn. Bhd. (ASMA). Pada tahun 2006, sebanyak 1064 buah stesen dari 146 buah lembangan sungai dipantau di seluruh negara secara manual (Jadual 4.5). Sampel air yang diambil dari 1064 buah stesen dianalisa untuk mendapatkan Indek Kualiti Air (IKA):

- Keperluan Oksigen Biokimia (BOD)
- Keperluan Oksigen Kimia (COD)
- Ammoniakal Nitrogen (NH_3N)
- pH
- Oksigen Terlarut (DO)
- Pepejal Terampai (SS)

Selain itu parameter lain juga dianalisa seperti logam berat dan bakteria mengikut keperluan sesuatu tempat (stesen). JAS juga telah menubuhkan 10 buah stesen pemantauan kualiti air sungai secara automatik untuk mengesan perubahan secara terus menerus kepada kualiti air sungai. Sg. Perai (Seberang Perai - Pulau Pinang), Sg. Perak (Perak), Sg. Selangor (Selangor), Sg. Kelang (W.P. Kuala Lumpur), Sg. Linggi (Negeri Sembilan), Sg. Melaka (Melaka), Sg. Skudai (Johor), Sg. Keratong (Pahang), Sg. Terengganu (Terengganu) dan Sg. Sarawak (Sarawak) (Jadual 4.5). Di bawah Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai , 5 stesen automatik telah ditubuhkan di Sg. Langat (Selangor), Sg. Batang Benar (Negeri Sembilan), Sg. Labu (Negeri Sembilan), Sg. Putat (Melaka) dan Sg. Rajang (Sarawak).

The National River Water Monitoring Program was implemented in1978. However since 1995 this work was privatized to Alam Sekitar Malaysia Sdn Bhd (ASMA). In 2006, a total of 1064 stations located within 146 river basins in Malaysia were monitored (Table 4.5). Water samples taken from the 1064 stations were analyzed to compute the Water Quality Index (WQI) based on the following parameters :

- Biochemical Oxygen Demand (BOD)
- Chemical Oxygen Demand (COD)
- Ammoniacal Nitrogen (NH_3N)
- pH
- Dissolved Oxygen (DO)
- Suspended Solids (SS)

Other parameters such as heavy metals and bacterial contamination would be measured depending on site requirements. In addition, 10 automatic water quality monitoring stations had been installed to monitor river quality changes on a continuous basis at Sg.Perai (Seberang Perai - Pulau Pinang), Sg. Perak (Perak), Sg. Selangor (Selangor), Sg. Kelang (W.P. Kuala Lumpur), Sg. Linggi (Negeri Sembilan), Sg. Melaka (Melaka), Sg. Skudai (Johor), Sg. Keratong (Pahang), Sg. Terengganu (Terengganu) and Sg. Sarawak (Sarawak) (Table 4.5). Under the Pollution Prevention and Water Quality Improvement Program, 5 automatic stations had been installed at Sg. Langat (Selangor), Sg. Batang Benar (Negeri Sembilan) Sg. Labu (Negeri Sembilan), Sg. Putat (Melaka) and Sg. Rajang (Sarawak).

Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai

Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai yang mula dilaksanakan sejak tahun 2001 di bawah Rancangan Malaysia Ke-Lapan (RMK-8) kini diteruskan di bawah Rancangan Malaysia Ke-Sembilan (RMK-9). Program ini mempunyai dua aktiviti utama untuk tujuan peningkatan kualiti air sungai-sungai yang telah dikategorikan sebagai tercemar atau sederhana tercemar berdasarkan hasil pemantauan yang telah dijalankan. Aktiviti pertama ialah pelaksanaan kajian pencemaran lembangan sungai yang tercemar dan diikuti dengan tindakan penguatkuasaan serta kempen kesedaran awam bagi lembangan sungai yang telah dipilih. Bagi tahun 2006 sebanyak 33 lembangan sungai telah dipilih untuk program ini (Rajah 4.2).

Kriteria pemilihan tersebut adalah berdasarkan kepada kegunaan berfaedah seperti bekalan air minuman, perikanan, rekreasi dan potensi untuk pelancongan dan juga sungai yang menghadapi pencemaran yang serius atau yang berada di tahap Kelas III dan ke bawah yang perlu dipulihkan ke tahap Kelas II iaitu sesuai sebagai bekalan air minuman dengan rawatan konvensional.

Kajian Pencemaran Lembangan Sungai

Bagi tahun 2006, dua lembangan sungai iaitu lembangan Sungai Linggi di Negeri Sembilan dan lembangan Sungai Sepetang di Negeri Perak telah dikenalpasti untuk kajian terperinci terhadap pencemaran sungai. Tujuan kajian adalah untuk mengenalpasti punca-punca pencemaran yang menyebabkan kemerosotan kualiti air sungai dan merumuskan pelan-pelan tindakan untuk pencegahan pencemaran dan peningkatan kualiti air sungai berkenaan. Kajian lembangan Sungai Linggi telah dimulakan pada penghujung tahun 2006 dan dijangka akan diselesaikan pada pertengahan tahun 2007 manakala kajian bagi lembangan Sungai Sepetang akan dimulakan pada awal tahun 2007 dan akan diselesaikan pada akhir tahun yang sama. Pelan-pelan tindakan yang dirumuskan itu akan dikemukakan kepada agensi-agensi yang berkaitan untuk pertimbangan peruntukan dan perlaksanaan.

River Pollution Prevention and Water Quality Improvement Programme

The River Pollution Prevention and Water Quality Improvement Programme had been implemented since 2001 under the 8th Malaysia Plan and is extended into the 9th Malaysia Plan. The programme comprised of two main activities for the purpose of improving the water quality of rivers categorised as polluted or slightly polluted based on monitoring results. The first activity is the implementation of a study on a polluted river basin, followed by the enforcement action and public awareness campaign for the selected river basin. As for the year 2006, 33 river basins were selected for this programme (Figure 4.2).

The selection criteria were based on their beneficial uses such as water supply, fisheries, recreational and tourism potential as well as those rivers which were seriously affected by pollution or categorised as Class III and below and had to be improved to Class II i.e. suitable for drinking water supply with only conventional treatment.

Study on Pollution of River Basin

In 2006, two river basins namely Linggi River Basin in Negeri Sembilan and Sepetang River Basin in Perak were identified for the pollution study. The purpose of the study was to identify pollution sources responsible for the deterioration of the river water quality and formulate action plans to prevent pollution and improve its water quality. The Linggi River Basin study started at the end of 2006 and will be completed by the middle of 2007. The Sepetang River Basin study will start in early 2007 and will be completed in the same year. The formulated action plans will be presented to all relevant agencies for financial considerations and implementation.

Penguatkuasaan

Penguatkuasaan berkesan adalah merupakan salah satu rumusan pelan tindakan yang dicadangkan oleh kajian terperinci untuk mengurangkan beban pencemaran dan meningkatkan kualiti air sungai. Pada tahun 2006, terdapat sebanyak 8894 premis di dalam 33 lembangan sungai yang tertakluk di bawah Akta Kualiti Alam Sekeliling 1974. Dari jumlah ini, 2683 premis telah diperiksa dan 212 premis telah diberi notis arahan supaya mempertingkatkan keupayaan loji pengolahan effluen dan 61 premis telah dihadapkan ke mahkamah (Rajah 4.3).

Selain daripada itu, inventori punca-punca tetap yang tertakluk di bawah Akta Kualiti Alam Sekeliling 1974 bagi 33 lembangan sungai ini juga dikemaskini dari masa ke semasa bagi memantapkan program penguatkuasaan yang dijalankan.

Kesedaran Awam

Kesedaran awam merupakan satu lagi langkah yang berkesan dalam mencegah pencemaran dan meningkatkan kualiti air sungai. Pada tahun 2006, Jabatan Alam Sekitar telah menerbitkan poster "Bersama Mencegah Pencemaran Sungai" untuk edaran kepada pihak industri dan orang awam terutamanya bagi 33 lembangan sungai yang dijadualkan. Satu dokumentari khas dengan tajuk yang sama juga telah diterbitkan. Aktiviti kesedaran awam yang dijalankan adalah seperti di Rajah 4.4.

Enforcement

Effective enforcement is one of the essential measure in the action plans proposed under the study to reduce pollution loads and improve river water quality. In 2006, a total of 8894 premises within the 33 river basins were subjected to the Environmental Quality Act 1974. Of these 8894 premises, inspection visits were conducted on 2683 premises, of which 212 premises were given notices to upgrade their treatment systems and 61 premises were taken to court (Figure 4.3).

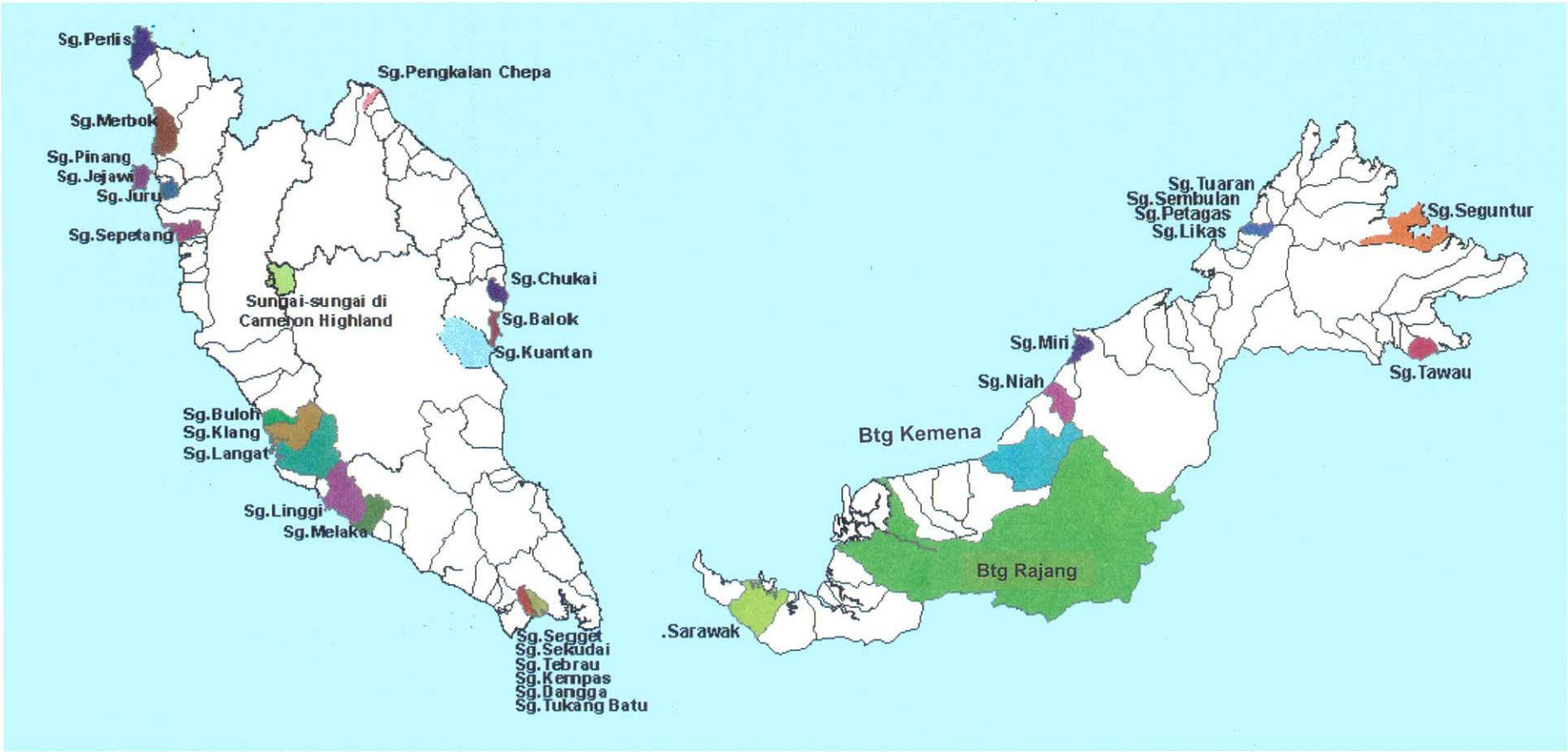
In addition, the inventory of point sources of pollution within the 33 river basins which were subjected to the Environmental Quality Act 1974 was regularly updated to enhance and strengthen the implementation of the enforcement programme.

Public Awareness

Promoting awareness is another effective measure to prevent pollution and improve river water quality. In 2006, Department of Environment printed posters entitled "Bersama Mencegah Pencemaran Sungai" for distribution to industrial sectors and the public especially sited within the selected 33 river basins. A special documentary under the same title was also produced. Public awareness activities implemented were listed as in Figure 4.4.

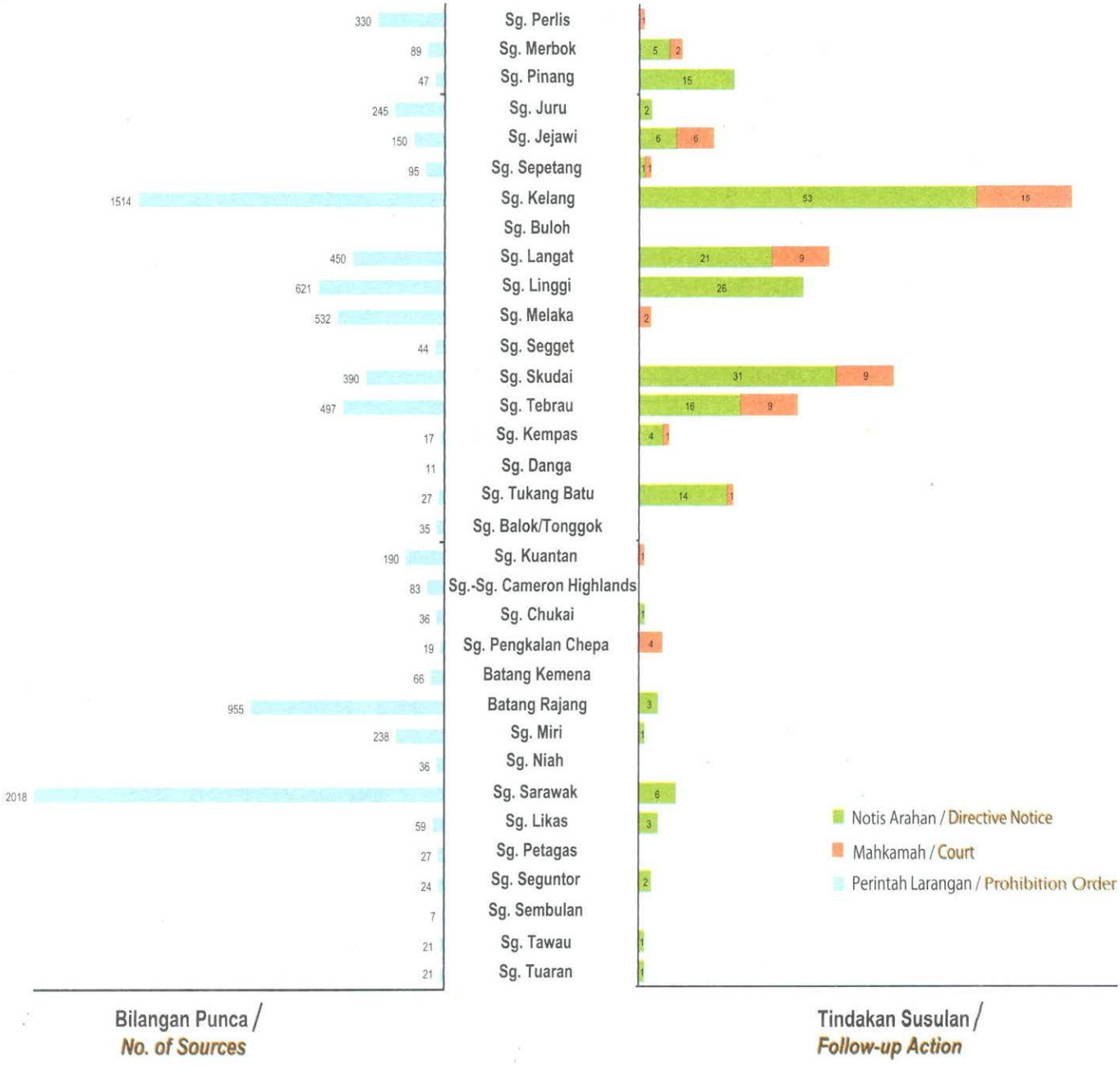
Jadual 4.5 : Jabatan Alam Sekitar : Stesen Pemantauan Kualiti Air Sungai, 1995 - 2006
Table 4.5 : Department of Environment : River Quality Monitoring Stations, 1995 - 2006

Jenis Pemantauan/ Types Of Monitoring	Tahun											
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Pemantauan Manual/ Manual Monitoring												
Lembangan Sungai / River Basin	115	116	117	120	120	120	120	120	120	120	146	146
Bilangan Stesen Pemantauan / Number of Monitoring Stations	821	909	909	900	902	901	931	827	926	926	1069	1064
Pemantauan Berterusan Automatik / Automatic Continuous Monitoring												
Lembangan Sungai/ River Basin	2	4	6	8	10	10	10	10	12	12	12	12
Bilangan Stesen Pemantauan / Number of Monitoring Stations	2	4	6	8	10	10	10	10	15	15	15	15



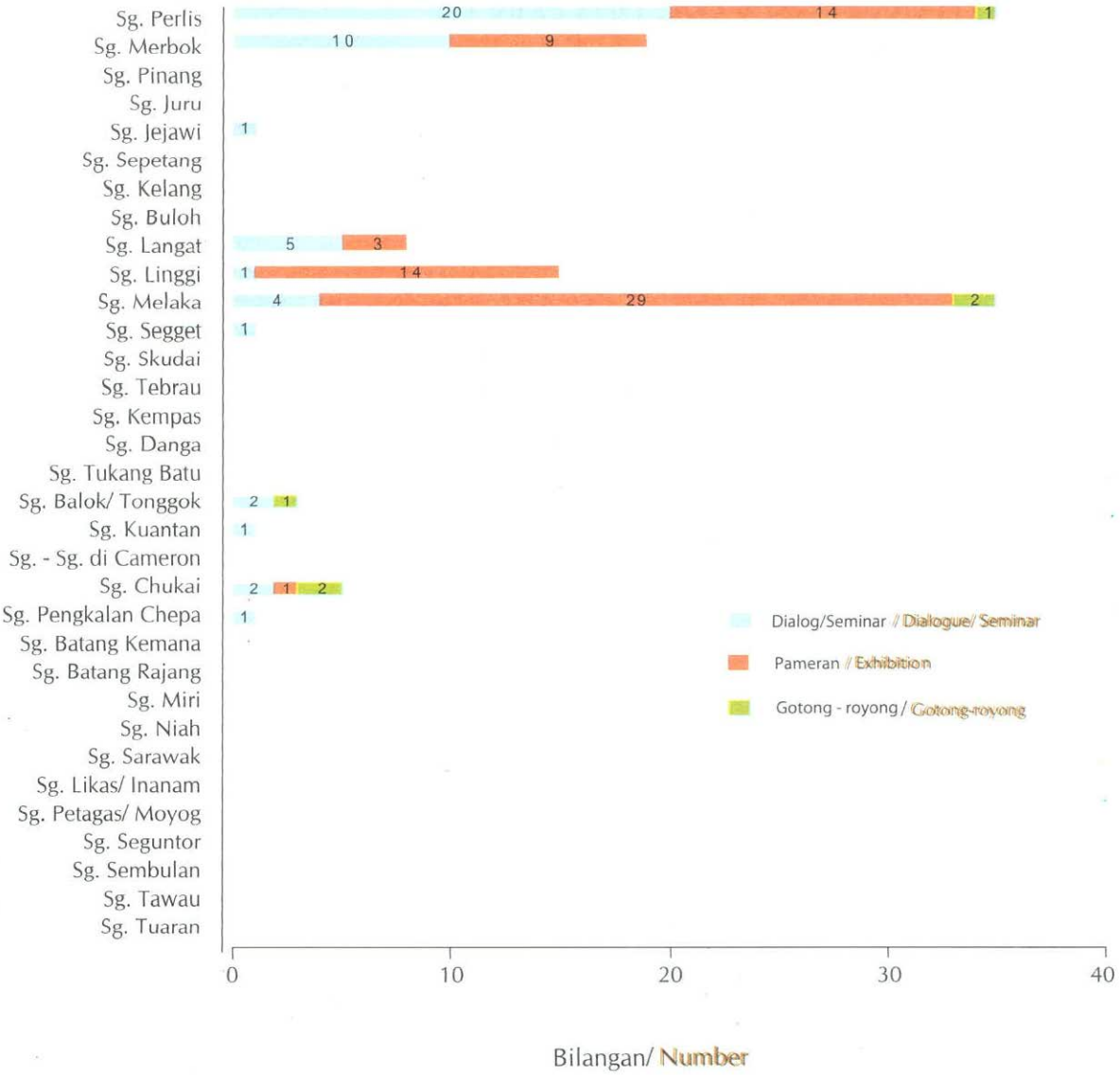
Rajah 4.2 JAS: Lembangan Sungai yang dipilih di bawah Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai

Figure 4.2 DOE: Selected river basins under River Pollution Prevention and Water Quality Improvement Programme



Rajah 4.3 JAS : Lawatan Penguatkuasaan/ Tindakan Susulan ke Atas Punca-Punca di Bawah Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai, 2006

Figure 4.3 DOE : Enforcement Visits/ Follow-up Action on Pollution Sources Under River Pollution Prevention and Water Quality Improvement Programme, 2006



Rajah 4.4 JAS : Aktiviti-Aktiviti Kesedaran di Bawah Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai, 2006

Figure 4.4 DOE : Awareness Activities under the River Pollution Prevention and Water Quality Improvement Programme, 2006

KAWALAN TERHADAP PREMIS YANG DITETAPKAN
CONTROL OF PRESCRIBED PREMISES

Kilang Getah Asli Mentah dan Kilang Kelapa Sawit Mentah dikategorikan sebagai premis yang ditetapkan di bawah Perintah Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Getah Asli Mentah) 1978 dan Perintah Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Kelapa Sawit Mentah) 1977. Operasi premis-premis ini adalah tertakluk kepada keperluan Seksyen 18, Akta Kualiti Alam Sekeliling, 1974 di mana tuan punya premis-premis ini perlu mempunyai lesen daripada Jabatan Alam Sekitar bagi menduduki dan menggunakan premis.

Raw natural rubber factories and crude palm oil processing mills are classified as prescribed premises under the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Order, 1978 and the Environmental Quality (Prescribed Premises) (Crude Palm Oil) Order, 1977. The operation of these premises is subjected to the requirement of Section 18 of the Environmental Quality Act, 1974 whereby the owners of prescribed premises are required to obtain a license from the Department of Environment for occupation and use of the said premises.

Kilang Getah Asli Mentah

Pada tahun 2006, sejumlah 84 buah kilang getah asli mentah telah dilesenkan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Getah Asli Mentah), 1978. Dari jumlah ini 76 buah kilang telah dilesenkan untuk melepaskan effluen yang telah diolah ke alur air, sebuah kilang telah dilesenkan untuk melepaskan effluen ke atas tanah manakala tujuh (7) buah kilang dibenarkan untuk mengitar semula effluen. Tempoh lesen yang diberikan bagi setiap premis adalah berbeza dari satu (1) hingga tiga (3) tahun bergantung kepada paras pematuhan kilang-kilang tersebut terhadap syarat-syarat lesen.

Sepanjang tahun 2006, pegawai-pegawai penguatkuasa JAS negeri telah menjalankan sebanyak 212 pemeriksaan ke atas ke semua 84 buah kilang getah asli mentah yang telah dilesenkan. Kilang-kilang yang mempunyai rekod pematuhan yang rendah telah diberi keutamaan. Sebanyak 70 surat dan 19 notis arahan telah dikeluarkan kepada premis-premis tersebut untuk mengambil tindakan pembaikan. Sebanyak 17 kompaun telah dikeluarkan bagi kesalahan-kesalahan yang telah dilakukan sementara 12 tindakan mahkamah telah diambil bagi kesalahan melanggar syarat-syarat lesen melibatkan denda sebanyak RM117,500 (Rajah 4.5).

Pematuhan keseluruhan oleh kilang getah asli mentah pada 2006 meningkat ke 81% berbanding 77% pada tahun 2005.

Raw Natural Rubber Factories

In 2006, there were 84 raw natural rubber factories licensed under the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations, 1978. Out of these, 76 factories were licensed to discharge treated effluent into inland watercourse, one (1) was permitted to practise land disposal, while the remaining seven (7) were allowed to recycle their effluent. The licensing periods of each premise varied from one (1) to three (3) years depending on the level of compliance to license the conditions.

Throughout 2006, State DOE enforcement officers conducted 212 inspections on 84 licensed raw natural rubber factories. Factories with low compliance record were given priority. A total of 70 directives and 19 notices were issued to the concerned premises to take remedial action. Meanwhile, 17 compounds were issued for offences committed and 12 court actions were taken and a total fine of RM117,500 for failure to comply with conditions of the licence (Figure 4.5).

Overall compliance by the raw natural rubber factories increased to 81% in 2006 compared to 77% in 2005.

Kilang Kelapa Sawit Mentah

Sejumlah 398 buah kilang kelapa sawit mentah telah dilesenkan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Kelapa Sawit Mentah), 1977 pada tahun 2006. Terdapat pertambahan sebanyak tiga (3) buah kilang berbanding dengan tahun 2005. Dari 398 buah kilang yang dilesenkan, sebanyak 248 buah kilang telah dilesenkan untuk melepaskan effluen yang diolah ke dalam alur air, 105 buah kilang untuk melupuskan effluen ke atas tanah, 36 buah kilang melupuskan effluen dengan menggunakan kedua-dua kaedah dan enam (6) buah kilang secara kitar semula.

Sepanjang tahun 2006, 1033 pemeriksaan ke atas 398 kilang kelapa sawit yang telah dilesenkan telah dilaksanakan oleh pegawai-pegawai penguatkuasa JAS negeri. Sebanyak 393 surat arahan dan 244 notis telah dikeluarkan kepada premis-premis tersebut untuk mengambil tindakan bagi mematuhi keperluan perundangan. Sebanyak 112 kompaun dikeluarkan bagi kesalahan yang dilakukan dan 56 tindakan mahkamah telah diambil dengan denda sebanyak RM646,500 (Rajah 4.6).

Pencapaian pematuhan keseluruhan syarat-syarat lesen oleh kilang kelapa sawit pada 2006 adalah 75% berbanding 65% pada tahun 2005.

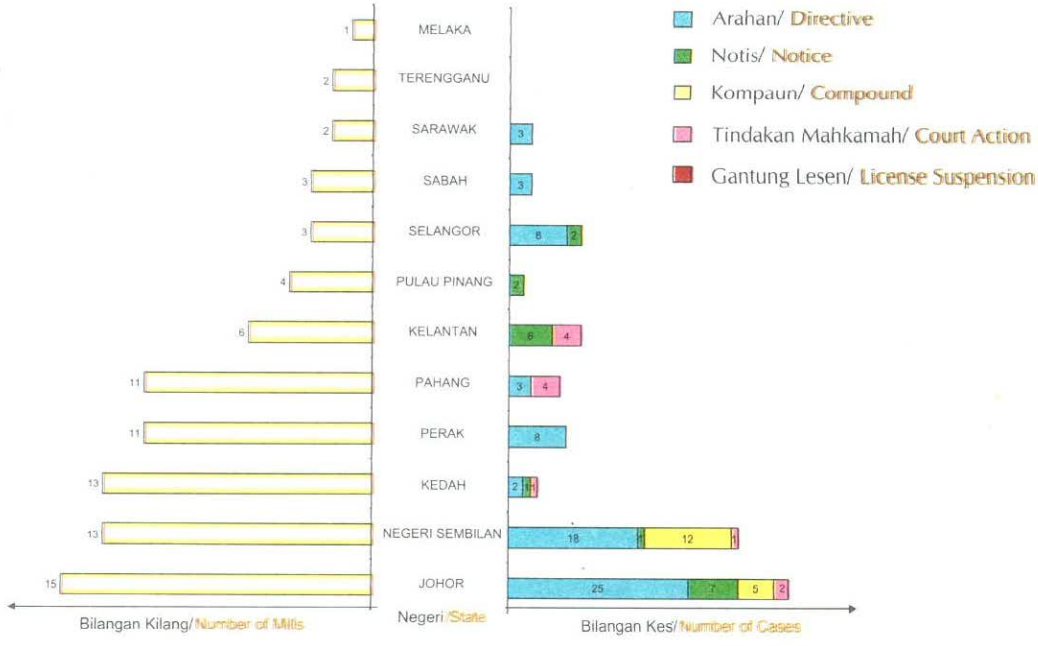
Crude Palm Oil Mills

There were 398 palm oil processing mills licensed under the Environmental Quality (Prescribed Premises) (Crude Palm Oil Mill) Regulations, 1977 in 2006, an increase of 3 mills as compared to 2005. Of these 398 licensed prescribed premises, 248 were granted permission to discharge treated effluent into inland watercourses, 105 land disposal, 36 to implement both methods of effluent disposal and six (6) effluent recycling.

Throughout the year, 1033 inspections on 398 licensed palm oil mills were conducted by DOE state enforcement officers. A total of 393 directive and 244 notices were issued to affected mills to take action to comply with the legal requirements. The number of compounds issued for offences committed were 112 and 56 were prosecuted and RM646,500 in fines were collected. (Figure 4.6).

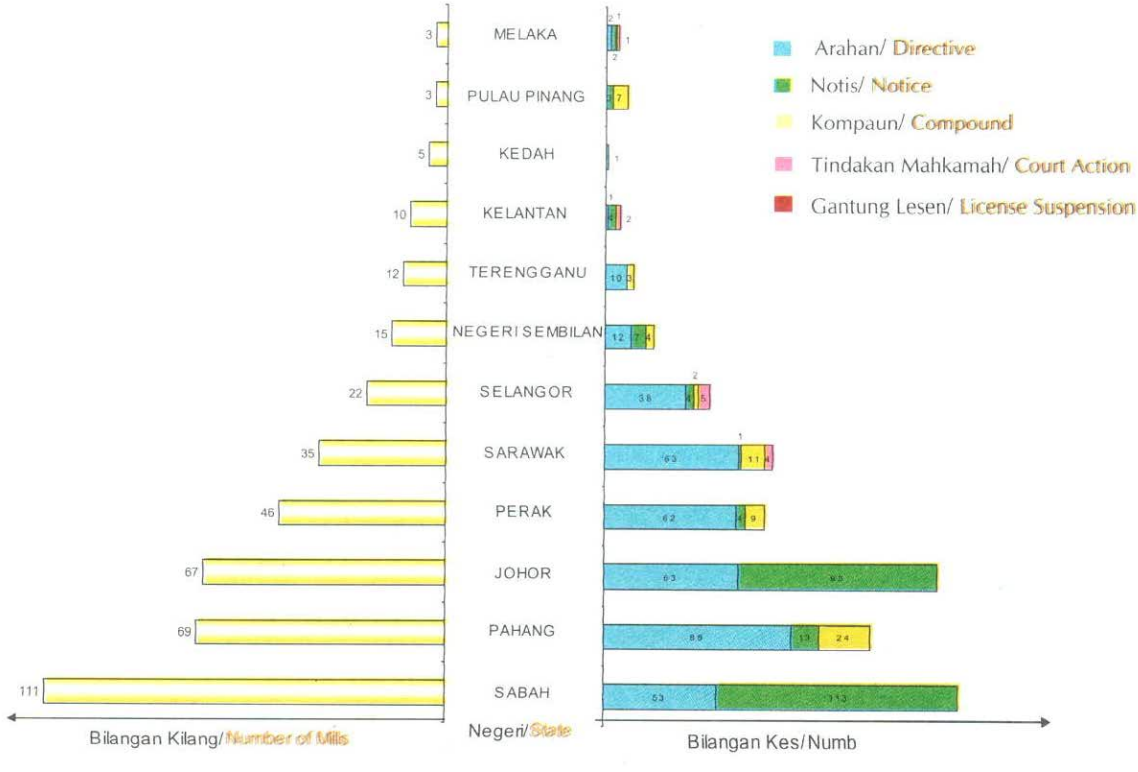
Overall licensing compliance by the palm oil mills in 2006 was 75% compared to 65% in 2005.

Kilang Kelapa Sawit Mentah
Crude Palm Oil Mill



Rajah 4.5 JAS : Bilangan Kes Tindakan Undang-Undang Terhadap Kilang Getah Asli Mentah, 2006

Figure 4.5 DOE: Legal Action Against Raw Natural Rubber Factories, 2006



Rajah 4.6 JAS : Bilangan Kes Tindakan Undang-Undang Terhadap Kilang Kelapa Sawit Mentah, 2006

Figure 4.6 : DOE : Legal Action Against Crude Palm Oil Mills, 2006

KAWALAN TERHADAP PREMIS YANG BUKAN DITETAPKAN
CONTROL OF NON-PRESCRIBED PREMISES

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan dan Effluen-Effluen Perindustrian),1979

Premis-premis yang bukan ditetapkan yang melepaskan effluen adalah tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan Dan Effluen-Effluen Perindustrian) 1979. Pada tahun 2006, Jabatan Alam Sekitar telah menjalankan 6156 pemeriksaan penguatkuasaan terhadap 5451 industri pembuatan dan premis-premis yang bukan ditetapkan lain yang tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan dan Effluen-Effluen Perindustrian) 1979. Pencapaian pematuhan keseluruhan oleh premis yang bukan ditetapkan adalah 85%. Manakala baki 15% premis lain yang diperiksa didapati menghadapi masalah untuk mematuhi standard pelepasan effluen (Peraturan 8) dan tidak mempunyai Kebenaran Bertulis bagi pembinaan loji pengolahan effluen (Peraturan 4).

Dari jumlah premis yang tidak patuh ini, 75 kes adalah tertakluk kepada tindakan undang-undang dan telah didakwa di mahkamah. Sejumlah RM 1,419,000.00 denda telah dikenakan. Tindakan-tindakan lain yang diambil adalah pengeluaran 1865 surat arahan dan 311 notis arahan kepada industri supaya mereka mengambil tindakan yang sepatutnya bagi mematuhi Akta Kualiti Alam Sekeliling, 1974 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan Dan Effluen-Effluen Perindustrian) 1979.

Pada tahun 2006, status pematuhan industri dan premis-premis yang bukan ditetapkan mengikut jenis pula menunjukkan kilang padi mencapai pematuhan 100%, sementara industri-industri kenderaan, galian bukan logam, plastik, elektrik dan elektronik, berasaskan kayu, makanan ternakan, jentera, fabrikasi logam, hotel, loji pengolahan kumbahan Indah Water Konsortium dan loji pengolahan kumbahan persendirian mencapai 87% hingga 97% pematuhan. Walaupun demikian industri-industri penapisan minyak boleh dimakan, makanan dan minuman, penyudahan logam dan sadur elektrik, kertas, asas getah, simen, ubatan, kulit, tekstil, penapisan petroleum, industri logam, bengkel, kimia, percetakan dan loji rawatan air hanya dapat mencapai paras pematuhan 85% dan kurang (Rajah 4.7). Ada diantara

Status Of Compliance With The Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979

Non-prescribed premises that discharged effluents are subjected to the Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979. In 2006, the Department of Environment conducted 6156 inspections on 5451 industrial premises and other non-prescribed premises that were also subjected to the Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979. The overall compliance by the non-prescribed premises was 85%. The remaining 15% of the inspected premises committed offences relating to non-compliance of effluent discharge standards (Regulation 8) and did not have written approval for installation of effluent treatment plants (Regulation 4).

Of these non-complying premises, 75 cases were subjected to legal action and were charged in courts. A total fine of RM 1,419,000.00 was collected. Other actions taken were issuance of 1865 written directives and 311 written notices to industries to take appropriate action to comply with the Environmental Quality Act, 1974 and the Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979.

In 2006, compliance status of industries and other non-prescribed premises by types indicated that rice mills achieved 100% compliance, while transport, non-metal mineral, plastics, electric and electronic, wood-based, feedmeal, machinery, metal fabrication, hotels, Indah Water Konsortium's and private sewerage treatment plants achieved 87% to 97% compliance. However industries like edible oil refineries, food and beverages, metal finishing and electroplating, paper, rubber-based, cement, pharmaceutical, leather, textiles, petroleum refineries, metal industries, workshop, chemical, printing and water treatment plants could only achieve not more than 85% compliance (Figure 4.7). Some of these industries were found to be operating without effluent treatment plants while many had effluent treatment

industri ini yang beroperasi tanpa loji pengolahan effluen ataupun loji pengolahan effluen yang tidak efisien untuk mematuhi standard pelepasan yang ditetapkan.

Parameter-parameter yang sukar dipatuhi ialah keperluan oksigen biokimia (BOD), keperluan oksigen kimia (COD), pepejal terampai (SS), minyak dan gris (O & G) dan logam-logam berat seperti tembaga, nikel kromium, zink dan besi. Industri elektrik dan elektronik gagal mematuhi standard bagi parameter COD, BOD, SS, nikel dan tembaga; industri pengilangan logam tidak mematuhi parameter COD; industri makanan dan minuman bagi parameter COD, BOD, SS dan O & G; industri kertas sukar mematuhi parameter COD, BOD, SS dan O & G; industri asas getah gagal mematuhi parameter COD dan SS; industri tekstil sukar mematuhi parameter COD dan SS; industri penyudahan logam dan sadur elektrik dengan parameter COD, BOD, SS, nikel, tembaga, zink, besi, kromium, arsenik dan sianid; dan loji pengolahan kumbahan persendirian pula sukar mematuhi parameter COD, BOD, SS dan O & G.

Bagi meningkatkan pematuhan, JAS telah mengeluarkan arahan-arahan kepada pihak industri untuk memasang alat kawalan pencemaran yang efisien, meningkatkan keupayaan kemudahan kawalan pencemaran yang sedia ada dan juga supaya menyediakan jadual perancangan dan pelaksanaan sistem pengurusan alam sekitar yang baik. Di samping itu, pelbagai aktiviti kesedaran turut dilaksanakan sepanjang tahun untuk kumpulan sasaran yang spesifik seperti dialog, seminar dan bengkel untuk industri dengan tujuan untuk meningkatkan paras pematuhan. JAS turut mempromosi penggunaan teknologi kawalan yang efisien, amalan pengeluaran bersih serta 'self-regulation'. Pihak industri juga dinasihatkan untuk mewujudkan sistem pengurusan alam sekitar yang baik dan mendapatkan pensijilan ISO 14000.

plants that are not capable of treating the effluent to the stipulated standards.

The problematic parameters were biochemical oxygen demand (BOD), chemical oxygen demand (COD), suspended solids (SS), oil and grease (O & G), heavy metals such as copper, nickel, chromium, zinc and iron. Specifically, the electric and electronic industries had difficulty with parameters such as COD, BOD, SS, nickel and copper; metal industries with COD; food and beverages industries COD, BOD, SS and O & G; paper industries COD, BOD, SS and O & G; rubber-based industries COD and SS; textile industries COD and SS; metal finishing and electroplating industries had difficulty in complying with parameters COD, BOD, SS, nickel, copper, zink, iron, chromium, arsenic and cyanide; and sewage treatment plants faced difficulty with parameters COD, BOD, SS and O & G.

In order to improve compliance, the DOE issued many directives to the relevant industries to install more efficient control equipment, upgrade existing pollution control facilities and have good planning and implementation schedule of environmental management systems. In addition, various awareness activities were implemented throughout the year for specific target groups such as dialogues, seminars and workshops for industries with the aim of improving the level of compliance. DOE also promoted the adoption of more efficient control technologies, cleaner production practices as well as self-regulatory measures. Industries were also advised to set up good environmental management systems and be ISO 14000 certified.

Lesen Pelanggaran

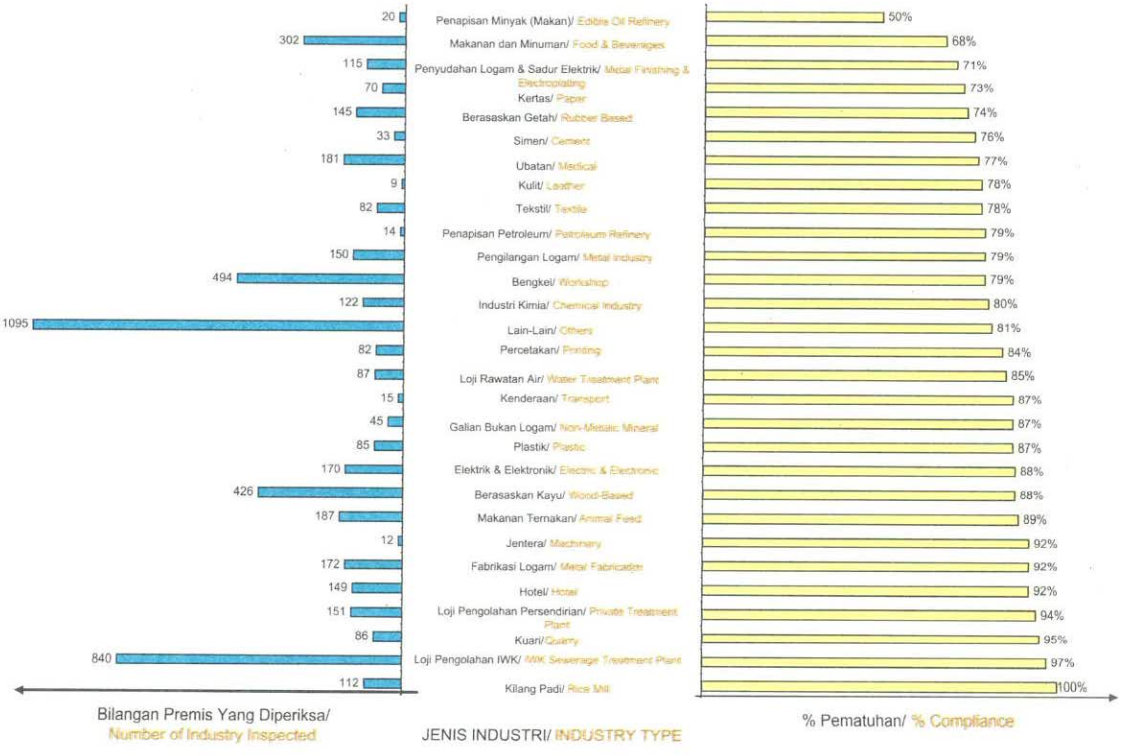
Di bawah Akta Kualiti Alam Sekeliling, 1974 Lesen Pelanggaran boleh dikeluarkan untuk tempoh masa yang spesifik bagi membenarkan industri yang menghadapi kesukaran mematuhi standard pelepasan, melanggar syarat-syarat yang dibenarkan untuk pelepasan effluen ke dalam pengairan daratan atau pelepasan bendasing udara ke atmosfera sebagaimana yang diperuntukkan di bawah Seksyen 25(1) dan Seksyen 22(1), Akta. Lesen Pelanggaran adalah untuk membantu, memudah dan membolehkan industri yang bermasalah memasang atau meningkatkan peralatan kawalan pencemaran dalam tempoh masa yang mencukupi. Pengeluaran lesen pelanggaran adalah bergantung kepada penilaian mengenai situasi sosio-ekonomi, kualiti alam sekitar semasa dan juga komitmen pihak industri yang bermasalah untuk mematuhi Akta dan Peraturan-Peraturan di bawahnya.

Pada tahun 2006, jumlah permohonan lesen pelanggaran di bawah Seksyen 25, Akta adalah berkurangan kepada 78 berbanding 81 permohonan dalam tahun 2005. (Rajah 4.8). Dari 78 permohonan tersebut, 54 telah diluluskan dan 24 ditolak. Dari 54 lesen pelanggaran yang diluluskan, 19 (35%) lesen adalah untuk industri makanan dan minuman, 10 (19%) untuk industri asas getah, 6 (11%) untuk industri kimia, 5 (9%) untuk industri kertas, galian bukan logam, fabrikasi logam, penyudahan logam dan sadur elektrik, tapak pelupusan sampah dan percetakan setiapnya, 4 (7%) untuk industri elektrik dan elektronik, 3 (6%) untuk industri tekstil dan 2 (4%) untuk industri petroleum. Antara parameter yang sukar dipatuhi adalah keperluan oksigen biokimia, keperluan oksigen kimia, pepejal terampai, amoniakal nitrogen, jumlah nitrogen, minyak dan gris, pH, boron, plumbum, sulfid, fenol, kadmium, zink, perak dan besi. Penguatkuasaan telah dijalankan terhadap premis-premis yang dilesenkan bagi menentukan tahap pematuhan. Pematuhan keseluruhan terhadap syarat-syarat lesen pelanggaran yang dikenakan pada tahun 2006 adalah 89%.

Contravention Licenses

Under the Environmental Quality Act, 1974 contravention licenses may be granted for a specific time frame to allow industries with genuine difficulties complying with stipulated discharge or emission standards to contravene the acceptable conditions of effluent discharge into watercourses or emission into the atmosphere as stipulated under Section 25(1) and Section 22(1) of the Act. These Contravention Licenses serve to assist, facilitate and enable the problematic industries to have adequate time to install or upgrade their pollution control equipment. Approvals for such contravention licenses would depend on the assessment of the socio-economic situation, the existing environmental quality and also the commitment of the problematic industries to comply with the Act and Regulations made thereunder.

In 2006, the total number of application for contravention licenses under Section 25 of the Act decreased to 78 as compared to 81 applications in 2005 (Figure 4.8). Out of the 78 applications, 54 were approved and 24 were rejected. Of the 54 approved contravention licenses, 19 (35%) licenses were for food and beverages industries, 10 (19%) for rubber based, 6 (11%) for chemical industries, 5 (9%) for paper industries, non-metal mineral, metal fabrication, printing, landfill, metal finishing and electroplating industries respectively, 4 (7%) for electric and electronic industries, 3 (6%) for textiles industries and 2 (4%) for petroleum industries. Among parameters under contravention were biochemical oxygen demand, chemical oxygen demand, suspended solids, oil and grease, ammonical nitrogen, total nitrogen, sulphide, pH, lead, iron, zinc, boron, cadmium, silver and phenol. Enforcement visits were conducted on the licensed premises to determine the level of compliance. The overall compliance with the conditions of contravention licenses in 2006 was 89%.



Rajah 4.7 JAS : Peraturan-Peraturan Kualiti Alam Sekeliling
(Kumbahan dan Effluen-Effluen Perindustrian) 1979; Status Pematuhan Industri, 2006
Figure 4.7 DOE : Environmental Quality (Sewage and Industrial Effluent)
Regulations, 1979; Compliance Status, 2006

Rajah 4.8 JAS : Bilangan Permohonan Lesen Pelanggaran di Bawah Seksyen 25 (1) AKAS 1974 (1995 - 2006)
Figure 4.8 DOE : Number Of Contravention Licenses Under Section 25 (1) EQA 1974 (1995 - 2006)

PENGAWASAN KUALITI AIR MARIN
MARINE WATER QUALITY MONITORING

Program Pengawasan Kualiti Air Marin Kebangsaan telah dimulakan pada tahun 1978 di Semenanjung Malaysia dan diperkembangkan ke Sabah dan Sarawak pada tahun 1985. Stesen-stesen pemantauan air marin diwujudkan di kuala sungai dan pantai-pantai bagi memantau perubahan dalam kualiti air marin berdasarkan kepada kegunaannya seperti kawasan rekreasi, perikanan dan taman-taman laut.

Marine water quality monitoring started in 1978 for Peninsular Malaysia and was extended in 1985 to cover Sabah and Sarawak. Monitoring stations had been established at estuarine and coastal areas to monitor marine water quality in relation to their beneficial uses such as recreation, fishing and marine parks.

Dalam tahun 2006, terdapat 229 stesen pengawasan di seluruh Malaysia; Perlis (2 stesen), Kedah (3 stesen), Pulau Langkawi (7 stesen), Pulau Pinang (25 stesen), Perak (13 stesen), Selangor (14 stesen), Negeri Sembilan (13 stesen), Melaka (9 stesen), Johor (51 stesen), Pahang (11 stesen), Terengganu (19 stesen), Kelantan (10 stesen), Sabah (26 stesen), W.P Labuan (5 stesen) dan Sarawak (21 stesen) (Jadual 4.6). Dua belas stesen baru telah ditambah pada tahun 2006 (Jadual 4.7).

In 2006, a total of 229 monitoring stations were set up throughout Malaysia; Perlis (2 stations), Kedah (3 stations), Pulau Langkawi (7 stations), Pulau Pinang (25 stations), Perak (13 stations), Selangor (14 stations), Negeri Sembilan (13 stations), Melaka (9 stations), Johor (51 stations), Pahang (11 stations), Terengganu (19 stations), Kelantan (10 stations), Sabah (26 stations), W.P Labuan (5 stations) dan Sarawak (21 stations) (Table 4.6). Twelve new monitoring stations were established in 2006 (Table 4.7).

Di bawah Program Pengawasan Selat Johor di bawah seliaan 'Malaysia-Singapore Joint Committee on the Environment' (MSJCE), 20 stesen juga dipantau pada tahun 2006 (Jadual 4.8).

Under the Malaysia-Singapore Joint Committee on the Environment (MSJCE) Monitoring Programme, 20 stations were also monitored in 2006 (Table 4.8).

Jadual 4.6 JAS : Stesen Pengawasan Kualiti Air Marin, 2006
Table 4.6 DOE : Marine Water Quality Monitoring Stations, 2006

Bil/ No	Negeri/ State	Kawasan/ Area	Nama Stesen/ Station Name	No. Stesen/ Station No.	Latitud/ Latitude	Longitud/ Longitude
1	Perlis	Kuala/ Estuarine	Kuala Sg. Baru	6302903	N 06° 19′ 54.5″	E 100° 09′ 20.0″
2	Perlis	Kuala/ Estuarine	Kuala Sg. Perlis	6401901	N 06° 23′ 59.0″	E 100° 07′ 34.8″
1	Kedah	Kuala/ Estuarine	Kuala Sg. Kedah	6102908	N 06° 06′ 13.0″	E 100° 16′ 32.0″
2	Kedah	Kuala/ Estuarine	Kuala Jerlun	6302925	N 06° 12′ 36.0″	E 100° 14′ 20.9″
3	Kedah	Pantai/ Coastal	Pantai Merdeka	5603905	N 05° 40′ 10.0″	E 100° 22′ 40.0″
1	P. Langkawi	Pantai/ Coastal	Langkawi Island Resort	6399914	N 06° 17′ 51.1″	E 099° 51′ 38.3″
2	P. Langkawi	Pantai/ Coastal	Pantai Kok	6397922	N 06° 22′ 12.0″	E 099° 40′ 43.7″
3	P. Langkawi	Pantai/ Coastal	Pantai Kuah	6398913	N 06° 19′ 04.1″	E 099° 51′ 04.5″
4	P. Langkawi	Pantai/ Coastal	Pantai Pasir Tengkorak	6497901	N 06° 25′ 46.3″	E 099° 43′ 37.1″
5	P. Langkawi	Pantai/ Coastal	Pantai Teluk Burau	6396923	N 06° 21′ 52.4″	E 099° 40′ 13.7″
6	P. Langkawi	Pantai/ Coastal	Pantai Teluk Nibung	6497915	N 06° 21′ 38.9″	E 099° 42′ 08.1″
7	P. Langkawi	Pantai/ Coastal	Pantai Tengah	6297903	N 06° 18′ 52.4″	E 099° 43′ 46.8″
1	Pulau Pinang	Kuala/ Estuarine	Kuala Sg. Jawi	5204901	N 05° 16′ 50.0″	E 100° 25′ 00.0″
2	Pulau Pinang	Kuala/ Estuarine	Kuala Sg. Juru	5304904	N 05° 20′ 20.0″	E 100° 24′ 20.0″
3	Pulau Pinang	Kuala/ Estuarine	Kuala Sg. Kerian	5104901	N 05° 10′ 00.0″	E 100° 25′ 00.0″
4	Pulau Pinang	Kuala/ Estuarine	Kuala Sg. Pinang	5403934	N 05° 24′ 00.0″	E 100° 20′ 05.0″
5	Pulau Pinang	Kuala/ Estuarine	Kuala Sg. Perai	5303908	N 05° 23′ 00.0″	E 100° 22′ 00.0″
6	Pulau Pinang	Pantai/ Coastal	Batu Feringgi (Casuarina)	5402904	N 05° 28′ 10.0″	E 100° 14′ 30.0″
7	Pulau Pinang	Pantai/ Coastal	Batu Maung	5202901	N 05° 17′ 10.0″	E 100° 17′ 25.0″
8	Pulau Pinang	Pantai/ Coastal	Gertak Sanggul	5201919	N 05° 16′ 50.0″	E 100° 12′ 40.0″
9	Pulau Pinang	Pantai/ Coastal	Kaw. Per. Bayan Lepas I	5303932	N 05° 20′ 00.0″	E 100° 18′ 45.0″
10	Pulau Pinang	Pantai/ Coastal	Kaw. Per.Bayan Lepas II	5303933	N 05° 19′ 00.0″	E 100° 18′ 30.0″
11	Pulau Pinang	Pantai/ Coastal	Kaw. Per. Bayan Lepas III	5302939	N 05° 18′ 20.0″	E 100° 17′ 45.0″
12	Pulau Pinang	Pantai/ Coastal	Luar Pantai Teluk Bahang	5402930	N 05° 27′ 45.0″	E 100° 12′ 45.0″
13	Pulau Pinang	Pantai/ Coastal	Pantai Bersih	5403906	N 05° 26′ 30.0″	E 100° 22′ 40.0″
14	Pulau Pinang	Pantai/ Coastal	Pantai Miami	5502901	N 05° 28′ 30.0″	E 100° 16′ 00.0″
15	Pulau Pinang	Pantai/ Coastal	Pantai Pasir Panjang	5201938	N 05° 17′ 50.0″	E 100° 11′ 00.0″
16	Pulau Pinang	Pantai/ Coastal	Persiaran Gurney	5403902	N 05° 25′ 30.0″	E 100° 19′ 30.0″
17	Pulau Pinang	Pantai/ Coastal	Pulau Aman	5203910	N 05° 15′ 50.0″	E 100° 23′ 35.0″
18	Pulau Pinang	Pantai/ Coastal	Rumah Pam Baru Perai	5304927	N 05° 21′ 15.0″	E 100° 23′ 15.0″
19	Pulau Pinang	Pantai/ Coastal	Rumah Pam Lama Perai	5303926	N 05° 20′ 00.0″	E 100° 18′ 45.0″
20	Pulau Pinang	Pantai/ Coastal	Selat PP Selatan (Jelutong)	5303911	N 05° 23′ 30.0″	E 100° 19′ 50.0″
21	Pulau Pinang	Pantai/ Coastal	Tanjung Bungah	5402937	N 05° 28′ 00.0″	E 100° 16′ 50.0″
22	Pulau Pinang	Pantai/ Coastal	Teluk Bahang (P. Mutiara)	5402912	N 05° 28′ 46.0″	E 100° 15′ 41.0″
23	Pulau Pinang	Pantai/ Coastal	Teluk Tempoyak	5202923	N 05° 28′ 30.0″	E 100° 17′ 30.0″
24	Pulau Pinang	Kuala/ Estuarine	Kuala Sungai Tengah	5104901	N 05° 12′ 41.0″	E 100° 25′ 29.0″
25	Pulau Pinang	Kuala/ Estuarine	Kuala Sungai Pinang	403934	N 05° 24′ 13.0″	E 100° 19′ 54.0″
1	Perak	Kuala/ Estuarine	Kuala Sg. Manjung	4205930	N 04° 14′ 09.0″	E 100° 39′ 57.0″
2	Perak	Kuala/ Estuarine	Kuala Sg. Tg. Piandang	5003921	N 05° 04′ 27.0″	E 100° 22′ 34.0″
3	Perak	Kuala/ Estuarine	Kuala Sg. Gula	4906926	N 04° 55′ 07.0″	E 100° 28′ 57.0″
4	Perak	Kuala/ Estuarine	Kuala Sg. Kurau	4994919	N 04° 59′ 13.0″	E 100° 25′ 46.0″
5	Perak	Kuala/ Estuarine	Kuala Sg. Perak	4007901	N 03° 59′ 03.0″	E 100° 48′ 58.0″

Jadual 4.6 JAS : Stesen Pengawasan Kualiti Air Marin, 2006
Table 4.6 DOE : Marine Water Quality Monitoring Stations, 2006

Bil/ No	Negeri/ State	Kawasan/ Area	Nama Stesen/ Station Name	No. Stesen/ Station No.	Latitud/ Latitude	Longitud/ Longitude
6	Perak	Kuala/ Estuarine	Kuala Sg. Sepetang	4806925	N 04° 50′ 07.0″	E 100° 37′ 57.0″
7	Perak	Pantai/ Coastal	Pantai Pasir Bogak	4205908	N 04° 12′ 58.0″	E 100° 37′ 55.0″
8	Perak	Pantai/ Coastal	Pantai Pasir Panjang	4305924	N 04° 25′ 07.0″	E 100° 35′ 35.0″
9	Perak	Pantai/ Coastal	Pantai Puteri Dewi	4205907	N 04° 15′ 17.0″	E 100° 32′ 47.0″
10	Perak	Pantai/ Coastal	Pantai Tanjung Batu	4406927	N 04° 25′ 07″	E 100° 35′ 35″
11	Perak	Pantai/ Coastal	Pantai Teluk Batik	4205923	N 04° 11′ 14.0″	E 100° 36′ 33.0″
12	Perak	Pantai/ Coastal	Pantai Teluk Dalam	4205928	N 04° 14′ 53.0″	E 100° 33′ 25.0″
13	Perak	Pantai/ Coastal	Pantai Teluk Gedung	4205929	N 04° 15′ 39.0″	E 100° 34′ 49.0″
1	Selangor	Pantai/ Coastal	Pantai Bagan Lalang	2616927	N 02° 36′ 20.0″	E 101° 41′ 30.0″
2	Selangor	Pantai/ Coastal	Pantai Morib	2712902	N 02° 45′ 00.0″	E 101° 26′ 20.0″
3	Selangor	Pantai/ Coastal	Selat Pulau Babi	3012929	N 03° 01′ 10.0″	E 101° 15′ 55.0″
4	Selangor	Kuala/ Estuarine	Selat Klang Utara	3013908	N 03° 04′ 00.0″	E 101° 21′ 00.0″
5	Selangor	Kuala/ Estuarine	Kuala Sg. Sepang	2517922	N 02° 35′ 35.0″	E 101° 42′ 56.0″
6	Selangor	Kuala/ Estuarine	Kuala Sg. Sepang (Kecil)	2612928	N 02° 36′ 40.0″	E 101° 42′ 15.0″
7	Selangor	Kuala/ Estuarine	Kuala Sg. Sepang (Kawalan)	2616926	N 02° 36′ 20.0″	E 101° 41′ 30.0″
8	Selangor	Kuala/ Estuarine	Kuala Sungai Klang	3013909	N 03° 00′ 06.0″	E 101° 23′ 24.0″
9	Selangor	Kuala/ Estuarine	Kuala Sungai Langat (Jugra)	2814925	N 02° 48′ 25.0″	E 101° 24′ 15.0″
10	Selangor	Kuala/ Estuarine	Kuala Sungai Langat (Lumut)	2913903	N 02° 55′ 50.0″	E 101° 21′ 15.0″
11	Selangor	Kuala/ Estuarine	Kuala Sungai Buloh	3212930	N 03° 15′ 10.0″	E 101° 15′ 50.0″
12	Selangor	Kuala/ Estuarine	Kuala Sungai Selangor	3312915	N 03° 20′ 00.0″	E 101° 13′ 30.0″
13	Selangor	Kuala/ Estuarine	Kuala Sungai Tengi	3311931	N 03° 23′ 00.0″	E 101° 10′ 20.0″
14	Selangor	Kuala/ Estuarine	Kuala Sungai Bernam	3808924	N 03° 51′ 00.0″	E 100° 49′ 00.0″
1	N. Sembilan	Pantai/ Coastal	Kuala Sungai Linggi	2319901	N 02° 23′ 20.0″	E 101° 58′ 19.0″
2	N. Sembilan	Pantai/ Coastal	Kuala Sungai Lukut	2517910	N 02° 34′ 45.0″	E 101° 47′ 16.0″
3	N. Sembilan	Pantai/ Coastal	Pantai Bagan Pinang	2418915	N 02° 30′ 31.0″	E 101° 49′ 44.0″
4	N. Sembilan	Pantai/ Coastal	Pantai Teluk Sinting Pasir Panjang	2419908	N 02° 24′ 57.0″	E 101° 56′ 31.0″
5	N. Sembilan	Pantai/ Coastal	Port Dickson Bandar	2517907	N 02° 31′ 16.0″	E 101° 47′ 51.0″
6	N. Sembilan	Pantai/ Coastal	Pantai Port Dickson Batu 10	2418914	N 02° 24′ 58.0″	E 101° 51′ 23.0″
7	N. Sembilan	Pantai/ Coastal	Pantai Port Dickson Batu 5	2418906	N 02° 29′ 46.0″	E 101° 50′ 15.0″
8	N. Sembilan	Pantai/ Coastal	Pantai Port Dickson Batu 6	2418916	N 02° 29′ 05.0″	E 101° 50′ 46.0″
9	N. Sembilan	Pantai/ Coastal	Pantai Port Dickson Batu 7	2418905	N 02° 27′ 43.0″	E 101° 51′ 04.0″
10	N. Sembilan	Pantai/ Coastal	Pantai Port Dickson Batu 8	2418912	N 02° 27′ 16.0″	E 101° 51′ 20.0″
11	N. Sembilan	Pantai/ Coastal	Pantai PD. Batu 8 (Stesen Kawalan)	2418913	N 02° 27′ 16.0″	E 101° 51′ 10.0″
12	N. Sembilan	Kuala/ Estuarine	Port Dickson TNB	2517909	N 02° 32′ 09.0″	E 101° 47′ 42.0″
13	N. Sembilan	Kuala/ Estuarine	Pantai Tg. Pelandok	2419917	N 02° 25′ 03.0″	E 101° 53′ 34.0″
1	Melaka	Kuala/ Estuarine	Kuala Sg. Kesang	2186905	N 02° 05′ 43.0″	E 102° 29′ 12.0″
2	Melaka	Kuala/ Estuarine	Kuala Sg. Melaka	2122903	N 02° 11′ 06.0″	E 102° 14′ 52.0″
3	Melaka	Kuala/ Estuarine	Kuala Sg. Merlimau	2124912	N 02° 09′ 25.0″	E 102° 25′ 28.0″
4	Melaka	Kuala/ Estuarine	Kuala Sg. Sebatu	2186904	N 02° 06′ 06.0″	E 102° 27′ 35″
5	Melaka	Pantai/ Coastal	Pantai Kundor Tg. Keling	2221908	N 02° 14′ 37.0″	E 102° 08′ 29.0″
6	Melaka	Pantai/ Coastal	Pantai Rombang Tg. Keling	2221906	N 02° 13′ 35.0″	E 102° 08′ 57.0″
7	Melaka	Pantai/ Coastal	Pantai Tg. Bidara	2320909	N 02° 17′ 30.0″	E 102° 05′ 18″

Jadual 4.6 JAS : Stesen Pengawasan Kualiti Air Marin, 2006
Table 4.6 DOE : Marine Water Quality Monitoring Stations, 2006

Bil/ No	Negeri/ State	Kawasan/ Area	Nama Stesen/ Station Name	No. Stesen/ Station No.	Latitud/ Latitude	Longitud/ Longitude
8	Melaka	Pantai/ Coastal	Pulau Besar	2123911	N 02° 06′ 55.1″	E 102° 20′ 09″
9	Melaka	Pantai/ Coastal	Pantai Teluk Gong, Pengkalan Balak	2320902	N 02° 20′ 23.0″	E 102° 03′ 30.0″
1	Johor	Pantai/ Coastal	Kg. Tanjung Kopok	Sj1	N 01° 25′ 31.0″	E 104° 00′ 03″
2	Johor	Pantai/ Coastal	Kg. Pasir Putih	Sj2	N 01° 25′ 48.0″	E 103° 55′ 40.0″
3	Johor	Pantai/ Coastal	J/k Sultan Iskandar	Sj3	N 01° 26′ 49.0″	E 103°46′ 09.0″
4	Johor	Pantai/ Coastal	Kg. Senibung	Sj4	N 01° 29′ 01.0″	E 103° 48′ 47.0″
5	Johor	Kuala/ Estuarine	Kuala Sg. Tebrau	Sj4a	N 01° 28′ 56.0″	E 103° 47′ 48.0″
6	Johor	Pantai/ Coastal	Tanjung Putri	Sj5	N 01° 27′ 20.0″	E 103° 46′ 09.0″
7	Johor	Pantai/ Coastal	Hadapan MPJB	Sj6	N 01° 27′ 08.0″	E 103° 45′ 43.0″
8	Johor	Pantai/ Coastal	Tanjung Danga	Sj7	N 01° 27′ 24.0″	E 103° 42′ 52.0″
9	Johor	Kuala/ Estuarine	Kuala Sg. Skudai	Sj7a	N 01° 27′ 46.0″	E 103° 43′ 22.0″
10	Johor	Pantai/ Coastal	Hadapan Pusat Islam	Sj7b	N 01° 27′ 19.0″	E 103° 44′ 51.0″
11	Johor	Pantai/ Coastal	Tebing Runtuh	Sj8	N 01° 25′ 10.0″	E 103° 40′ 06.0″
12	Johor	Kuala/ Estuarine	Kuala Sg. Melayu	Sj8a	N 01° 26′ 53.0″	E 103° 41′ 53.0″
13	Johor	Pantai/ Coastal	Tanjung Bunga	Sj9	N 01° 23′ 07.0″	E 103° 39′ 02.0″
14	Johor	Pantai/ Coastal	Tanjung Kupang	Sj10	N 01° 23′ 36.0″	E 103° 39′ 11.0″
15	Johor	Kuala/ Estuarine	Kuala Sungai Batu Pahat	1729930	N 01° 47′ 44.0″	E 102° 53′ 22.0″
16	Johor	Kuala/ Estuarine	Kuala Sungai Johor	1440916	N 01° 29′ 04.0″	E 104° 01′ 22.0″
17	Johor	Kuala/ Estuarine	Kuala Sungai Melayu	1437946	N 01° 27′ 15.0″	E 103° 41′ 56.0″
18	Johor	Kuala/ Estuarine	Kuala Sungai Mersing	2438905	N 02° 26′ 10.0″	E 103° 50′ 35.0″
19	Johor	Kuala/ Estuarine	Kuala Sungai Muar	2024932	N 02° 02′ 54.0″	E 102° 33′ 11.0″
20	Johor	Kuala/ Estuarine	Kuala Sungai Segget	1437919	N 01° 27′ 21.0″	E 103° 45′ 58.0″
21	Johor	Kuala/ Estuarine	Kuala Sungai Skudai	1437922	N 01° 28′ 28.0″	E 103° 43′ 12.0″
22	Johor	Kuala/ Estuarine	Kuala Sungai Tebrau	1438943	N 01° 28′ 56.0″	E 103° 47′ 48.0″
23	Johor	Pantai/ Coastal	Hadapan HSAJB	1437920	N 01° 27′ 19.0″	E 103° 44′ 44.0″
24	Johor	Pantai/ Coastal	Jeti Tanjong Belungkor	1440963	N 01° 27′ 14.0″	E 104° 04′ 03.0″
25	Johor	Pantai/ Coastal	Kg. Teluk Jawa	1438918	N 01° 28′ 17.0″	E 103° 50′ 30.0″
26	Johor	Pantai/ Coastal	Pantai Air Papan	2538959	N 02° 31′ 05.0″	E 103° 50′ 00.0″
27	Johor	Pantai/ Coastal	Pantai Desaru	1542914	N 01° 32′ 48.0″	E 104° 15′ 41.0″
28	Johor	Pantai/ Coastal	Luar Kukup	1334925	N 01° 19′ 30.0″	E 103° 26′ 29.0″
29	Johor	Pantai/ Coastal	Pantai Lido	1437921	N 01° 27′ 56.0″	E 103° 43′ 29.0″
30	Johor	Pantai/ Coastal	Pantai Sri Pantai	2339960	N 02° 22′ 45.0″	E 103° 53′ 19.0″
31	Johor	Pantai/ Coastal	Pantai Stulang Laut	1437951	N 01° 28′ 02.0″	E 103° 46′ 46.0″
32	Johor	Pantai/ Coastal	Pantai Sungai Lurus	1730962	N 01° 43′ 42.0″	E 103° 01′ 43.0″
33	Johor	Pantai/ Coastal	Pantai Tanjong Setapa	1341961	N 01° 20′ 33.0″	E 104° 08′ 09.0″
34	Johor	Pantai/ Coastal	Pantai Teluk Gorek	2538958	N 02° 34′ 57.0″	E 103° 48′ 18.0″
35	Johor	Pantai/ Coastal	Pantai Teluk Mahkota	1841911	N 01° 53′ 52.0″	E 104° 06′ 15.0″
36	Johor	Pantai/ Coastal	Pantai Tg. Leman	2140694	N 02° 08′ 43.0″	E 104° 00′ 24.0″
37	Johor	Pantai/ Coastal	Pasir Gogok	1441966	N 01° 25′ 02.8″	E 104° 05′ 59.7″
38	Johor	Pantai/ Coastal	Pel. Pasir Gudang	1428939	N 01° 25′ 44.0″	E 103° 54′ 03.0″
39	Johor	Pantai/ Coastal	Tanjung Buai	1340973	N 01° 29′ 48.1″	E 104° 02′ 43.4″
40	Johor	Pantai/ Coastal	Tanjung Merak	1441968	N 01° 21′ 45.9″	E 104° 06′ 35.5″

Jadual 4.6 JAS : Stesen Pengawasan Kualiti Air Marin, 2006
Table 4.6 DOE : Marine Water Quality Monitoring Stations, 2006

Bil/ No	Negeri/ State	Kawasan/ Area	Nama Stesen/ Station Name	No. Stesen/ Station No.	Latitud/ Latitude	Longitud/ Longitude
41	Johor	Pantai/ Coastal	Tanjung Pengelih	1441967	N 01° 22 14.7"	E 104° 05' 19.5"
42	Johor	Pantai/ Coastal	Tanjung Penyusup	1444920	N 01° 22' 12.9"	E 104° 16' 48.3"
43	Johor	Pantai/ Coastal	Tanjung Sepang	1443969	N 01° 23' 01.2"	E 104° 06' 44.8"
44	Johor	Pantai/ Coastal	Pantai Punggur	1531974	N 01° 41' 05.0"	E 103° 05' 54.0"
45	Johor	Kuala/ Estuarine	Sungai Kim-kim	1439965	N 01° 25' 24.0"	E 103° 54' 03.0"
46	Johor	Pantai/ Coastal	Pulau Belungkor	Em4	N 01° 26' 25.8"	E 104° 03' 11.04"
47	Johor	Pantai/ Coastal	Pulau Tekong	Em5	N 01° 25' 42.3"	E 104° 04' 36.72"
48	Johor	Pantai/ Coastal	Pulau Tekong	Em6	N 01° 23' 19.2"	E 104° 05' 20.40"
49	Johor	Pantai/ Coastal	Jeti Pularek	Em7	N 01° 21' 26.8"	E 104° 04' 40.65"
50	Johor	Pantai/ Coastal	Tanjung Pengelih	Wq10	N 01° 19' 52.62"	E 104° 05' 39.57"
51	Johor	Pantai/ Coastal	Pulau Merambong	Wm1	N 01° 20' 17.02"	E 103° 37' 36.29"
1	Pahang	Pantai/ Coastal	Pantai Sepat	3633940a	N 03° 42' 02.0"	E 103° 20' 16.0"
			3633940b	N 030 41' 54.0"	E 103° 20' 19.0"	
2	Pahang	Pantai/ Coastal	Pantai Batu Hitam	3833915a	N 03° 53' 06"	E 103° 21' 58"
			3833915b	N 030 53' 09"	E 103° 21' 59"	
3	Pahang	Pantai/ Coastal	Pantai Cherating (Club Med)	4133903a	N 04° 08' 41.0"	E 103° 24' 31.0"
			4133903b	N 040 07' 51.0"	E 103° 24' 23"	
4	Pahang	Pantai/ Coastal	Pantai Cherating (Legend)	4133942a	N 04° 06' 16.0"	E 103° 23' 06"
			4133942b	N 040 06' 12.0"	E 103° 23' 07"	
5	Pahang	Pantai/ Coastal	Pantai Kuala Api-api	3235917	N 03° 31' 20.0"	E 103° 23' 45.0"
6	Pahang	Pantai/ Coastal	Pantai Muhibbah Balok	3933901a	N 03° 55' 28.0"	E 103° 22' 21.1"
			3933901b	N 030 55' 30.0"	E 103° 22' 23.0"	
7	Pahang	Pantai/ Coastal	Pantai Beserah	3933941a	N 03° 54' 41.0"	E 103° 22' 02.0"
			3933941b	N 030 54' 39.0"	E 103° 22' 01.0"	
8	Pahang	Pantai/ Coastal	Pantai Tanjung Batu	3334915	N 03° 31' 10.0"	E 103° 23' 45.0"
9	Pahang	Pantai/ Coastal	Pantai Teluk Cempedak	3833910a	N 03° 48' 51"	E 103° 22' 19.0"
			3833910b	N 030 48' 49.0"	E 103° 22' 21.0"	
10	Pahang	Pantai/ Coastal	Pantai Teluk Gelora	3833909a	N 03° 48' 16.0"	E 103° 20' 43.0"
			3833909b	N 030 48' 20.0"	E 103° 20' 43.0"	
11	Pahang	Pantai/ Coastal	Pantai Legenda	3534943a	N 03° 12' 16.7"	E 103° 26' 53.7"
			3534943b	N 030 12' 16.7"	E 103° 26' 53.7"	
1	Terengganu	Kuala/ Estuarine	Kuala Sg. Besut	5825902	N 05° 50' 02.8"	E 102° 33' 28.8"
2	Terengganu	Kuala/ Estuarine	Kuala Sg. Dungun	4734918	N 04° 46' 48.9"	E 103° 25' 21.6"
3	Terengganu	Kuala/ Estuarine	Kuala Sg. Ibai	5231949	N 05° 17' 06.1"	E 103° 10' 06.5"
4	Terengganu	Kuala/ Estuarine	Kuala Sg. Kerteh	4534922	N 04° 30' 59.1"	E 103° 26' 52.6"
5	Terengganu	Kuala/ Estuarine	Utara Tioxide	4234950	N 04° 17' 06.3"	E 103° 28' 20.9"
6	Terengganu	Kuala/ Estuarine	Tengah Tioxide (Discharge)	4234951	N 04° 16' 22.8"	E 103° 28' 12.7"
7	Terengganu	Kuala/ Estuarine	Selatan Tioxide	4234952	N 04° 15' 04.1"	E 103° 27' 59.2"
8	Terengganu	Kuala/ Estuarine	Kuala Sg. Marang	5232911	N 05° 12' 24.7"	E 103° 12' 28.9"
9	Terengganu	Kuala/ Estuarine	Kuala Sg. Paka	4634920	N 04° 39' 29.7"	E 103° 25' 57.7"
10	Terengganu	Kuala/ Estuarine	Kuala Sg. Setiu	5627953	N 05° 40' 05.9"	E 102° 42' 26.9"
11	Terengganu	Kuala/ Estuarine	Kuala Sg. Terengganu	5331907	N 05° 20' 22.1"	E 103° 08' 12.6"

Jadual 4.6 JAS : Stesen Pengawasan Kualiti Air Marin, 2006
Table 4.6 DOE : Marine Water Quality Monitoring Stations, 2006

Bil/ No	Negeri/ State	Kawasan/ Area	Nama Stesen/ Station Name	No. Stesen/ Station No.	Latitud/ Latitude	Longitud/ Longitude
12	Terengganu	Kuala/ Estuarine	Kuala Sungai Kemaman	4234929	N 04° 14′ 25.2″	E 102° 26′ 48.8″
13	Terengganu	Pantai/ Coastal	Pantai Batu Buruk	5331935	N 05° 19′ 29.1″	E 103° 09′ 01.4″
14	Terengganu	Pantai/ Coastal	Pantai Bukit Keluang	5825903	N 05° 50′ 02.8″	E 102° 36′ 01.4″
15	Terengganu	Pantai/ Coastal	Pantai Chendering	5231934	N 05° 16′ 11.8″	E 103° 10′ 51.9″
16	Terengganu	Pantai/ Coastal	Pantai Rantau Abang	4833917	N 04° 52′ 11.4″	E 103° 23′ 17.4″
17	Terengganu	Pantai/ Coastal	KIPC Utara	4634953	N 04° 36′ 37.9″	E 103° 26′ 39.2″
18	Terengganu	Pantai/ Coastal	KIPC Tengah	4534954	N 04° 34′ 54.9″	E 103° 27′ 19.5″
19	Terengganu	Pantai/ Coastal	KIPC Selatan	4534955	N 04° 30′ 09.5″	E 103° 26′ 52.6″
1	Kelantan	Kuala/ Estuarine	Kuala Sungai Kemasin	5824914	N 5° 53′ 50.0″	E 102° 29′ 05.0″
2	Kelantan	Kuala/ Estuarine	Kuala Sg. Golok	6220911	N 6° 14′ 05.0″	E 102° 05′ 35.0″
3	Kelantan	Kuala/ Estuarine	Kuala Sg. Kelantan	6222901	N 6° 13′ 12.0″	E 102° 13′ 50.0″
4	Kelantan	Kuala/ Estuarine	Kuala Sg. Peng. Datu	6123913	N 6° 10′ 20.0″	E 102° 20′ 40.0″
5	Kelantan	Kuala/ Estuarine	Kuala Sg. Peng. Chepa	6223912	N 6° 12′ 20.0″	E 102° 18′ 10.0″
6	Kelantan	Pantai/ Coastal	Pantai Bisikan Bayu	5825905	N 5° 52′ 00.0″	E 102° 31′ 00.0″
7	Kelantan	Pantai/ Coastal	Pantai Cahaya Bulan	6122903	N 6° 10′ 45.0″	E 102° 16′ 50.0″
8	Kelantan	Pantai/ Coastal	Pantai Irama Bachok	6024908	N 6° 03′ 00.0″	E 102° 25′ 15.0″
9	Kelantan	Pantai/ Coastal	Pantai Sabak	6123909	N 6° 10′ 25.0″	E 102° 20′ 10.0″
10	Kelantan	Pantai/ Coastal	Pantai Seri Tujuh	6221910	N 6° 13′ 00.0″	E 102° 08′ 00.0″
1	W.P. Labuan	Pantai/ Coastal	Layang - Layangan	5251902	N 05° 20′ 01.0″	E 115° 11′ 37.0″
2	W.P. Labuan	Pantai/ Coastal	Tanjung Aru	5251903	N 05° 21′ 02.0″	E 115° 14′ 39.0″
3	W.P. Labuan	Pantai/ Coastal	Pulau Papan	5151905	N 05° 15′ 22.0″	E 115° 16′ 03.0″
4	W.P. Labuan	Pantai/ Coastal	Klamsam	5151906	N 05° 15′ 22.0″	E 115° 10′ 28.0″
5	W.P. Labuan	Pantai/ Coastal	Sungai Pagar	5151907	N 05° 16′ 20.0″	E 115° 10′ 19.0″
1	Sabah	Kuala/ Estuarine	Kuala Sg. Menggatal/ Inanam	5050905	N 05° 01′ 05.0″	E 115° 07′ 07.0″
2	Sabah	Kuala/ Estuarine	Kuala Sg. Penyu	5453901	N 05° 34′ 13.0″	E 115° 35′ 55.0″
3	Sabah	Pantai/ Coastal	Borneo Golf Seawater	5355901	N 05° 33′ 00.0″	E 115° 47′ 01.0″
4	Sabah	Pantai/ Coastal	Pantai Bak-Bak Kudat	6665901	N 06° 56′ 44.0″	E 116° 50′ 23.0″
5	Sabah	Pantai/ Coastal	Pantai Ulu Tungku, Lahad Datu	5085901	N 05° 01′ 09.0″	E 118° 53′ 09.0″
6	Sabah	Pantai/ Coastal	Pantai Batu Sapi	5580903	N 05° 47′ 42.0″	E 118° 02′ 22.0″
7	Sabah	Pantai/ Coastal	Pantai Dalit, Tuaran	6161901	N 06° 11′ 25.0″	E 116° 09′ 45.0″
8	Sabah	Pantai/ Coastal	Pantai Lok Kawi	5560904	N 05° 55′ 00.0″	E 116° 02′ 00.0″
9	Sabah	Pantai/ Coastal	Pantai Mangrove Paradise, Tuaran	6161902	N 06° 15′ 02.0″	E 116° 13′ 50.0″
10	Sabah	Pantai/ Coastal	Pantai Manis, Papar	5555901	N 05° 45′ 15.0″	E 115° 52′ 04.0″
11	Sabah	Pantai/ Coastal	Pantai Melinsung, Papar	5565902	N 05° 50′ 18.0″	E 115° 50′ 45.0″
12	Sabah	Pantai/ Coastal	Pantai Pasir Putih, Sandakan	5580901	N 05° 49′ 26.0″	E 118° 04′ 58.0″
13	Sabah	Pantai/ Coastal	Pantai Sabandar, Tuaran	6161903	N 06° 15′ 02.2″	E 116° 13′ 50.0″
14	Sabah	Pantai/ Coastal	Pantai Sarina, Kunak	4481901	N 04° 39′ 41.0″	E 118° 17′ 01.0″
15	Sabah	Pantai/ Coastal	Pantai Silam Lahad Datu	4681902	N 04° 58′ 08.0″	E 118° 14′ 46.0″
16	Sabah	Pantai/ Coastal	Pantai Teluk Brunei 1	5053901	N 05° 09′ 55.0″	E 115° 32′ 53.0″
17	Sabah	Pantai/ Coastal	Pantai Teluk Brunei 2	5053902	N 05° 09′ 55.0″	E 115° 32′ 53.0″
18	Sabah	Pantai/ Coastal	Pantai Teluk Brunei 3	5053903	N 05° 09′ 55.0″	E 115° 32′ 53.0″
19	Sabah	Pantai/ Coastal	Pantai Teluk Brunei 4	5053904	N 05° 09′ 55.0″	E 115° 32′ 53.0″

Jadual 4.6 JAS : Stesen Pengawasan Kualiti Air Marin, 2006
Table 4.6 DOE : Marine Water Quality Monitoring Stations, 2006

Bil/ No	Negeri/ State	Kawasan/ Area	Nama Stesen/ Station Name	No. Stesen/ Station No.	Latitud/ Latitude	Longitud/ Longitude
20	Sabah	Pantai/ Coastal	Pantai Teluk Brunei 5	5053905	N 05° 09′ 55.0″	E 115° 32′ 53.0″
21	Sabah	Pantai/ Coastal	Pantai Teluk Brunei 6	5053906	N 05° 09′ 55.0″	E 115° 32′ 53.0″
22	Sabah	Pantai/ Coastal	Pantai Tg. Aru (Rest Lido)	5656901	N 05° 55′ 01.0″	E 115° 59′ 03.0″
23	Sabah	Pantai/ Coastal	Pantai Tg. Aru (Roller Skating)	5656902	N 05° 55′ 01.0″	E 115° 59′ 03.0″
24	Sabah	Pantai/ Coastal	Pantai Tg. Aru (No. 3)	5656903	N 05° 55′ 01.0″	E 115° 59′ 03.0″
25	Sabah	Pantai/ Coastal	Pantai Tinagat, Tawau	4473901	N 04° 13′ 22.0″	E 117° 59′ 04.0″
26	Sabah	Pantai/ Coastal	Kastam Lama Sandakan (Pantai TLDM)	5580902	N 05° 50′ 00.0″	E 118° 08′ 01.0″
1	Sarawak	Kuala/ Estuarine	Kuala Bako	1704905	N 01° 40′ 00.0″	E 110° 52′ 08.0″
2	Sarawak	Kuala/ Estuarine	Kuala Batang Kemena	3130911	N 03° 10′ 53.0″	E 113° 01′ 40.0″
3	Sarawak	Kuala/ Estuarine	Kuala Batang Rajang	2111909	N 02° 07′ 22.0″	E 111° 11′ 21″
4	Sarawak	Kuala/ Estuarine	Kuala Sg. Miri	4349915	N 04° 23′ 59.0″	E 113° 58′ 25.0″
5	Sarawak	Kuala/ Estuarine	Kuala Sg. Santubong	1702903	N 01° 46′ 38.0″	E 110° 16′ 46.0″
6	Sarawak	Kuala/ Estuarine	Kuala Sg. Sematan	1898901	N 01° 48′ 49.0″	E 109° 46′ 29.0″
7	Sarawak	Kuala/ Estuarine	Kuala Sg.sarawak	1604907	N 01° 36′ 44.0″	E 110° 29′ 44.0″
8	Sarawak	Kuala/ Estuarine	Kuala Mukah	2920920	N 02° 54′ 41.0″	E 112° 05′ 25.0″
9	Sarawak	Kuala/ Estuarine	Kuala Krian	1710924	N 01° 47′ 20.0″	E 111° 05′ 58.0″
10	Sarawak	Pantai/ Coastal	Pantai Bako	1704906	N 01° 42′ 49.0″	E 110°25′ 40.0″
11	Sarawak	Pantai/ Coastal	Pantai Belawai	2212913	N 02° 14′ 27.0″	E 111° 12′ 51.0″
12	Sarawak	Pantai/ Coastal	Pantai Brighton	4449917	N 04° 22′ 25.0″	E 113° 57′ 51.0″
13	Sarawak	Pantai/ Coastal	Pantai Damai	1702904	N 01° 47′ 55.0″	E 110° 17′ 58.0″
14	Sarawak	Pantai/ Coastal	Pantai Likau	3230915	N 03° 20′ 49.0″	E 113° 08′ 57.0″
15	Sarawak	Pantai/ Coastal	Pantai Pandan	1824918	N 01° 50′ 16.0″	E 109° 40′ 11.0″
16	Sarawak	Pantai/ Coastal	Pantai Pasir Putih	1604910	N 01° 30′ 14.0″	E 110° 30′ 00.0″
17	Sarawak	Pantai/ Coastal	Pantai Piasau	4539918	N 04° 27′ 27.0″	E 113° 59′ 38.0″
18	Sarawak	Pantai/ Coastal	Pantai Sematan	1898902	N 01° 49′ 38.0″	E 109° 46′ 29.0″
19	Sarawak	Pantai/ Coastal	Pantai Tanjung Batu	3230913	N 03° 12′ 38.0″	E 113° 02′ 26.0″
20	Sarawak	Pantai/ Coastal	Pantai Harmoni	2920921	N 02° 54′ 35.0″	E 112° 03′ 22.0″
21	Sarawak	Pantai/ Coastal	Pantai Tanjung Kembang	1810923	N 01° 49′ 28.0″	E 111° 05′ 44.0″
		Kuala/ Estuarine	73			
		Pantai/ Kuala	156			
		Jumlah/ Total	229			

Jadual 4.7 JAS : Senarai Stesen Baru, 2006
Table 4.7 DOE : List of New Stations, 2006

Bil/ No	Negeri/ State	Kawasan/ Area	Nama Stesen/ Station Name	No. Stesen/ Station No.	Latitud/ Latitude	Longitud/ Longitude
1	Pulau Pinang	Kuala/ Estuarine	Kuala Sungai Tengah	5104901	N 05° 12′ 41.0″	E 100° 25′ 29.0″
2	Pulau Pinang	Kuala/ Estuarine	Kuala Sungai Pinang	403934	N 05° 24′ 13.0″	E 100° 19′ 54.0″
3	Johor	Pantai/ Coastal	Pulau Belungkor	Em4	N 01° 26′ 25.8″	E 104° 03′ 11.04″
4	Johor	Pantai/ Coastal	Pulau Tekong	Em5	N 01° 25′ 42.3″	E 104° 04′ 36.72″
5	Johor	Pantai/ Coastal	Pulau Tekong	Em6	N 01° 23′ 19.2″	E 104° 05′ 20.40″
6	Johor	Pantai/ Coastal	Jeti Pularek	Em7	N 01° 21′ 26.8″	E 104° 04′ 40.65″
7	Johor	Pantai/ Coastal	Tanjung Pengelih	Wq10	N 01° 19′ 52.62″	E 104° 05′ 39.57″
8	Johor	Pantai/ Coastal	Pulau Merambong	Wm1	N 01° 20′ 17.02″	E 103° 37′ 36.29″

Jadual 4.8 JAS : Stesen Pengawasan di bawah 'Malaysia-Singapore Joint Committee on the Environment' (MSJCE), 2006
Table 4.8 DOE : Monitoring Stations under the Malaysia-Singapore Joint Committee on the Environment (MSJCE), 2006

Bil/ No	Negeri/ State	Kawasan/ Area	Nama Stesen/ Station Name	No. Stesen/ Station No.	Latitud/ Latitude	Longitud/ Longitude
1	Johor	Pantai/ Coastal	Kg. Tanjung Kopok	Sj1	N 01° 25′ 31.0″	E 104° 00′ 03″
2	Johor	Pantai/ Coastal	Kg. Pasir Putih	Sj2	N 01° 25′ 48.0″	E 103° 55′ 40.0″
3	Johor	Pantai/ Coastal	J/k Sultan Iskandar	Sj3	N 01° 26′ 49.0″	E 103° 46′ 09.0″
4	Johor	Pantai/ Coastal	Kg. Senibung	Sj4	N 01° 29′ 01.0″	E 103° 48′ 47.0″
5	Johor	Kuala/ Estuarine	Kuala Sg. Tebrau	Sj4a	N 01° 28′ 56.0″	E 103° 47′ 48.0″
6	Johor	Pantai/ Coastal	Tanjung Putri	Sj5	N 01° 27′ 20.0″	E 103° 46′ 09.0″
7	Johor	Pantai/ Coastal	Hadapan MPJB	Sj6	N 01° 27′ 08.0″	E 103° 45′ 43.0″
8	Johor	Pantai/ Coastal	Tanjung Danga	Sj7	N 01° 27′ 24.0″	E 103° 42′ 52.0″
9	Johor	Kuala/ Estuarine	Kuala Sg. Skudai	Sj7a	N 01° 27′ 46.0″	E 103° 43′ 22.0″
10	Johor	Pantai/ Coastal	Hadapan Pusat Islam	Sj7b	N 01° 27′ 19.0″	E 103° 44′ 51.0″
11	Johor	Pantai/ Coastal	Tebing Runtuh	Sj8	N 01° 25′ 10.0″	E 103° 40′ 06.0″
12	Johor	Kuala/ Estuarine	Kuala Sg. Melayu	Sj8a	N 01° 26′ 53.0″	E 103° 41′ 53.0″
13	Johor	Pantai/ Coastal	Tanjung Bunga	Sj9	N 01° 23′ 07.0″	E 103° 39′ 02.0″
14	Johor	Pantai/ Coastal	Tanjung Kupang	Sj10	N 01° 23′ 36.0″	E 103° 39′ 11.0″
15	Johor	Pantai/ Coastal	Pulau Belungkor	Em4	N 01° 26′ 25.8″	E 104° 03′ 11.04″
16	Johor	Pantai/ Coastal	Pulau Tekong	Em5	N 01° 25′ 42.3″	E 104° 04′ 36.72″
17	Johor	Pantai/ Coastal	Pulau Tekong	Em6	N 01° 23′ 19.2″	E 104° 05′ 20.40″
18	Johor	Pantai/ Coastal	Jeti Pularek	Em7	N 01° 21′ 26.8″	E 104° 04′ 40.65″
19	Johor	Pantai/ Coastal	Tanjung Pengelih	Wq10	N 01° 19′ 52.62″	E 104° 05′ 39.57″
20	Johor	Pantai/ Coastal	Pulau Merambong	Wm1	N 01° 20′ 17.02″	E 103° 37′ 36.29″

PENGAWASAN KUALITI AIR MARIN PULAU-PULAU
ISLAND MARINE WATER QUALITY MONITORING

Malaysia dikurniakan dengan pulau-pulau yang kaya dengan sumber akuatik. Kualiti air marin memainkan peranan yang penting dalam pemuliharaan sumber semulajadi ini. Oleh itu, Program Pengawasan Kualiti Air Marin Pulau-Pulau telah dimulakan pada Julai 1998. Program ini melibatkan 71 buah pulau terpilih dengan 85 buah stesen pengawasan. Pulau-pulau ini dikelaskan mengikut empat kategori iaitu pulau-pulau pembangunan (3); pulau-pulau peranginan (25); pulau-pulau Taman Laut (38); dan pulau-pulau yang dilindungi (5) (Jadual 4.9). Frekuensi persampelan bagi pulau-pulau pembangunan adalah sebanyak enam (6) kali setahun manakala bagi pulau yang lainnya adalah sebanyak empat (4) kali setahun.

Malaysian islands are endowed with rich marine aquatic resources. The quality of marine water plays an important role in the conservation of these resources. The Island Marine Water Quality Monitoring Programme started in July 1998. The entire programme covers 71 selected islands and 85 monitoring stations. These islands are classified into four categories ; Development Islands (3); Resort Islands (25); Marine Park Islands (38); and Protected Islands (5) (Table 4.9). The sampling frequency for development islands was set at six (6) times per year, while the sampling frequency for the others was four (4) times per year.

Pengukuran parameter-parameter fizikal kualiti air marin dibuat secara *in-situ* seperti suhu, pH, konduktiviti, kemasinan, oksigen terlarut dan kekeruhan manakala 12 parameter yang dianalisis di makmal pula adalah seperti jumlah pepejal terampai, *Escherichia coli*, nitrat, jumlah karbon organik, minyak dan gris termasuk logam berat seperti merkuri (Hg), kadmium (Cd), kromium (Cr), kuprum (Cu), plumbum (Pb) dan arsenik (As) (Jadual 4.10). Percontohan bebola tar di pantai juga dilaksanakan.

Marine water quality monitoring includes measurement of *in-situ* parameters such as temperature, pH, conductivity, salinity, dissolved oxygen, turbidity; while laboratory analysis involves twelve other parameters such as total suspended solids, *Escherichia coli*, nitrate, total organic carbon, oil and grease, and heavy metals like mercury (Hg), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), arsenic (As) (Table 4.10). Tarball samplings on beaches were also conducted.

Pulau Gaya, Sabah

Jadual 4.9 JAS : Stesen Pengawasan Kualiti Air Marin Pulau, 2006
Table 4.9 DOE : Island Water Quality Monitoring Stations, 2006

Bil/ No.	Negeri/ State	Pulau/ Island	Kategori/ Category	Bil. Stesen/ Station No.	Latitud/ Latitude	Longitud/ Longitude
1.	KEDAH	Singa Besar	R	1	N 06° 13′ 36.3″	E 099° 44′ 42.9″
		Dayang Bunting	R	1	N 06° 12′ 26.2″	E 099° 46′ 48.9″
		Payar	M	1	N 06° 03′ 52.0″	E 100° 02′ 33.5″
		Kaca	M	1	N 06° 04′ 18.2″	E 100° 03′ 06.5″
		Lembu	M	1	N 06° 04′ 28.2″	E 100° 03′ 29.6″
		Segantang	M	1	N 06° 02′ 36.7″	E 099° 55′ 34.0″
		Langkawi	D	1	N 06° 18′ 34.8″	E 099° 51′ 00.3″
		Langkawi	D	1	N 06° 25′ 51.1″	E 099° 45′ 49.0″
		Langkawi	D	1	N 06° 18′ 51.9″	E 099° 42′ 30.1″
		Langkawi	D	1	N 06° 27′ 24.6″	E 099° 49′ 27.6″
2.	PERAK	Pangkor	R	1	N 04° 11′ 33.8″	E 100° 34′ 51.8″
		Pangkor	R	1	N 04° 15′ 10.7″	E 100° 32′ 39.3″
		Pangkor Laut	R	1	N 04° 12′ 14.1″	E 100° 32′ 53.0″
		Sembilan	R	1	N 04° 00′ 30.7″	E 100° 32′ 38.4″
3.	P. PINANG	Aman	R	1	N 05° 17′ 09.7″	E 100° 17′ 28.5″
		Jerejak	R	1	N 05° 16′ 51.2″	E 100° 11′ 24.6″
		Kendi	R	1	N 05° 27′ 41.4″	E 100° 12′ 51.9″
		Rimau	R	1	N 05° 25′ 12.7″	E 100° 20′ 47.9″
		Gedong	R	1	N 05° 16′ 02.6″	E 100° 23′ 35.9″
		Pulau Pinang	R	1	N 05° 20′ 02.3″	E 100° 19′ 03.6″
		Pulau Pinang	D	1	N 05° 13′ 56.6″	E 100° 11′ 04.8″
		Pulau Pinang	D	1	N 05° 15′ 01.9″	E 100° 16′ 19.3″
		Pulau Pinang	D	1	N 05° 16′ 26.4″	E 100° 23′ 30.6″
4.	SELANGOR	Ketam	R	1	N 03° 01′ 17.5″	E 101° 15′ 46.4″
		Angsa	R	1	N 03° 11′ 08.0″	E 101° 13′ 07.1″
		Lumut	R	1	N 02° 59′ 54.6″	E 101° 21′ 42.6″
5.	MELAKA	Besar	R	1	N 02° 06′ 55.8″	E 102° 20′ 10.6″
		Upeh	R	1	N 02° 11′ 39.5″	E 102° 12′ 17.2″
6.	PAHANG	Tioman	M	1	N 02° 44′ 22.0″	E 104° 07′ 53.4″
		Tioman	M	1	N 02° 44′ 22.0″	E 104° 07′ 53.4″
		Seri Buat	M	1	N 02° 41′ 07.4″	E 103° 55′ 24.6″
		Cebeh	M	1	N 02° 55′ 53.6″	E 104° 05′ 51.4″
		Tulai	M	1	N 02° 54′ 42.1″	E 104° 06′ 51.9″
		Sepui	M	1	N 02° 53′ 53.8″	E 104° 03′ 09.7″
		Labas	M	1	N 02° 53′ 23.7″	E 104° 03′ 56.6″
		Sembilang	M	1	N 02° 40′ 53.8″	E 103° 53′ 28.4″
		Tokong Bahara	M	1	N 02° 39′ 48.2″	E 104° 03′ 43.9″
		But	M	1	N 02° 39′ 59.5″	E 104° 03′ 36.4″
7.	JOHOR	Setindan	R	1	N 02° 28′ 35.9″	E 103° 51′ 28.7″
		Babi Tengah	M	1	N 02° 28′ 20.4″	E 103° 51′ 41.9″
		Dayang	R	1	N 02° 28′ 12.8″	E 104° 30′ 12.9″

Jadual 4.9 JAS : Stesen Pengawasan Kualiti Air Marin Pulau, 2006
Table 4.9 DOE : Island Water Quality Monitoring Stations, 2006

Bil/ No.	Negeri/ State	Pulau/ Island	Kategori/ Category	Bil. Stesen/ Station No.	Latitud/ Latitude	Longitud/ Longitude
		Harimau	M	1	N 02° 33′ 26.5″	E 103° 56′ 46.3″
		Mensirip	M	1	N 02° 33′ 04.8″	E 103° 57′ 28.9″
		Gual	M	1	N 02° 32′ 03.0″	E 103° 58′ 03.0″
		Babi Hujung	M	1	N 02° 29′ 24.8″	E 103° 56′ 21.9″
		Nanga Besar	M	1	N 02° 16′ 18.0″	E 104° 37′ 37.5″
		Sibu Besar	M	1	N 02° 12′ 21.0″	E 104° 04′ 22.0″
		Sibu Hujung	M	1	N 02° 10′ 20.0″	E 104° 06′ 39.7″
		Sibu Tengah	R	1	N 02° 10′ 54.9″	E 104° 05′ 45.4″
		Rawa	M	1	N 02° 31′ 03.0″	E 103° 58′ 09.6″
		Tinggi	M	1	N 02° 17′ 33.7″	E 104° 06′ 03.7″
		Besar	M	1	N 02° 25′ 51.8″	E 103° 58′ 37.1″
		Pemanggil	M	1	N 02° 04′ 52.1″	E 104° 18′ 54.8″
		Aur	M	1	N 02° 27′ 24.3″	E 104° 30′ 08.5″
8.	TERENGGANU	Gumia	R	1	N 05° 13′ 51.8″	E 103° 15′ 39.3″
		Bidong Laut	R	1	N 05° 36′ 43.6″	E 103° 03′ 23.7″
		Duyong	R	1	N 05° 20′ 05.6″	E 103° 07′ 44.7″
		Perhentian Besar	M	1	N 05° 53′ 21.5″	E 102° 45′ 01.8″
		Perhentian Besar	M	1	N 05° 53′ 21.5″	E 102° 45′ 01.8″
		Perhentian Kecil	M	1	N 05° 55′ 04.5″	E 102° 43′ 30.4″
		Redang	M	1	N 05° 46′ 32.2″	E 103° 02′ 13.4″
		Redang	M	1	N 05° 46′ 32.2″	E 103° 02′ 13.4″
		Kapas	M	1	N 05° 13′ 01.1″	E 103° 15′ 35.4″
		Susu Dara	M	1	N 05° 57′ 34.8″	E 102° 40′ 30.8″
		Lang Tengah	M	1	N 05° 47′ 32.9″	E 102° 53′ 27.1″
		Pinang	M	1	N 05° 44′ 52.7″	E 103° 00′ 09.4″
		Ekor Tebu	M	1	N 05° 44′ 25.6″	E 103° 01′ 45.4″
		Lima	M	1	N 05° 46′ 11.5″	E 103° 03′ 32.6″
		Tenggol	P	1	N 04° 48′ 33.8″	E 103° 40′ 32.1″
		Nyireh	P	1	N 04° 50′ 39.9″	E 103° 39′ 47.5″
9.	SABAH	Gaya	R	1	N 06° 00′ 58.7″	E 116° 03′ 12.1″
		Layang-Layang	R	1	N 07° 22′ 12.6″	E 113° 50′ 16.4″
		Mabul	R	1	N 04° 15′ 04.0″	E 118° 38′ 02.4″
		Sipadan	R	1	N 04° 07′ 05.2″	E 118° 37′ 37.3″
		Sipadan	R	1	N 04° 06′ 51.0″	E 118° 37′ 32.9″
10.	SARAWAK	Satang Besar	P	1	N 01° 46′ 39.0″	E 110° 09′ 53.7″
		Talang-Talang Kecil	P	1	N 01° 53′ 42.9″	E 109° 45′ 58.2″
		Talang-Talang Besar	P	1	N 01° 54′ 39.7″	E 109° 46′ 36.0″
11.	W. P LABUAN	Labuan	D	1	N 05° 22′ 49.9″	E 115° 13′ 43.8″
		Labuan	D	1	N 05° 16′ 21.9″	E 115° 14′ 55.5″
		Labuan	D	1	N 05° 22′ 18.6″	E 115° 14′ 48.0″
		Labuan	D	1	N 05° 14′ 30.9″	E 115° 14′ 23.3″
		Kuraman	M	1	N 05° 13′ 07.5″	E 115° 08′ 25.5″
		Rusukan Kecil	M	1	N 05° 12′ 06.4″	E 115° 08′ 53.9″
		Rusukan besar	M	1	N 05° 11′ 24.0″	E 115° 08′ 31.2″

Jadual 4.9 JAS : Stesen Pengawasan Kualiti Air Marin Pulau, 2006 (Taburan Stesen Pengawasan Kualiti Air Marin Pulau)
Table 4.9 DOE : Island Water Quality Monitoring Stations, 2006 (Distribution of Marine Water Quality Monitoring Program)

Bil/ No.	Kategori/ Category	Bil. Pulau/ No. Of Islands	Bil. Stesen/ No. Of Stations
1	Pulau Peranginan / Resort Island (R)	25	27
2	PulauTaman Laut / Marine Park Island (M)	38	41
3	Pulau Dilindungi / Protected Island (P)	5	5
4	Pulau Pembangunan / Development Island (D)	3	12
	Jumlah/ Total	71	85

Jadual 4.10 JAS : Parameter Kualiti Air Marin, 2006
Table 4.10 DOE : Marine Water Quality Parameters, 2006

	Parameter/ Parameters	Kod/ Code	Unit/ Unit
	Pengukuran In-situ/ In-situ Measurements		
1.	Oksigen Terlarut/ Dissolved Oxygen	DO	mg/l
2.	Kemasinan/ Salinity	Sal	%
3.	Suhu/ Temperature	Temp	^{o}C
4.	Konduktiviti/ Conductivity	Cond	mS/cm
5.	Kekeruhan/ Turbidity	Turb	ntu/ ftu
6.	pH	pH	-
	Pengukuran Makmal/ Laboratory Analysis		
1.	Jumlah Pepejal Terampai/ Total Suspended Solid	TSS	mg/l
2.	*Escherichia coli*	*E. coli*	cfu/100 ml
3.	Minyak Dan Gris/ Oil And Grease	O & G	mg/l
4.	Kuprum/ Copper	Cu	mg/l
5.	Kadmium/ Cadmium	Cd	mg/l
6.	Plumbum/ Lead	Pb	mg/l
7.	Arsenik/ Arsenic	As	mg/l
8.	Merkuri/ Mercury	Hg	mg/l
9.	Kromium/ Chromium	Cr	mg/l
10.	Bebola Tar/ Tarball	Tar	g/100m
11.	Jumlah Karbon Organic/ Total Organic Carbon	TOC	mg/l
12.	Nitrat/ Nitrate	NO_3^-	mg/l

PENCEMARAN MARIN
MARINE POLLUTION

Pada tahun 2006, terdapat dua puluh tujuh (27) kes pencemaran marin berpunca daripada tumpahan minyak dilaporkan; sembilan (9) kes dikesan di Laut China Selatan, lapan (8) kes di Selat Melaka, dan 10 kes di Selat Johor (Jadual 4.11).

In 2006, twenty seven (27) cases of marine pollution from oil spills were reported; nine (9) in the South China Sea, eight (8) in the Straits of Malacca, and 10 cases in the Johor Straits (Table 4.11).

Sebahagian besar dari kejadian-kejadian tumpahan minyak adalah disebabkan oleh pelepasan secara haram ke dalam perairan negara. Tindakan rondaan yang berterusan oleh Agensi-agensi Penguatkuasaan Maritim (APM) dan operasi bersepadu telah ditingkatkan dalam menangani kejadian pelepasan dan pembuangan haram sisa minyak ke dalam perairan Malaysia.

Most of the oil spill incidents were caused by illegal discharges of oil into Malaysian waters. Continuous surveillance by Maritime Enforcement Agencies (MEA) and Joint Marine Enforcements were increased to overcome illegal discharges and dumping of oily waste into Malaysian waters.

Sebanyak sembilan (9) operasi bersepadu telah dijalankan di seluruh perairan Malaysia bersama agensi-agensi penguatkuasaan maritim dari Malaysia dan juga agensi-agensi maritim dari negara jiran bagi menangani pelbagai isu termasuk pencemaran marin.

Nine (9) joint marine enforcements operations were executed within Malaysian waters by maritime enforcement agencies of Malaysia as well as from neighbouring countries to deal with various maritime issues including marine pollution.

Jadual 4.11 JAS : Kejadian Pencemaran Minyak, 2006
Table 4.11 DOE : Oil Pollution Incidents, 2006

Lokasi Perairan/ Location	Kawasan/ Area		Bilangan Kes/ Number of Cases
Laut China Selatan/ South China Sea	Perairan Malaysia / Malaysian Territory	Semenanjung/ Peninsular	7
		Malaysia Timur/East Malaysia	2
	Zon Ekonomi Eksklusif (EEZ)/ Exclusive Economic Zone (EEZ)		0
Laut Sulu / Sulu Sea	Perairan Malaysia	Sabah	0
Selat Melaka/ Straits of Malacca	Perairan Malaysia / Malaysian Territory		8
	Zon Ekonomi Eksklusif (EEZ)/ Exclusive Economic Zone (EEZ)		0
Selat Johor/ Johor Straits	Perairan Malaysia/ Malaysian Territory	Bahagian Barat / West Part	2
		Bahagian Timur/ East Part	8
JUMLAH/ TOTAL			**27**

Jadual 4.12 JAS : Mesyuarat-mesyuarat Luar Negara Berkaitan Hal Ehwal Marin, 2006
Table 4.12 DOE : International Meetings on Marine Enviromental Matters, 2006

Bil/ No.	Mesyuarat/ Meetings	Tarikh/ Date	Tempat/ Venue
1.	Technical Meeting to Finalize the White Paper and the 18th Co-ordinating Body of the Seas of East Asia (COBSEA) Meeting.	23-25 January 2006	Sanya, Hainan, China
2.	The Cambodia, Myanmar, Vietnam (CMV) Oil Spill Table Top Exercise.	19-21 February 2006	Myanmar
3.	International Maritime Organisation (IMO) and ASEAN Workshop on International Convention on Oil Pollution Preparedness, Response and Cooperation on Hazardous and Noxious Substances (OPRC-HNS).	7-10 March 2006	Singapore
4.	2006 IMO/UNEP Forum on Regional Co-operation in Combating Marine Pollution.	2-5 May 2006	London, United Kingdom
5.	Malaysia-Singapore Joint Committee on Environment (MSJCE) Expert Group Meeting.	29 June 2006	Singapore
6.	The 12th Programme Steering Committee Meeting, Partnerships in Environmental Managemant of the Seas of East Asia (PEMSEA).	1-3 August 2006	Manila, Philippines.
7.	East Asian Seas Inter Governmental Review (IGR) – 2 Preparatory Workshop : Partnership Opportunities for Enhanced Global Programme of Action (GPA) Implementation.	4-5 September 2006	Bangkok, Thailand.
8.	The 55th Marine Environment Protection Committee (MEPC) Conference.	9-13 October 2006	London, United Kingdom.
9.	7th Meeting of the Regional Scientific and Technical Committee (RSTC) of the UNEP/GEF Project: Reversing Environmental Degradation Trends in the South China Sea and the Gulf of Thailand.	14-17 November 2006	Siem Reap, Cambodia
10.	6th Meeting of the Project Steering Committee of the UNEP/GEF Project : Reversing Environmental Degradation Trends in the South China Sea and the Gulf of Thailand.	20-22 November 2006	Siem Reap, Cambodia

Rancangan Kontingensi Kebangsaan Kawalan Tumpahan Minyak (RKKKTM)
National Oil Spill Contingency Plan (NOSCP)

RKKKTM ditadbir oleh Jawatankuasa Kebangsaan Kawalan Tumpahan Minyak (JKKTM) yang dianggotai oleh lapan belas (18) Jabatan dan agensi, dipengerusikan oleh Jabatan Alam Sekitar Malaysia (JAS) dan dibantu Jabatan Laut Semenanjung Malaysia (JLSM). Di samping penubuhan rangkaian stok simpanan peralatan kawalan tumpahan minyak (KTM) di lokasi-lokasi strategik sepanjang Pantai Timur dan Pantai Barat Malaysia, latihan secara berkala bagi semua kakitangan yang terlibat dalam tindakbalas KTM turut dilaksanakan. Latihan-latihan barkenaan adalah bagi memastikan semua kakitangan JAS yang akan terlibat dalam KTM dibekalkan dengan pengetahuan dan kemahiran yang mencukupi dalam pengendalian peralatan dan pengurusan krisis. Resolusi 7 konvensyen antarabangsa OPRC 1990 (International Convention on Oil Spill Preparedness and Response) telah menggariskan komitmen peringkat antarabangsa dalam hal-hal berhubung latihan. Keperluan latihan ini telah dimasukkan ke dalam mekanisma tindakbalas RKKKTM.

The NOSCP is administered by the National Oil Spill Control Committee comprising of eighteen (18) member departments and agencies, chaired by the Department of Environment Malaysia (DOE) and assisted by the Marine Department of Malaysia (MARDEP). Apart from the establishment of adequate Oil Spill Response Equipment (OSRE) bases that are strategically positioned throughout the Eastern and Western Coast of the nation, scheduled and periodical training activities for OSR personnel were also conducted. Such training was to ensure that DOE officers involved in Oil Spill Response (OSR) were equipped with the necessary knowledge and skills in equipment handling and crisis management. Resolution 7 of the International Convention on Oil Spill Preparedness and Response (OPRC) 1990 provides for an international commitment for training and preparedness. This preparedness and training requirement has been incorporated into the Malaysian NOSCP response system.

Sepanjang tahun 2006, pelbagai peringkat latihan dan drill KTM telah dilaksanakan secara berasingan atau bersama oleh badan kerajaan dan swasta seperti JAS, JLSM, Syarikat-syarikat Minyak serta kemudahan-kemudahan di bawahnya dan PIMMAG (Petroleum Industry of Malaysia Mutual Aid Group). JAS telah menganjurkan dua latihan dan kursus KTM di Bintulu, Sarawak (17 & 18 Julai 2006) dan Kota Kinabalu, Sabah (18 & 19 September 2006). Pada 15 Disember 2006, JAS telah menganjurkan program latihan umum (sehari) untuk penduduk kawasan Pengerang, Daerah Kota Tinggi berhubung 'Pencemaran Laut: Kesan dan Langkah-langkah Kawalan'. Program sehari berkenaan disertai oleh kakitangan agensi kerajaan, pihak berkuasa tempatan, penduduk kampung dan persatuan nelayan tempatan.

Throughout 2006, many levels of OSR trainings and drills were conducted by DOE or through joint efforts with other governmental and non governmental organizations such as MARDEP, Oil Companies and Facilities, and the Petroleum Industry of Malaysia Mutual Aid Group (PIMMAG). Two (2) OSR exercises and courses were coordinated by DOE in Bintulu, Sarawak (17 & 18 July 2006) and Kota Kinabalu, Sabah (18 & 19 September 2006). On 15 December 2006, DOE organised a one day public training program for residents of Pengerang in the Kota Tinggi District of Johor, entitled "Marine Pollution : Effects & Mitigation Measures". This one day program was well attended by members of relevant government agencies, local authorities, villagers, and local fisherman association.

Pelepasan Haram Sisa Berminyak
Illegal Discharge of Oily Waste

Pencemaran Pantai Akibat Pembuangan Sisa Minyak
Oily Waste Impact on Beach

Program Latihan Umum (sehari) untuk Penduduk Kawasan Pengerang, Kota Tinggi Anjuran JAS.
One Day Public Training Program Organised by DOE for Residents of Pengerang, Kota Tinggi, Johor

Jawatankuasa Tabung Pusingan Bagi Selat Melaka dan Singapura (RFC)
Straits of Malacca and Singapore Revolving Fund Committee (RFC)

Pada 11 Februari 1981, satu Memorandum Persefahaman (MoU) telah ditandatangani di antara Kerajaan Malaysia, Indonesia, Singapura dan *Japanese Malacca Straits Council* untuk mewujudkan Tabung Pusingan Selat Melaka dan Selat Singapura sebagai salah satu usaha untuk mengawal kejadian tumpahan minyak yang berpunca daripada kapal-kapal yang melalui perairan Selat Melaka dan Selat Singapura.

Malaysia telah dipertanggungjawabkan untuk mengurus Tabung Pusingan berkenaan untuk tempoh lima (5) tahun mulai 1 April 2001 hingga 31 Mac 2006. Pada 26 April 2006, pengurusan Tabung Pusingan telah diserahkan kepada Singapura. Protokol penyerahan telah ditandatangani oleh Y. Bhg. Dato' Hajah Rosnani Ibarahim, Ketua Pengarah Alam Sekitar Malaysia dan Capt. Khong Shen Ping, Pengarah, Bahagian Pelayaran, Maritime and Port Authority (MPA), Singapura untuk tempoh lima (5) tahun. Upacara menandatangani Protokol telah disaksikan oleh Setiausaha Tetap, Kementerian Pengangkutan, Singapura.

Antara aktiviti-aktiviti yang dilaksanakan oleh Jawatankuasa Tabung Pusingan pada tahun 2006 adalah:

- Susulan kepada keputusan mesyuarat Jawatankuasa Tabung Pusingan ke 26 di Kuala Lumpur pada 9 Jun 2005, Mesyuarat Teknikal Jawatankuasa Tabung Pusingan telah berlangsung di Kuala Lumpur pada 24 Januari 2006 dengan dihadiri oleh delegasi dari Malaysia, Indonesia dan Singapura. Mesyuarat telah bersetuju menerimapakai Prosedur Operasi Tetap (SOP) for Joint Oil Spill Combat in the Straits of Malacca and Straits of Singapore yang telah dikemaskini.

- Mesyuarat Jawatankuasa Tabung Pusingan ke27 telah diadakan dari 26-27 April 2006 di Hotel Oriental, Singapura. Mesyuarat telah dihadiri oleh Delegasi dari Malaysia (Jabatan Alam Sekitar dan Jabatan Laut Semenanjung Malaysia), Indonesia and Singapura.

- Membiayai tiga (3) orang peserta masing-masing dari Malaysia dan Indonesia ke International Bunkering Conference (SIBCON) 2006, at Shangri–La Hotel, Singapura, dari 27–29 September 2006.

On 11 February 1981, a Memorandum of Understanding (MoU) was signed between the Government of Malaysia, Indonesia, Singapore and the Japanese Malacca Straits Council, for the establishment of a Revolving Fund to combat oil spills from vessels plying the Straits of Malacca and Singapore.

Malaysia was entrusted with the management of the Revolving Fund for duration of five years from 1 April 2001 to 31 March 2006. On 26 April 2006, the Management of the Fund was handed over to Singapore. The Protocol of Handing Over the Revolving Fund was signed by the Dato' Hajah Rosnani Ibarahim, Director General of Environment and Capt. Khong Shen Ping, Director, Shipping Division, Maritime and Port Authority (MPA) of Singapore for a term of five (5) years, witnessed by the Permanent Secretary, Ministry of Transport, Singapore.

Among the activities carried out by the RFC in 2006 were:

- Pursuant to the decision of the 26th Meeting of the Revolving Fund Committee (RFC) held in Kuala Lumpur, Malaysia on 9 June 2005, the RFC Technical Meeting was convened in Kuala Lumpur on the 24 January 2006 which was attended by Malaysia, Indonesia and Singapore. The meeting adopted the reviewed Standard Operating Procedure (SOP) for Joint Oil Spill Combat in the Straits of Malacca and Straits of Singapore.

- 27th Revolving Fund Committee (RFC) Management Meeting was held from 26-27 April 2006 at the Oriental Hotel, Singapore. The meeting was attended by Delegations from Malaysia (Department of Environment and Marine Department), Indonesia and Singapore.

- Sponsoring of three (3) participants from Malaysia and Indonesia to the International Bunkering Conference (SIBCON) 2006, at Shangri–La Hotel, Singapore, from 27–29 of September 2006.

PEMANTAUAN KUALITI AIR TANAH
GROUNDWATER MONITORING

Pada tahun 2006, sebanyak 340 sampel daripada 122 buah telaga pemantauan kualiti air tanah di seluruh Malaysia telah dianalisis. Telaga dibina di kawasan-kawasan mengikut kategori gunatanah pertanian, perindustrian, padang golf, tapak pelupusan sampah, tapak penstoran radioaktif, pelupusan tapak J.E, kawasan bekalan air, bekas tapak perlombongan, perbandaran dan luar bandar di seluruh Malaysia (Jadual 4.13).

Sample untuk pengukuran secara *in-situ* dan analisa makmal diambil dari setiap stesen. Parameter *in-situ* yang diukur adalah suhu, pH, konduktiviti, turbiditi, saliniti (kemasinan) dan oksigen terlarut. Parameter yang dianalisis di makmal pula ialah bahan kimia organik meruap (VOC), hidrokarbon, racun perosak, logam berat, anion, bakteria, sebatian berfenol, radioaktif, jumlah keliatan dan jumlah pepejal terlarut.

In 2006, 340 groundwater samples were drawn on a quarterly basis from 122 monitoring wells in Malaysia for analysis. The wells had been constructed in areas categorized according to landuse: agriculture, industrial, golf course, solid waste landfill, radioactive storage, animal burial (J.E.), municipal water supply, ex-mining (gold mine) and urban/suburban areas in the country (Table 4.13).

Samples for *in-situ* measurements and samples for laboratory analysis were collected at each station. *In-situ* parameters were temperature, pH, conductivity, salinity, dissolved oxygen and turbidity. For laboratory analysis, the parameters were total volatile organic compounds (VOC), pesticides, heavy metals, anions, bacteria, phenolic compounds, radioactivity, total hardness and total dissolved solids.

Stesen Pemantauan Kualiti Air Tanah
Groundwater Quality Monitoring Station

Jadual 4.13 JAS : Taburan Telaga-telaga Pemantauan Air Bawah Tanah, 2006
Table 4.13 DOE : Distribution of Groundwater Monitoring Wells, 2006

Kategori/ Category	Bilangan Telaga/ Number of Wells
Kawasan Pertanian/ Agricultural Areas	12
Bandar / Urban Suburban Areas	12
Tapak Perindustrian/ Industrial Sites	18
Tapak Pelupusan Sampah/ Landfills	27
Padang Golf/ Golf Courses	7
Tapak Radioaktif/ Radioactive Sites	1
Luarbandar / Rural Areas	5
Bekas Lombong/ Ex-Mining Areas	3
Bekalan Air Tempatan/ Municipal Water Supply	11
Tapak Pelupusan Bangkai Haiwan/ Animal Burial Sites	16
Kolam Akuakultur/ Aquaculture Farms	6
Peranginan/ Resorts	1
Kolam Air Masin/ Saltwater Ponds	3
Jumlah/ Total	122

PENGURUSAN BUANGAN TERJADUAL
MANAGEMENT OF SCHEDULED WASTES

Kebenaran Bertulis dan Lesen Premis Yang Ditetapkan

Pada tahun 2006, sebanyak 56 Kebenaran Bertulis telah diluluskan oleh Ketua Pengarah untuk pembinaan kemudahan pengolahan dan pelupusan buangan terjadual iaitu 30 kemudahan pemerolehan kembali separa *(e-waste)*, 1 kemudahan pemerolehan kembali penuh *(e-waste)*, 17 kemudahan pemerolehan kembali, 7 kemudahan penunu buangan terjadual dan satu kemudahan penstoran luar tapak.

Sejumlah 394 lesen diluluskan kepada kemudahan baru dan kemudahan sediada untuk pemerolehan kembali luar tapak, penstoran luar tapak-pengangkutan, penunu buangan terjadual, pengolahan atas tanah, pengolahan luar tapak dan tapak pelupusan selamat (Jadual 4.14).

Import Dan Eksport Buangan Terjadual

Pada tahun 2006, sebanyak lapan (8) Kebenaran Bertulis telah dikeluarkan untuk mengimport 172,151 tan metrik buangan untuk tujuan penggunaan sebagai bahan mentah industri (Jadual 4.15). Buangan yang diimport ialah sanga kuprum, buangan gipsum dari loji janakuasa, asid terpakai dan buangan kaca daripada tiub sinar katod. Sejumlah 5,806 tan metrik buangan terjadual telah dieksport untuk tujuan pemerolehan kembali (Jadual 4.16). Buangan yang dieksport kebanyakannya terdiri daripada sanga zink, enapcemar hidroksida logam, mangkin terpakai dan buangan elektrikal dan elektronik daripada 49 pengeluar buangan untuk pemerolehan kembali logam di luar negara (Jadual 4.17).

Written Permission and Licenses for Prescribed Premises

In 2006, 56 Written Permissions were granted by the Director General for the construction of treatment and disposal facility for scheduled wastes; 30 off-site partial recovery plants (e-waste), 1 off–site full recovery plant (e-waste), 17 off-site recovery plants; 7 scheduled wastes incinerators and 1 off-site storage facility.

A total of 394 licenses were issued for both existing and new facilities for off-site recovery, off-site storage-transportation, scheduled wastes incinerators, land treatment, off-site treatment and secured landfills (Table 4.14).

Import And Export Of Scheduled Wastes

In 2006, eight (8) Written Approvals were issued for the import of 172,151 tonnes of wastes for use as raw materials in industrial processes (Table 4.15). The imported wastes comprised of copper slag, waste gypsum arising from power plant, spent acid and waste glass from cathode ray tube. A total of 5,806 tonnes of scheduled wastes were exported for recovery operations (Table 4.16). The exported wastes were derived from 49 waste generators and comprised mainly of zinc dross, metal hydroxide sludges, spent catalyst and electrical and electronic wastes destined for metal recovery in foreign countries (Table 4.17).

Jadual 4.14 : Malaysia : Lesen-lesen Yang DiKeluarkan Bagi Kemudahan Pengolahan dan Pelupusan Buangan Terjadual 2006.
Table 4.14 : Malaysia : Licensed Scheduled Wastes Treatment and Disposal Facilities, 2006

Kemudahan / *Facility*	Negeri / *State*													Jumlah/ Total
	JHR	KDH	MLK	N.S	PHG	PRK	PP	SBH	SRK	SLG	TRG	WP (KL)	WP (LAB)	
Penstoran Luar Tapak - Pengangkutan	27	19	11	6	4	13	36	8	18	39	1	9	5	196
Pemerolehan Kembali Luar Tapak	27	16	9	5	5	12	31		9	28	1	4		147
Insinerator Buangan Terjadual	6	1	1	3	1	2	3	4	9	4	4		1	39
Pengolahan Di Atas Tanah				1					1				1	3
Tapak Pelupusan Selamat		1		2					1		1			5
Pengolahan Luar Tapak				2					2					4
Bilangan Lesen	60	37	21	19	10	27	70	12	40	71	7	13	7	394
Bilangan Premis	32	20	11	11	7	17	37	11	30	48	5	10	7	246

Nota :

JHR — Johor
KDH — Kedah
MLK — Melaka
N.S — Negeri Sembilan
PRK — Perak
KLN — Kelantan
PHG — Pahang
SBH — Sabah
SLG — Selangor
SRK — Sarawak
TRG — Terengganu
WP (KL) — Wilayah Persekutuan Kuala Lumpur
WP (LAB) — Wilayah Persekutuan Labuan

Jadual 4.15 JAS : Kuantiti, Jenis dan Sumber Buangan Terjadual Yang Diimport (Tan), 2002 – 2006
Table 4.15 DOE : Quantity, Types and Sources of Scheduled Wastes Imported (Tonnes), 2002 – 2006

Jenis Buangan / Type of Waste	Tahun/ Year / Negara/ Country	2002	2003	2004	2005	2006
Sanga Kuprum/ Copper Slag	Singapura/ Singapore	33,945	52,283	58,723	58,774	33,674
Sanga Peleburan/ Granulated Blast Furnace Slag	Singapura/ Singapore	170	0	70	0	0
	Jepun/ Japan	15,000	234,644	293,614	241,872	0
	China/ China	14,770	17,363	0	0	0
Buangan Gipsum Dari Janakuasa/ Waste Gypsum From Power Plant	Singapura/ Singapore	0	0	0	0	132,833
Buangan Kaca CRT/ Waste Glass From CRT	Amerika Syarikat/ USA	0	0	0	0	4,628
Asid Terpakai / Spent Acid	Singapura/ Singapore	0	0	0	0	1,016
Mangkin Terpakai/ Spent Catalyst	Singapura/ Singapore	6,878	1,108	1,108	6,000	0
Jumlah (Tan) / Total (Tonnes)		**70,763**	**305,398**	**353,515**	**306,646**	**172,151**

Jadual 4.16 JAS : Kuantiti dan Jenis Buangan Terjadual Yang Dieksport (Tan), 2002 – 2006
Table 4.16 DOE : Quantity and Types of Scheduled Wastes Exported (Tonnes) by Type of Waste, 2002 – 2006

Tahun/ Year Jenis Buangan / Type of Waste	2002	2003	2004	2005	2006
Enapcemar Hidroksida Logam / Metal Hydroxide Sludge	1,746	1,451	2,494	2,288	1,769
Mangkin Terpakai / Spent Catalyst	1,365	693	722	215	645
Bahan Blasting Terpakai / Used Blasting Material	-	-	25	-	105
Dross zink / Zinc Dross	-	-	-	2,347	1,082
Buangan Bateri Nikel-Kadmium / Waste of Nickel Cadmium Battery	-	217	103	272	117
Toner Terpakai / Used Toner	-	-	-	-	139
Buangan mengandungi formaldehid/ Waste Containing Formaldehyde	-	-	-	-	24
Buangan Elektrikal & Elektronik / Electrical & Electronic Wastes	-	-	-	90	1,925
Bekas-bekas terpakai mengandungi bahan kimia/ Used Drums Containing Chemicals	-	-	10	12	-
Jumlah (Tan) / Total (Tonnes)	3,111	2,361	3,354	5,224	**5,806**

Jadual 4.17 JAS : Kuantiti dan Destinasi Buangan Terjadual Yang Dieksport (Tan), 2002 - 2006
Table 4.17 DOE : Quantity and Destination of Scheduled Wastes (Tonnes) Exported by Destination, 2002 - 2006

Tahun/ Year Negara Pengimport / Importing Country	2002	2003	2004	2005	2006
Amerika / America	533	60	25	-	1,847
Australia / Australia	315	209	-	-	-
Filipina / Philippines	-	-	1,000	1,000	1,280
Finland / Finland	100	23	190	-	381
Belgium / Belgium	-	140	51	-	119
Kanada / Canada	-	-	80	-	-
Belanda / Holland	570	323	295	-	-
Itali / Italy	44	28	-	-	98
Jepun / Japan	1,035	1,006	1,019	1,793	660
Jerman / Germany	128	349	476	492	537
Korea Selatan / South Korea	-	118	-	-	117
Perancis / France	67	98	189	272	-
Singapura / Singapore	169	-	23	14	10
Sweden / Sweden	149	7	6	8	21
China / China	-	-	-	-	79
South Africa/ Afrika Selatan	-	-	-	1,555	424
Thailand / Thailand	-	-	-	90	233
Jumlah (Tan) / Total (Tonnes)	3,110	2,361	3,354	5,224	5,806

PENGUATKUASAAN TERHADAP AKTIVITI PEMBAKARAN TERBUKA
ENFORCEMENT AGAINST OPEN BURNING ACTIVITIES

Pada tahun 2006, semua pejabat JAS Negeri telah meneruskan operasi rondaan di kawasan-kawasan yang cenderung berlaku kebakaran. Sejumlah 4315 kes pembakaran terbuka dikesan dan disiasat termasuk *hotspot* yang dikesan melalui satelit (Rajah 4.9 dan Rajah 4.10).

Kejadian pembakaran terbuka sering berlaku di kawasan pertanian (572), belukar (466), hutan (409) dan tapak pelupusan (276) terutamanya semasa cuaca panas dan kering iaitu pada bulan-bulan Februari (362), Mac (755), Jun (368), Julai (587) dan Ogos (908). Daripada 4315 kes pembakaran terbuka tersebut 507 kes telah dikompaun sebanyak RM 834,500.00 dan 36 kes telah dikenakan tindakan mahkamah di mana10 kes telah dijatuhkan hukuman dan didenda sebanyak RM 83,000.00.

Pengawasan Melalui Udara

Program Pengawasan Udara diteruskan pada tahun 2006 untuk mengawasi dan mengesan dari udara kejadian pencemaran alam sekitar seperti aktiviti pembakaran terbuka, pelepasan dari industri, pencemaran pantai dan laut, dan aktiviti pembukaan tanah dan pembangunan di kawasan tanah tinggi dan pulau-pulau. Sejumlah RM 3,000,000.00 diperuntukkan di bawah bajet pembangunan untuk pelaksanaan program ini. Maklumat mengenai kejadian pencemaran alam sekitar yang dikesan dari udara ini disalurkan ke bilik operasi JAS untuk tindakan penguatkuasaan susulan oleh pegawai penguatkuasa di lapangan.

Sebanyak 181 bilangan penerbangan yang melibatkan 547 jam penerbangan telah dilaksanakan sepanjang tahun 2006. RM 556,066.00 telah digunakan untuk tujuan penerbangan manakala baki berjumlah RM 2,443,934.00 telah digunakan untuk kerja-kerja penyelenggaraan dan perolehan pelbagai peralatan pemantauan dan penguatkuasaan seperti *multi gas detector, full face mask, ammonia cartridge*, kamera dan *disposal respirator*.

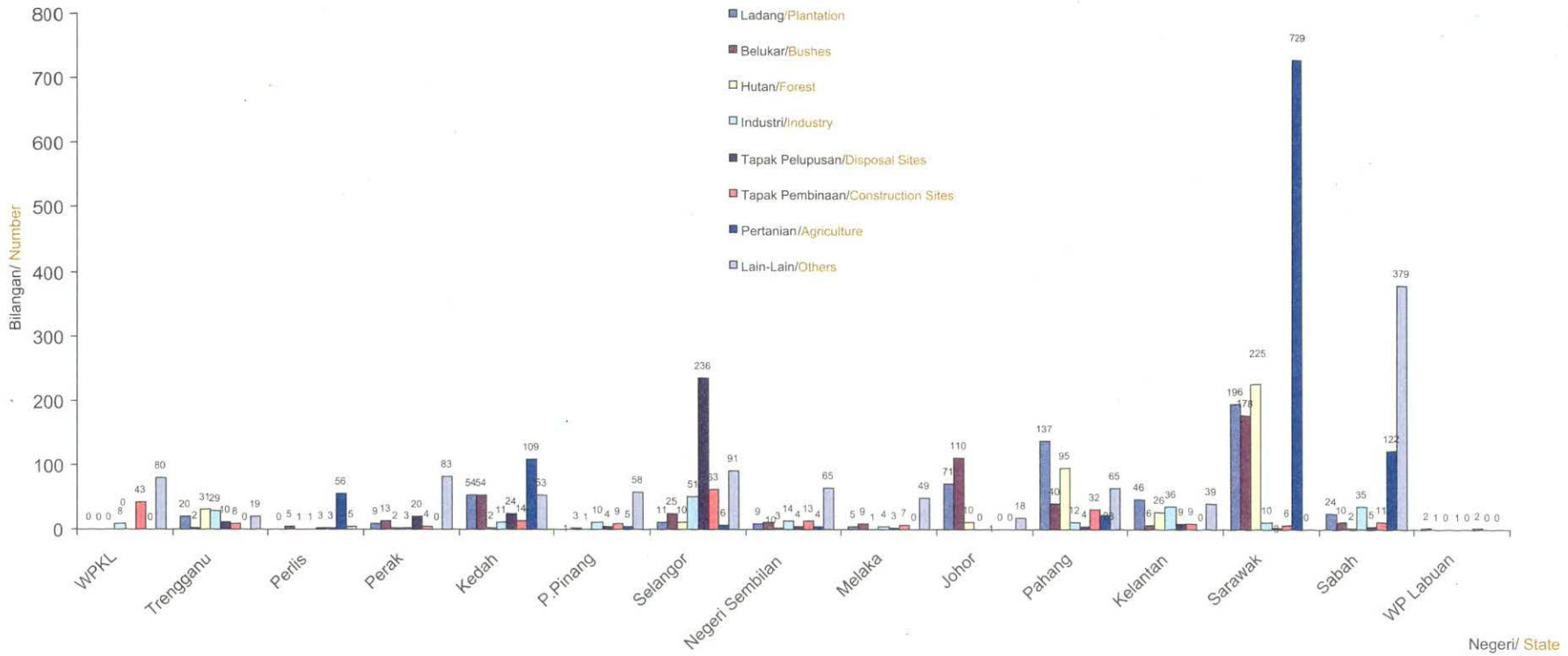
Throughout 2006 DOE State Offices continued to conduct daily ground surveillance of fire prone areas. A total of 4315 open burning cases were investigated, including hotspots detected via satellites (Figure 4.9 and Figure 4.10).

Frequent open burning incidents were found to occur in plantations (572), bushes (466), forests (409) and disposal sites (276) especially during the hot and dry period in February (362), March (755), June (368), July (587) and August (908). Out of 4315 open burning cases detected, 507 cases were given compounds amounting to RM 834,500.00 and 36 cases were prosecuted in court, 10 cases of which were found guilty and fined a total of RM 83,000.00.

Airborne Surveillance

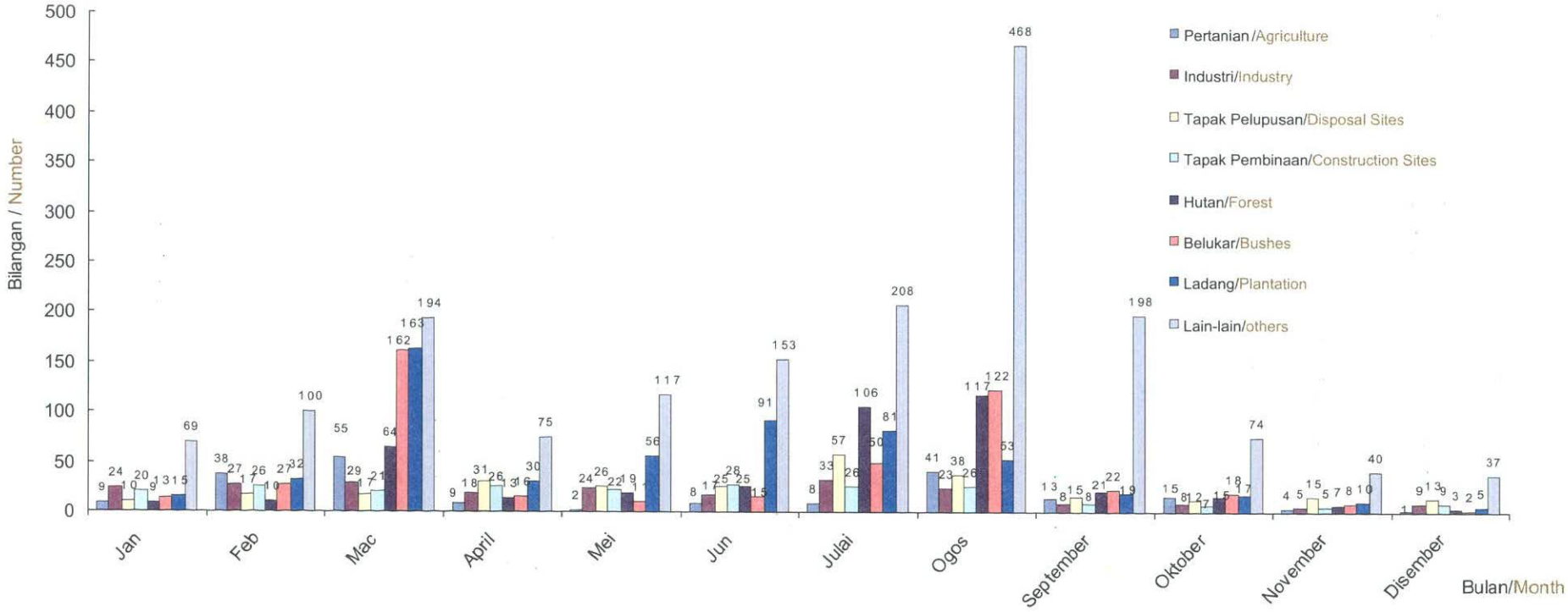
The National Airborne Surveillance Programme continued in 2006 to monitor and detect environmental pollution due to open burning activities, emission from industries, coastal and marine pollution, land clearing activities on highland and island development. A development budget allocation of RM 3 million was provided in 2006 surveillance. Information on environmental pollution activities detected from the air would be transmitted to the DOE operation room for follow up on enforcement action by ground surveillance staff.

In 2006, 181 flights with a total of 547 flight hours were recorded under this programme. RM 556,066.00 was spent for the surveillance activities while the remaining RM 2,443,934.00 was used for maintenance works and procurement of monitoring and enforcement equipment such as multi gas detector, full face mask , ammonia cartridge, camera and disposable respirators.



Rajah 4.9 JAS : Bilangan Kes Pembakaran Terbuka Mengikut Negeri, 2006

Figure 4.9 DOE : Number of Open Burning Cases By State, 2006



Rajah 4.10 JAS : Bilangan Kes Pembakaran Terbuka Bulanan, 2006

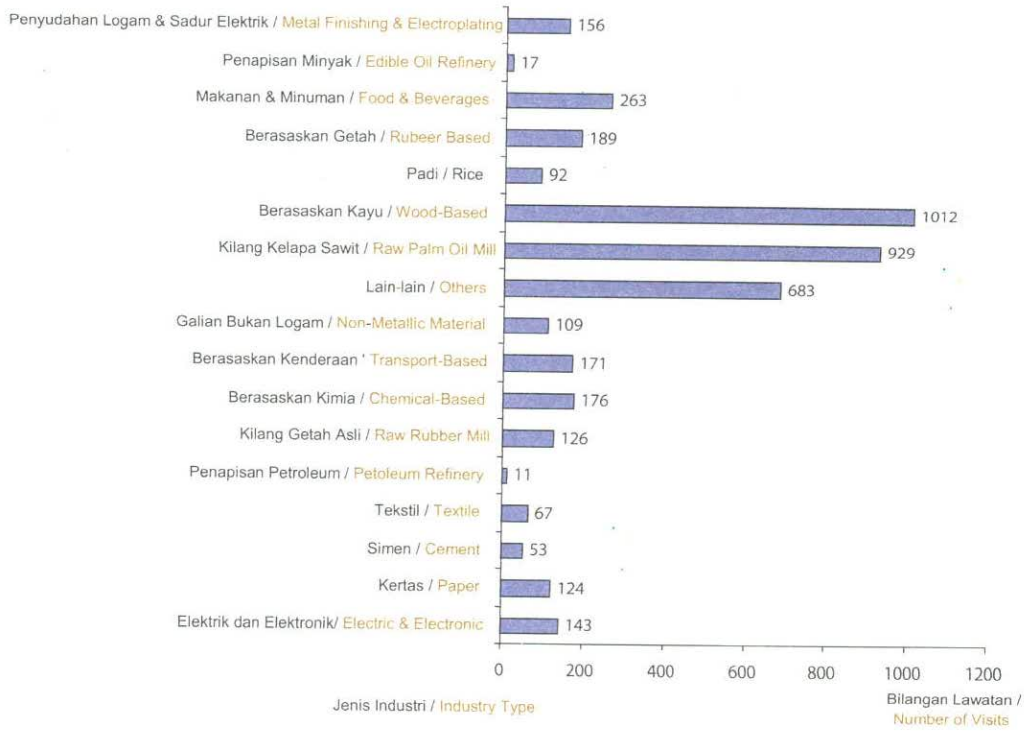
Figure 4.10 DOE : Number of Open Burning Cases By Month, 2006

STATUS PEMATUHAN TERHADAP PERATURAN-PERATURAN KUALITI ALAM SEKELILING (UDARA BERSIH) 1978
STATUS OF COMPLIANCE WITH THE ENVIRONMENTAL QUALITY (CLEAN AIR) REGULATIONS 1978

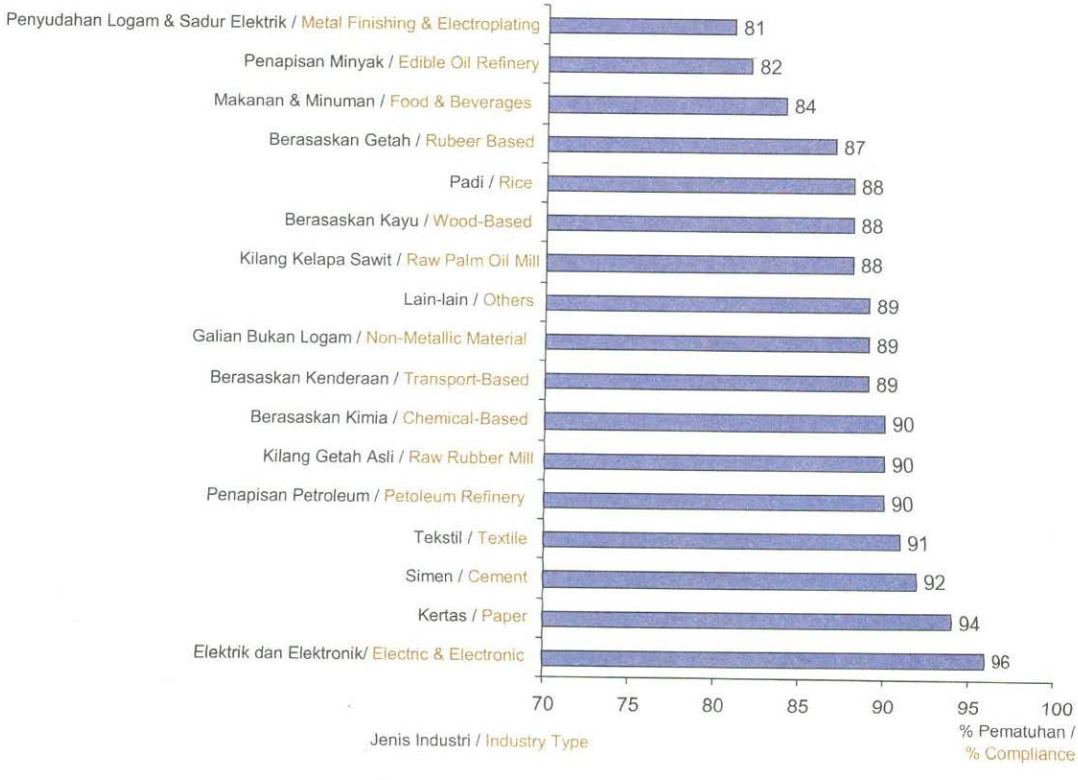
Sepanjang tahun 2006, sebanyak 4321 lawatan penguatkuasaan telah dijalankan ke atas 37484 premis-premis perindustrian (industri pembuatan dan premis yang ditetapkan). Jumlah keseluruhan tahap pematuhan kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978 adalah sebanyak 87%. Daripada jumlah ini, industri elektrik dan elektronik mencapai peratus pematuhan tertinggi iaitu 96% manakala industri berkaitan penyudahan logam dan sadur elektrik merekodkan tahap pematuhan yang paling rendah (81%) (Rajah 4.11). Antara sebab utama yang menyebabkan tahap pematuhan rendah ini ialah penyelenggaraan alat kawalan pencemaran yang kurang cekap.

Throughout 2006, 4321 enforcement visits to 37484 premises (both manufacturing industries and prescribed premises) were conducted. Overall compliance to the Environmental Quality (Clean Air) Regulations 1978 was 87%. The electric and electronic sector achieved the highest percentage compliance (96%) and the lowest compliance was recorded by the metal finishing and electroplating industry (81%) (Figure 4.11) The main reason for low compliance was inefficient maintenance of pollution control equipment.

Pencemaran Udara dari Kilang
Air Pollutition from Factory



* Berdasarkan bilangan lawatan penguatkuasaan/ Based on total number of enforcement visits



Rajah 4.8 : Jabatan Alam Sekitar: Status Pematuhan* Premis Perindustrian Terhadap Peraturan-Peraturan (Udara Bersih), 1978; 2006

Figure 4.8 : Department of Environment: Compliance* to Environmental Quality (Clean Air) Regulations, 1978; 2006

PUNCA-PUNCA BERGERAK (KENDERAAN BERMOTOR)
MOBILE SOURCES (MOTOR VEHICLES)

Sehingga akhir tahun 2006 sebanyak 15,790,732 buah kenderaan bermotor telah didaftar di Malaysia, penambahan sebanyak 971,513 buah kenderaan (iaitu 6.6%) berbanding tahun 2005. Pecahan keseluruhan kenderaan bermotor yang berdaftar mengikut jenis kenderaan adalah seperti di Rajah 4.12 .

By the end of 2006, there were about 15,790,732 registered motor vehicles in Malaysia, an increase of 971,513 (6.6%) compared to 2005. The breakdown of the total registered vehicles according to vehicle types is given in Figure 4.12 .

Dari sejumlah 971,513 buah kenderaan baru yang didaftarkan dalam tahun 2006, kategori motorsikal dan kereta adalah yang paling tinggi bilangannya dengan masing-masing sebanyak 448,751 unit (46.2%) dan 458,294 unit (47.2%), manakala baki selebihnya sebanyak 64,468 unit (6.6%) adalah dari jenis kenderaan lain seperti lori, bas dan van.

Out of 971,513 new vehicles registered in 2006, motorcycles and motorcars made up the highest number of 448,751 (46.2%) and 458,294 (47.2%) respectively, while the remaining 64,468 (6.6%) were from the other vehicle types such as lorries, buses and vans.

Taburan bilangan kenderaan bermotor di Malaysia mengikut negeri adalah seperti di Rajah 4.13. Wilayah Persekutuan Kuala Lumpur merekodkan bilangan kenderaan yang tertinggi iaitu sebanyak 3.49 juta (atau 22.1%), diikuti oleh Johor, Selangor, Pulau Pinang dan Perak.

The distribution of registered vehicles throughout the States is given in Figure 4.13. The Federal Territory of Kuala Lumpur recorded the highest number of vehicle registered i.e. 3.49 million (or 22.1%) followed by Johor, Selangor, Pulau Pinang and Perak.

Kawalan Pelepasan Asap dan Gas dari Kenderaan Bermotor

Pelepasan asap serta gas-gas pencemar seperti karbon monoksida (CO), hidrokarbon (HC), oksida-oksida nitrogen (NO_x) serta partikulat (PM) yang dilepaskan melalui ekzos kenderaan bermotor adalah dikawal di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Enjin Diesel) 1996 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Enjin Petrol) 1996.

Control of Smoke and Gaseous Emissions From Motor Vehicles

Emission of smoke and gaseous pollutants such as carbon monoxide (CO), hydrocarbons (HC), oxides of nitrogen (NO_x) and particulate matter (PM) emitted from motor vehicle exhausts are controlled under the Environmental Quality (Control of Emission from Diesel Engines) Regulations 1996 and the Environmental Quality (Control of Emission from Petrol Engines) Regulations 1996.

Kawalan Pelepasan Asap Hitam Dari Kenderaan Diesel

Kawalan pelepasan asap hitam berlebihan dari ekzos kenderaan diesel dilaksanakan melalui Program AWASI (Area Watch And Sanction Inspection). Melalui Program AWASI ini, skuad peronda JAS akan menjalankan

Control of Black Smoke Emission From Diesel Vehicles

The control of excessive black smoke emission from diesel vehicle exhausts is implemented through the AWASI (Area Watch And Sanction Inspection) Programme. Through this programme DOE's mobile squads would go on patrol,

rondaan, pemerhatian dan menjalankan ujian asap ke atas kenderaan-kenderaan diesel yang diperhatikan mengeluarkan asap hitam berlebihan. Kompaun akan dikenakan serta merta kepada pemandu dan tuan punya kenderaan yang didapati gagal mematuhi had pelepasan asap 50 HSU. Kompaun serta perintah larangan menggunakan kenderaan di jalanraya akan dikeluarkan sekiranya kenderaan didapati melepaskan asap hitam melebihi 70 HSU. Perintah larangan yang dikenakan ini adalah untuk satu tempoh tertentu bagi tujuan membaiki kenderaan.

observing and testing diesel vehicles emitting excessive smoke. Compounds were issued on-the-spot to the drivers and owners if the vehicle fails to comply with the stipulated smoke limit of 50 HSU, and a Prohibition Order (prohibiting road use) will only be issued if the smoke limit exceeds 70 HSU. Prohibition order is in force until the vehicle is repaired accordingly and comply with the stipulated smoke limit.

Di sepanjang tahun 2006, sebanyak 1,618 operasi penguatkuasaan AWASI telah dilaksanakan di bandar-bandar di seluruh negara. Dari sejumlah 152,250 buah kenderaan diesel yang diperiksa, sebanyak 5,248 buah kenderaan telah dikompaun kerana gagal mematuhi had pelepasan asap hitam 50 HSU, termasuk 808 daripadanya telah dikenakan perintah larangan beroperasi sehingga dibaikpulih dan lulus ujian asap semula oleh JAS. Pematuhan keseluruhan pelepasan asap hitam oleh kenderaan diesel adalah sebanyak 95.6%.

In 2006, a total of 1,618 AWASI enforcement campaigns were conducted in urban areas throughout the country. A total of 152,250 diesel vehicles were visually inspected, out of which 5248 vehicles were compounded for failing to comply the 50 HSU smoke limit including 808 vehicles issued with the prohibition order. Vehicles issued with prohibition order were required to undergo smoke retest by DOE before allowed on the road. Overall compliance of diesel vehicles was 95.6%.

Bilangan kenderaan diesel yang dikompaun dan peratus pematuhan mengikut jenis kenderaan adalah seperti di Rajah 4.14. Rajah 4.15 pula menunjukkan bilangan kenderaan dikompaun, pengeluaran perintah larangan serta peratus pematuhan mengikut jenis kenderaan. Tindakan mahkamah juga telah diambil ke atas 179 pemandu serta tuan-tuan punya kenderaan kerana gagal menjelaskan kompaun yang telah dikenakan.

The number of diesel vehicles summoned and their percentage of compliance according to vehicle types is given in Figure 4.14. Figure 4.15 shows the number of vehicles compounded, number of prohibition orders issued and the percentage of compliance according to States. Court prosecutions were also taken against 179 drivers and vehicle owners for failing to settle the compounds issued.

Selain daripada pelaksanaan program AWASI di kawasan bandar, program penguatkuasaan di sepanjang lebuhraya dan jalan utama di seluruh negara juga telah dilaksanakan. Upacara perasmian program Kempen Kawalan Pelepasan Kenderaan Berenjin Diesel dan Petrol di Sepanjang Lebuhraya dan Jalan Utama di Seluruh Negara telah disempurnakan oleh Y. B. Dato' S. Sothinathan, Timbalan Menteri Sumber Asli dan Alam Sekitar, pada 21 September 2006 di Plaza Tol Sungai Besi, Kuala Lumpur.

Apart from conducting the AWASI Programme within urban areas, enforcement programme were also conducted along highways and the main roads. The "Control of Emission From Diesel and Petrol Vehicles along Highways and Main Roads Campaign" was launched by Dato' S. Sothinathan, Deputy Minister of Natural Resources of Environment at the Sungai Besi Toll Plaza, Kuala Lumpur on 21 September 2006.

Kempen tersebut juga telah dilaksanakan secara serentak oleh semua pejabat-pejabat JAS negeri. Sebanyak 3,639 kenderaan diesel telah diperiksa, di mana 281 telah

The campaign was also conducted simultaneously by all DOE State Offices. From these campaigns, a total of 3639 diesel vehicles were inspected, 281 vehicles were

dikompaun dan 13 telah dikenakan perintah larangan menggunakan kenderaan (Rajah 4.16).

compounded and 13 issued with Prohibition Orders prohibiting road use (Figure 4.16).

Kawalan Pelepasan Gas CO dan HC dari Kenderaan Petrol

Pada tahun 2006, sejumlah 436 buah kenderaan petrol telah diuji pelepasan CO dan HC menggunakan meter gas CO-HC Analyzer melalui kaedah 'ujian idling' di jalan raya. Semua kenderaan yang diuji mematuhi had pelepasan CO dan HC.

Control of CO and HC Gas Emissions from Petrol Vehicles

Throughout 2006, a total of 436 petrol powered vehicles were tested for CO and HC emission using the CO-HC Gas Analyzer by the idling test method. All vehicles were able to comply the stipulated CO and HC limits.

Ujian Kelulusan Jenis (Kenderaan Petrol)

Mulai 1 Januari 2000, mana-mana model baru kenderaan motor yang menggunakan petrol dikehendaki mematuhi standard pelepasan yang ditetapkan dalam Jadual Ketiga, Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Enjin Petrol),1996. Jisim Karbon Monoksida yang dibenarkan hendaklah tidak melebihi 2.2 g/km, manakala kombinasi Hidrokarbon dan Nitrogen Oksida pula tidak melebihi 0.5 g/km. Pada tahun 2006, JAS telah mengeluarkan sebanyak 37 Sijil Ujian Kelulusan Jenis bagi model baru kenderaan yang akan dipasarkan di Malaysia.

Type Approval Test (Petrol Vehicles)

As of 1 January 2000, new models of petrol driven motor vehicles are required to comply with emission standards prescribed in the Third Schedule of the Environment Quality (Control of Emission from Petrol Engines) Regulations, 1996. The mass of Carbon Monoxide shall not exceed 2.2 g/km while the Hydrocarbon and Nitrogen Oxides combined shall not exceed 0.5 g/km. In 2006, DOE had issued 37 Type Approval Test Certificates for new models to be marketed in Malaysia.

Pewujudan Kemudahan Yang Diluluskan

Bagi memudahkan orang ramai menghantar kenderaan mereka untuk ujian pelepasan asap dan gas, JAS telah memberi pengiktirafan "Kemudahan Yang Diluluskan" kepada bengkel-bengkel kenderaan yang memenuhi kriteria-kriteria yang telah ditetapkan. Pusat-pusat ini juga bertindak membaiki kenderaan yang tidak mematuhi tahap pelepasan asap.

Sehingga akhir tahun 2006, sebanyak 49 bengkel serta pusat-pusat pemeriksaan kenderaan di seluruh negara telah diberikan sijil pengiktirafan sebagai "Kemudahan Yang Diluluskan" oleh JAS untuk menguji pelepasan asap hitam kenderaan diesel.

Establishment of Approved Testing Facilities

To facilitate public access to workshops for smoke and gaseous emission testing, DOE accredited a number of workshops that had fulfilled the prescribed criteria as "Approved Testing Facilities". Such centres could also serve as immediate repair centres for the non-complying vehicles.

By the end of 2006, a total of 49 workshops and vehicle testing centers throughout the country were registered by DOE as "Approved Testing Facilities" to test black smoke emission from diesel vehicles.

Kawalan Pelepasan Asap Daripada Motosikal

Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Motosikal), 2003 telah diwartakan dan mula dikuatkuasa mulai 1 Januari 2004. Peraturan ini telah menggariskan piawai pelepasan seperti berikut:-

- Standard Kelulusan Jenis bagi motosikal baru : 97/24/EC
- Standard pelepasan (idling) bagi motosikal terpakai : 4.5 % CO (Karbon Monoksida)

Pengimport motosikal dikehendaki supaya mematuhi standard baru pelepasan berkuatkuasa 1 Januari 2005 bagi model baru dan 1 Julai 2005 bagi model sedia ada, manakala pembuat tempatan hendaklah mematuhi standard pelepasan baru berkuatkuasa 1 Julai 2005 bagi model baru dan 1 Julai 2006 bagi model sedia ada. Sepanjang tahun 2006 sebanyak lapan (8) Sijil Kelulusan Jenis telah dikeluarkan kepada pembuat, pemasang dan pengimport motosikal untuk pasaran dalam negara.

Control of Emission from Motorcycles

The Environmental Quality (Control of Emission from Motorcycles) Regulations 2003 were gazetted and came into force on 1 January 2004. The emission standards adopted are as follows :-

- Type Approval Emission Standard for new motorcycles : 97/24/EC
- Idling Emission Standard for in-use motorcycles : 4.5 % CO (Carbon Monoxide)

Motorcycle importers were required to comply with the new emission standards effective from 1 January 2005 for new models and 1 July 2005 for current models. Local manufacturers would have to comply with the new emission standards effective from 1 July 2005 for new models and 1 July 2006 for current models. Throughout 2006, a total of eight (8) Type Approval Test Certificates were issued to manufacturers, assemblers and importers of motorcycles for the domestic market.

Bunyi Bising Kenderaan Bermotor

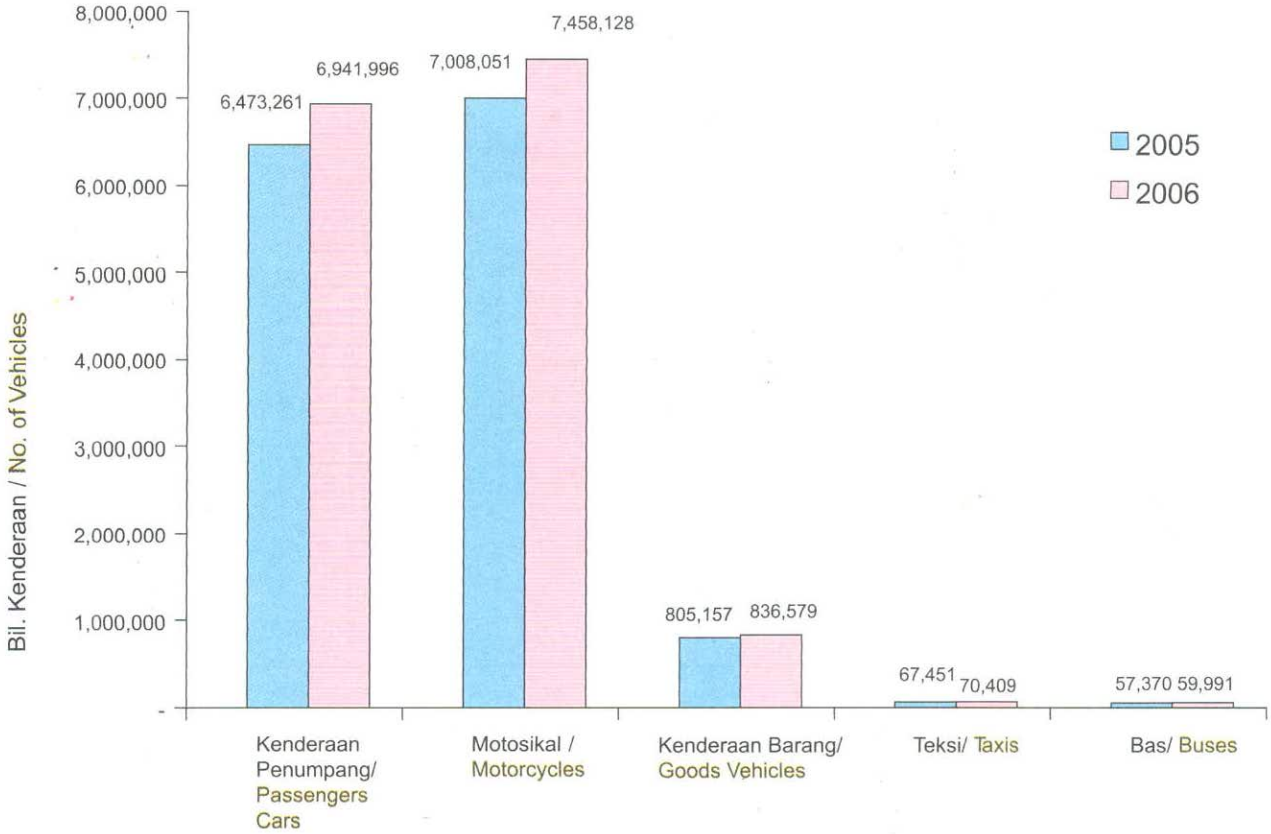
Pelepasan bunyi bising daripada kenderaan bermotor dikawal di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Bunyi Bising Kenderaan Bermotor) 1987.

Operasi penguatkuasaan bagi mengawal pelepasan bunyi bising dari motosikal telah dilaksanakan secara bersama oleh JAS dengan kerjasama Polis DiRaja Malaysia (Cawangan Trafik). Sepanjang tahun 2006, sejumlah 2,084 buah motosikal telah ditahan untuk diuji tahap pelepasan bunyi bising. Dari jumlah ini, 300 telah dikompaun kerana melanggar had bunyi bising yang dibenarkan. Peratus pematuhan secara keseluruhannya ialah 85.6 % (Rajah 4.17).

Noise from Motor Vehicles

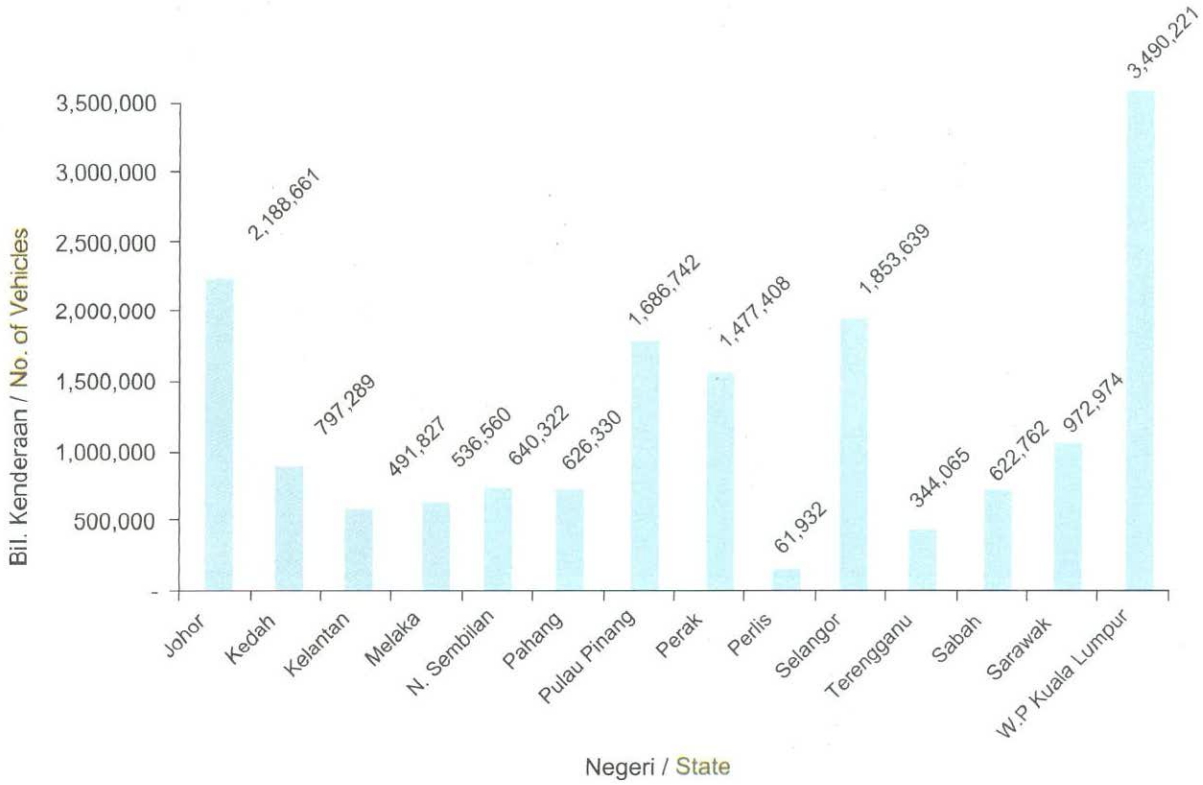
The control of noise from motor vehicles is enforced under the Environmental Quality (Motor Vehicle Noise) Regulations 1987.

Enforcement campaigns to control excessive noise from motorcycles were jointly conducted by the DOE and the Traffic Police. Throughout 2006, a total of 2,084 motorcycles were stopped for noise inspection. From the above total, 300 motorcyclists were summoned for violating the stipulated noise limits. The overall percentage of compliance was 85.6 % (Figure 4.17).



Rajah 4.12 Malaysia : Bilangan Kenderaan Bermotor Mengikut Jenis, 2006

Figure 4.12 Malaysia : Number of Motor Vehicles by Type, 2006

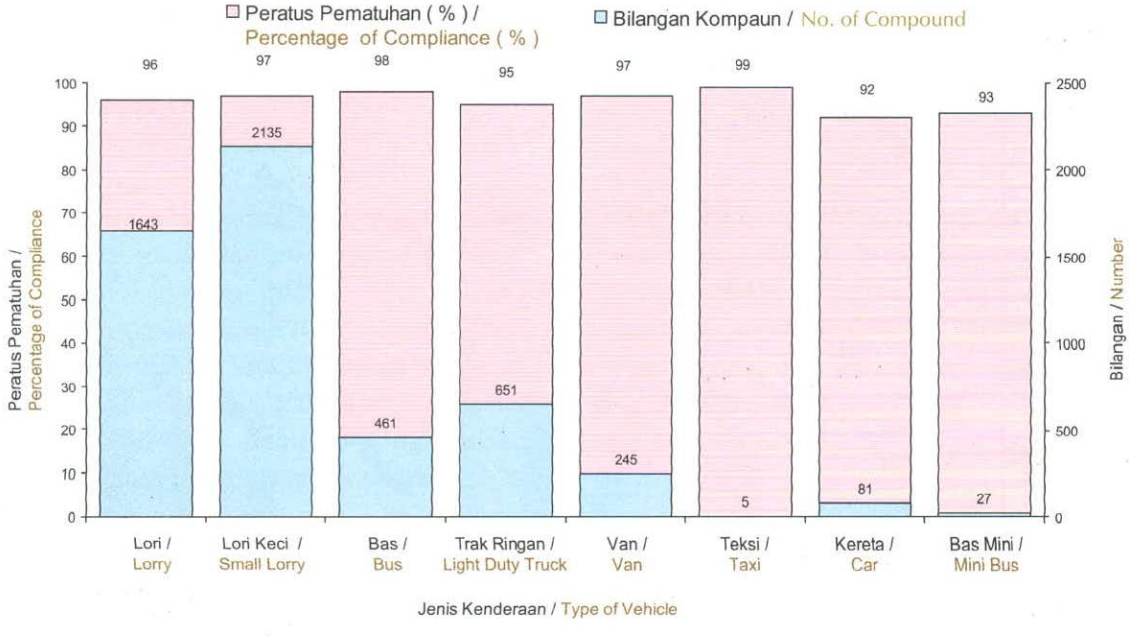


Rajah 4.13 Malaysia : Bilangan Kenderaan Bermotor Mengikut Negeri, 2006

Figure 4.13 Malaysia : Number of Motor Vehicles by State, 2006

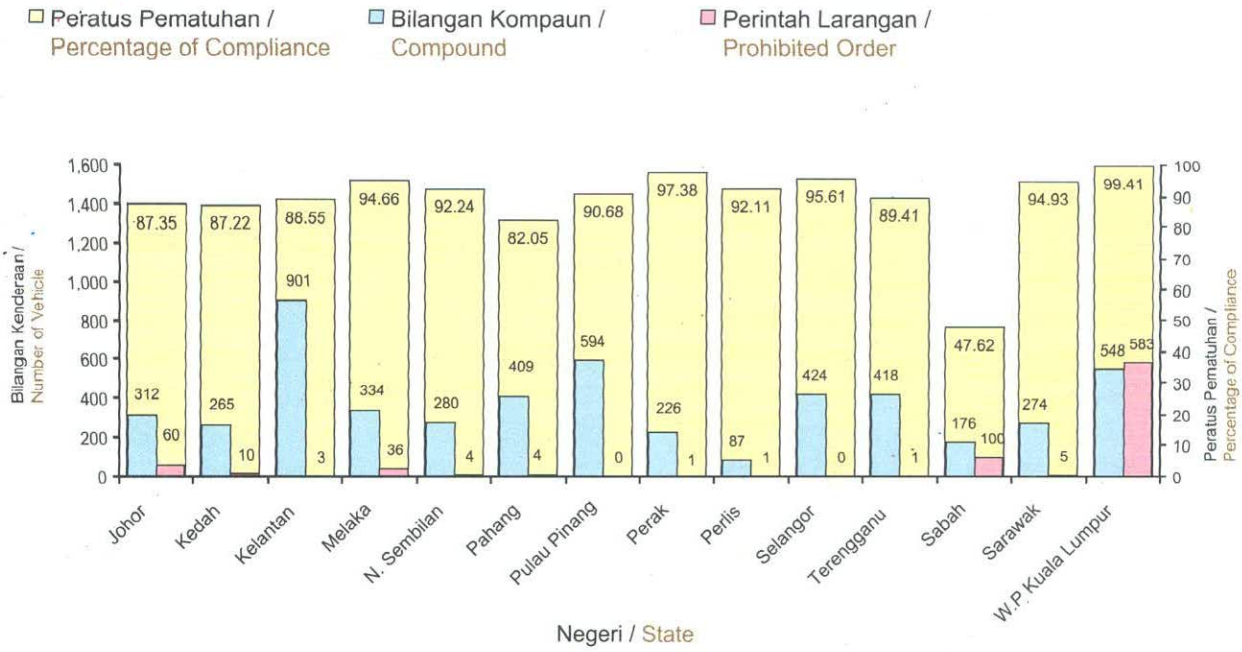
Rajah 4.14 JAS : Penguatkuasaan Pelepasan Asap Hitam Kenderaan Diesel, Kompaun dan Peratus Pematuhan, 1996 - 2006

Figure 4.14 DOE : Enforcement of Vehicular Black Smoke Emission, Compounds and Percentage of Compliance, 1996 - 2006



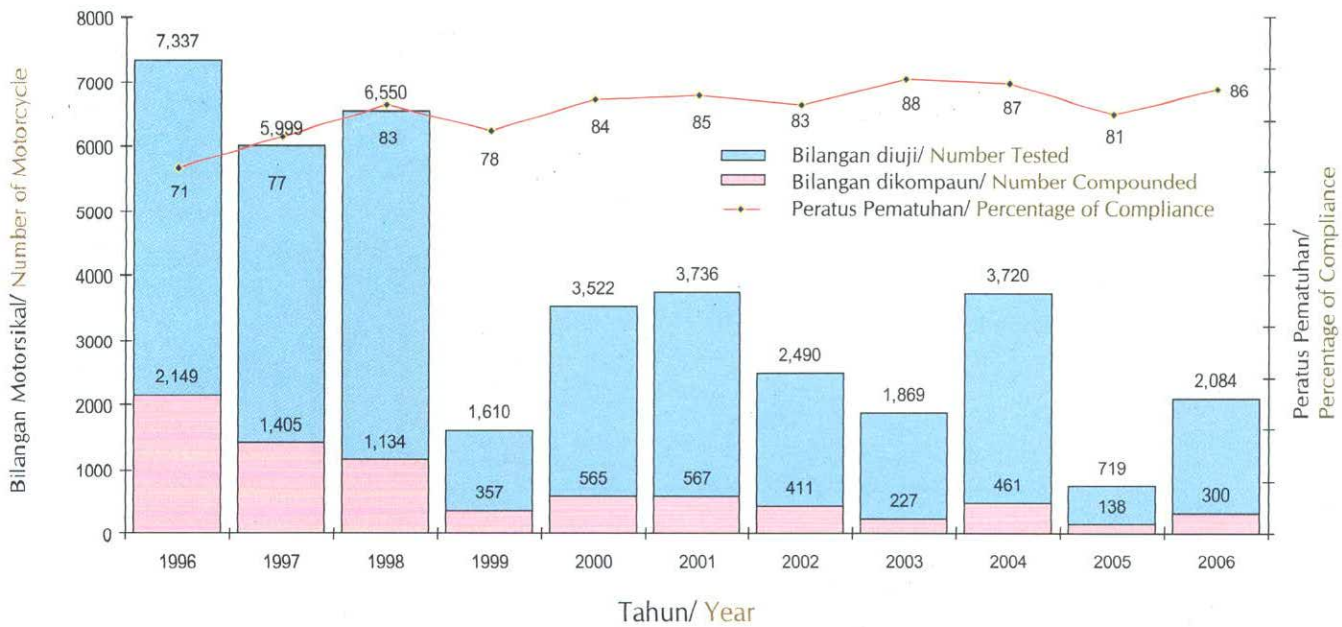
Rajah 4.15 JAS : Penguatkuasaan Pelepasan Asap Hitam Kenderaan Diesel , Bilangan Saman dan Peratus Pematuhan Mengikut Jenis Kenderaan, 2006

Figure 4.15 DOE : Enforcement of Vehicular Black Smoke Emission Compounds and Percentage of Compliance by Vehicle Type, 2006



Rajah 4.16 JAS : Penguatkuasaan Pelepasan Asap Hitam Kenderaan, Bilangan Kenderaan Dikompaun. Perintah Larangan dan Peratus Pematuhan Mengikut Negeri, 2006

Figure 4.16 DOE : Enforcement of Vehicular Black Smoke Emission, Number of Compounds, Prohibition Orders and Percentage of Compliance by State, 2006



Rajah 4.17 JAS : Penguatkuasaan Pelepasan Bunyi Bising Motosikal, 1996-2006

Figure 4.17 DOE : Enforcement of Motorcycle Noise Emission, 1996-2006

TINDAKAN UNDANG-UNDANG
LEGAL ACTION

Pendakwaan

Pada tahun 2006, sejumlah 362 kesalahan telah disabitkan oleh mahkamah yang melibatkan denda sebanyak RM 2,750,700.00 (Rajah 4.18 dan 4.19). Daripada jumlah tersebut, sebanyak 165 (46%) kes melibatkan kesalahan bagi pencemaran udara daripada pelepasan kenderaan bermotor melebihi had yang ditetapkan di bawah Seksyen 22(1), AKAS 1974 dengan jumlah denda sebanyak RM 302,600.00. Sebanyak 75 (21%) kes disabitkan kesalahan mencemar perairan daratan melalui pelepasan effluen melebihi had yang ditetapkan di bawah Seksyen 25(1) AKAS 1974 dengan jumlah denda sebanyak RM 1,419,000.00.

Prosecution

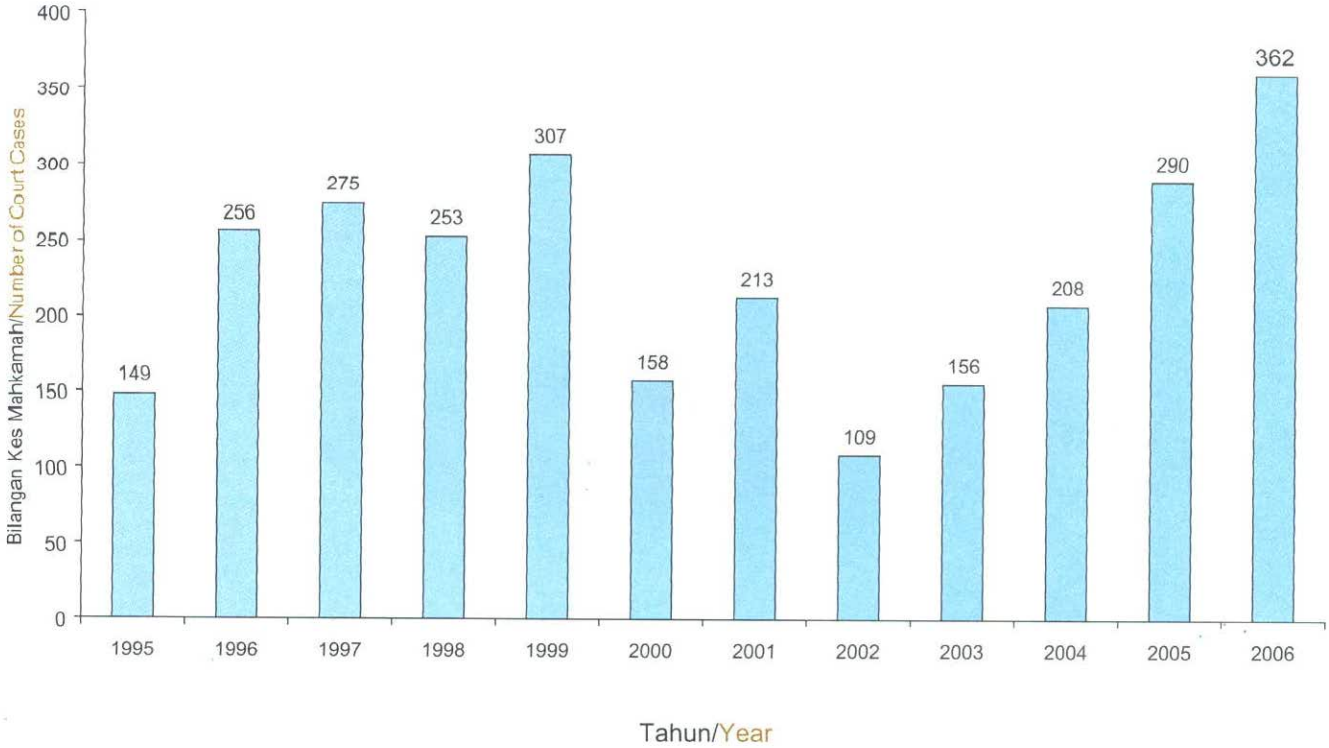
In 2006, a total of 362 environmental offences were prosecuted and fined a total of RM 2,750,700.00 (Figure 4.18 and 4.19). Out of this total, 165 (46%) cases involved offences for motor vehicular emissions above the stipulated standards under Section 22(1) of the EQA 1974 and fined a total of RM 302, 600.00. For polluting inland waters by effluent discharges above the stipulated standards under Section 25(1) of the EQA 1974, 75 (21%) cases were prosecuted and fined a total of RM 1,419,000.00.

Kompaun

Sejumlah 7,244 kompaun telah dikeluarkan pada tahun 2006 kepada premis dan syarikat untuk pelbagai kesalahan di bawah AKAS, 1974. Daripada jumlah tersebut, sebanyak 5,277 (72.9%) kompaun adalah kesalahan di bawah Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Dari Enjin Diesel) 1996, 897 (12.4%) kompaun adalah kesalahan di bawah Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005, 539 (7.4%) kompaun melibatkan kesalahan di bawah Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978, 507 (7.0%) kompaun untuk kesalahan di bawah Seksyen 29A, AKAS 1974 dan sebanyak 24 (0.3%) kompaun pula bagi kesalahan di bawah Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan dari Enjin Petrol) 1996 (Rajah 4.20, 4.21 dan 4.22).

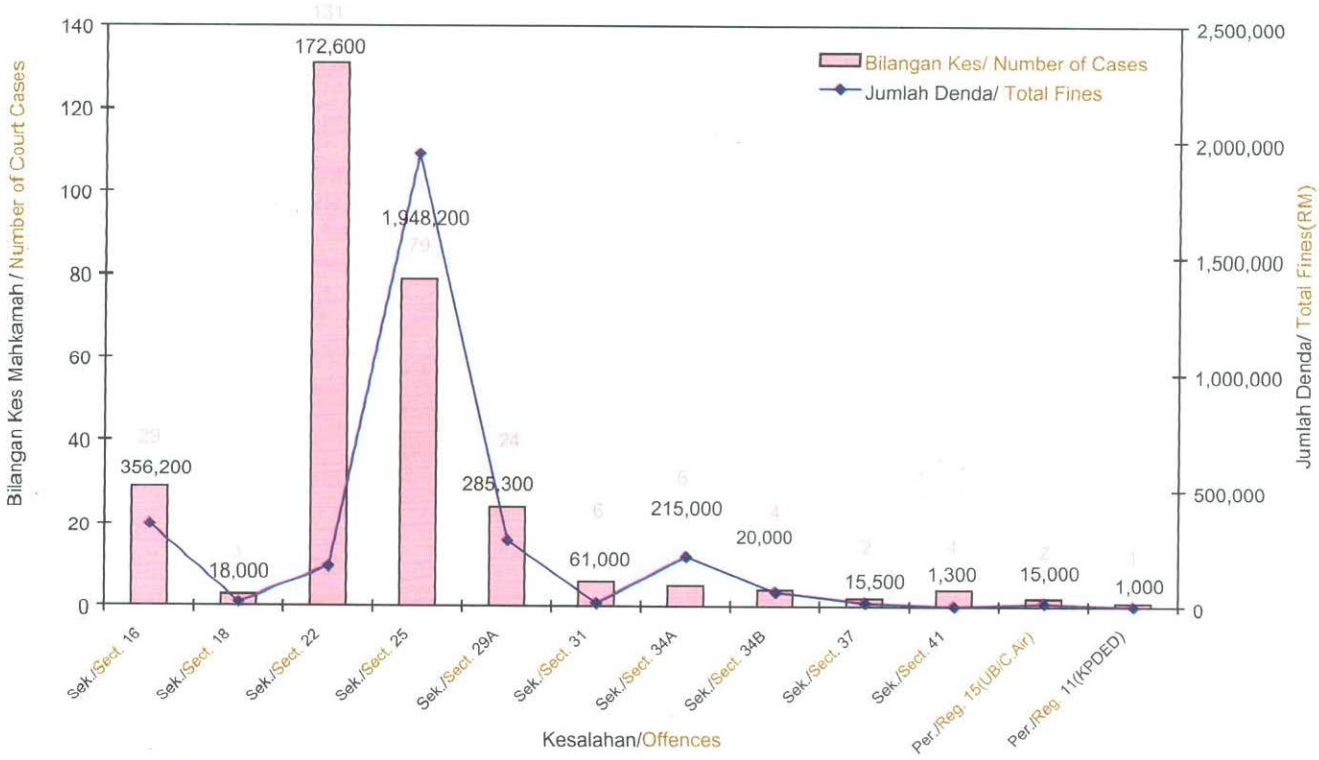
Compounds

A total of 7,244 compounds were issued in 2006 against premises and companies for various offences under EQA, 1974. Out of this total, 5,277 (72.9%) were offences under the Environmental Quality (Control of Emission from Diesel Engine) Regulations 1996; 897 (12.4%) were offences under Environmental Quality (Scheduled Wastes) Regulations 2005, 539 (7.4%) were offences under the Environmental Quality (Clean Air) Regulations 1978; 507 (7.0%) were offences under Section 29A of EQA 1974; and 24 (0.3%) were offences under the Environmental Quality (Control of Emission from Petrol Engine) Regulations 1996 (Figures 4.20, 4.21 and 4.22).



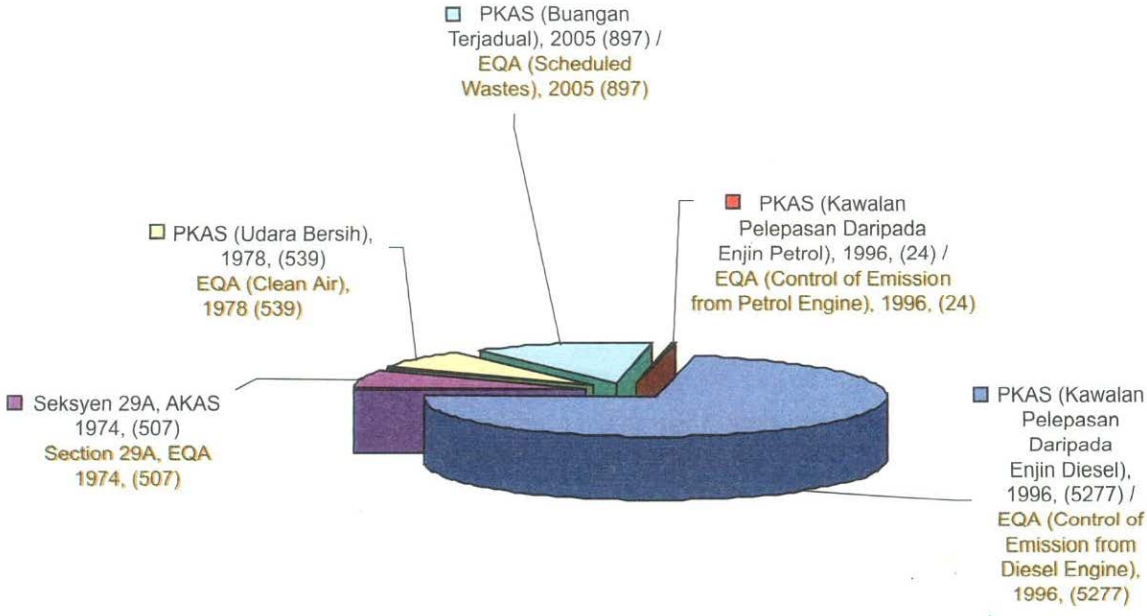
Rajah 4.18 JAS : Bilangan Kes Mahkamah, 1995-2006

Figure 4.18 DOE : Number of Court Cases, 1995-2006



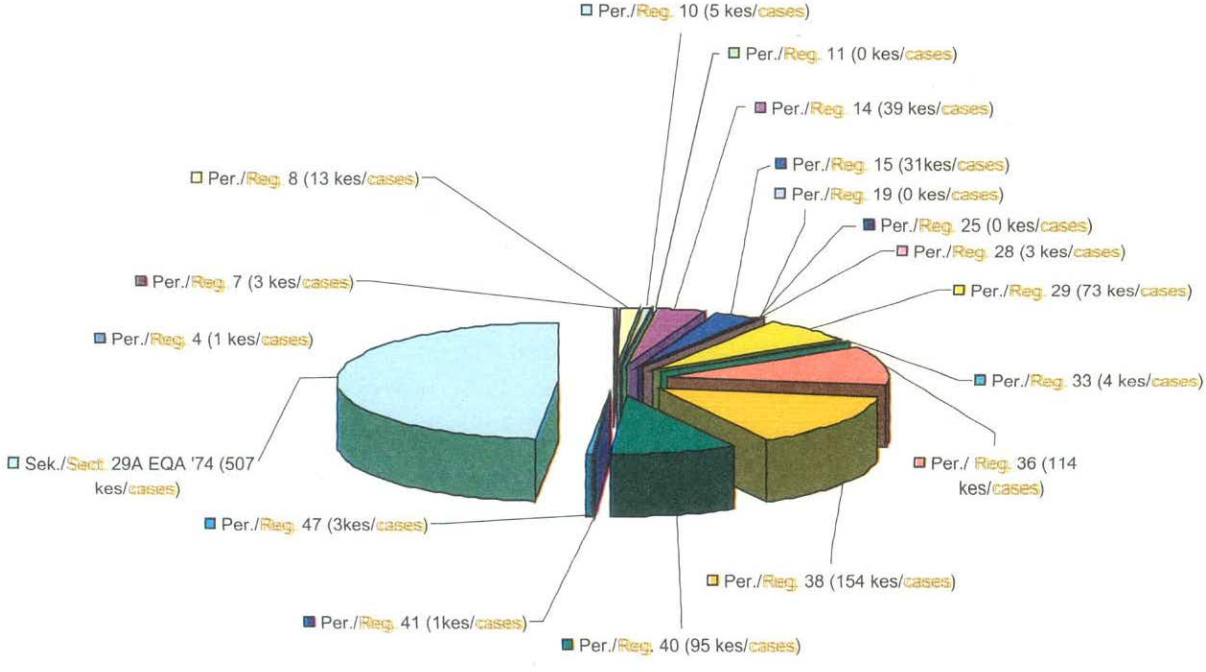
Rajah 4.19 JAS : Bilangan Kes Mahkamah dan Jumlah Denda, 2006

Figure 4.19 DOE : Number of Court Cases and Fines Collected, 2006



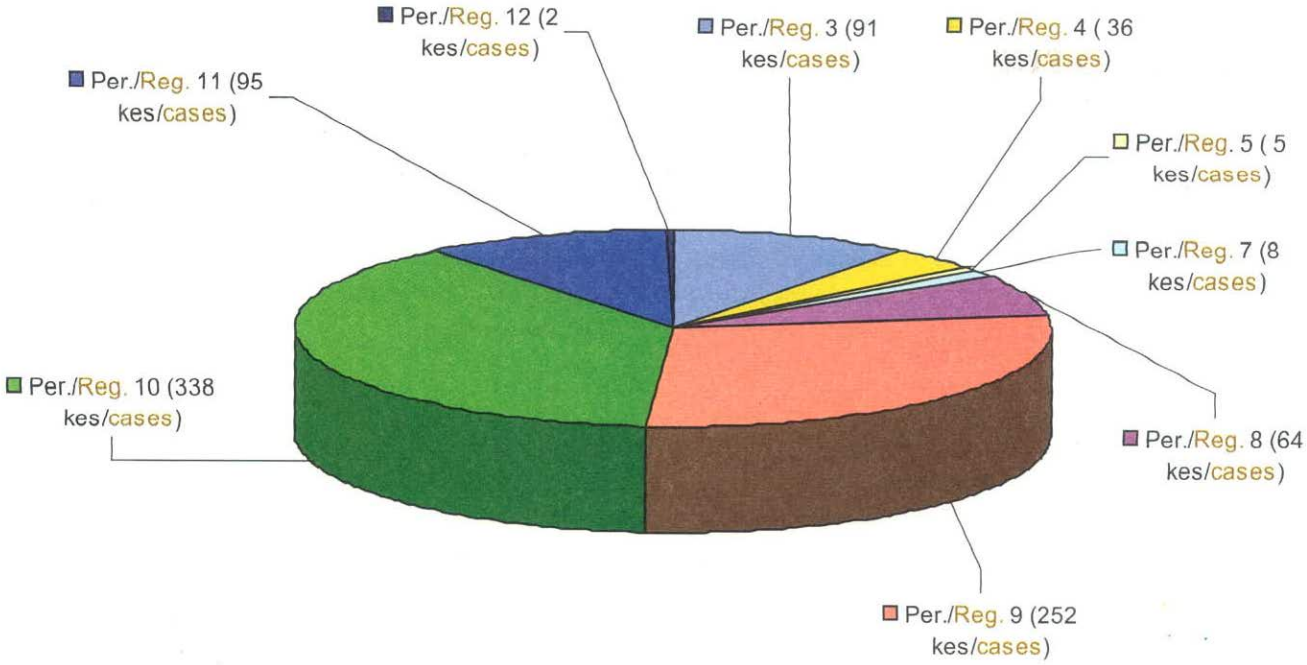
Rajah 4.20 JAS : Bilangan Kompaun Yang Diterima oleh JAS, 2006

Figure 4.20 DOE : Number of Compounds Received by DOE, 2006



Rajah 4.21 JAS : Kompaun di bawah Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978 dan Seksyen 29A AKAS 1974; 2006

Figure 4.21 DOE : Compounds under Environment Quality (Clean Air) Regulations 1978 and Section 29A EQA 1974; 2006



Rajah 4.22 JAS : Kompaun Di Bawah Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2006
Figure 4.22 DOE : Compounds Under Environment Quality (Scheduled Wastes) Regulations 2006

MAKLUMBALAS TERHADAP PENGADUAN AWAM
RESPONSE TO PUBLIC COMPLAINTS

Pada tahun 2006, sejumlah 4,774 aduan pencemaran alam sekitar telah diterima oleh Jabatan Alam Sekitar (Rajah 4.23). Daripada jumlah aduan, sebanyak 4,625 kes aduan telah diambil tindakan oleh pejabat JAS Negeri. Sementara 1,590 kes adalah di luar bidangkuasa JAS dan telah dirujuk kepada agensi lain yang berkaitan.

Selangor menerima aduan yang tertinggi iaitu sebanyak 1,018 (23%) kes, diikuti oleh Wilayah Persekutuan Kuala Lumpur; 498 (10.4%) kes dan Pulau Pinang sebanyak 478 (10%) kes. Perlis menerima aduan yang paling sedikit; iaitu 47 kes dan diikuti dengan Wilayah Persekutuan Labuan; sebanyak 43 kes (Rajah 4.24).

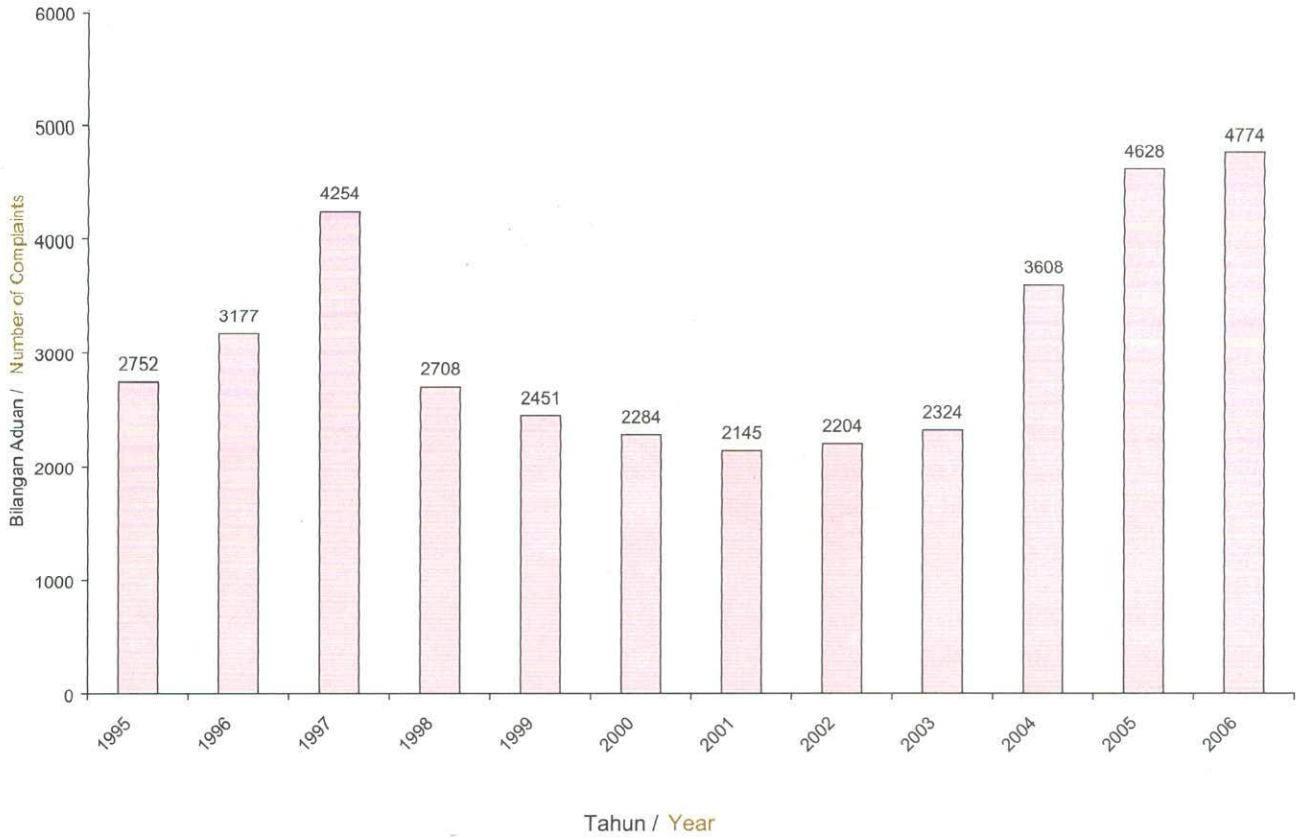
Seperti tahun-tahun yang sebelumnya, bilangan aduan pencemaran yang tertinggi adalah berkaitan pencemaran udara sebanyak 3,383 (71%) kes, 557 (12%) kes berkaitan pencemaran air, 180 (3.8%) kes berkaitan pencemaran bunyi, 191 (4%) kes berkaitan pelupusan haram buangan terjadual, enam (6) (0.1%) kes berkaitan pencemaran tanah, sebanyak 23 (0.53%) kes berkaitan tumpahan minyak dan sebanyak 434 (9.1%) kes-kes lain (Rajah 4.25).

The Department of Environment received 4,774 environmental pollution complaints in 2006 (Figure 4.23). Out of this total number, 4,625 cases were handled by the State DOE Offices. Another 1,590 cases outside the jurisdiction of DOE were referred to other relevant agencies.

Selangor recorded the highest number of complaints received 1,018 (23%); followed by the Federal Territory of Kuala Lumpur 498 (10.4%); and Pulau Pinang recorded 478 (10%). Perlis recorded the least number of complaints 47 followed by Federal Territory of Labuan 43 (Figure 4.24).

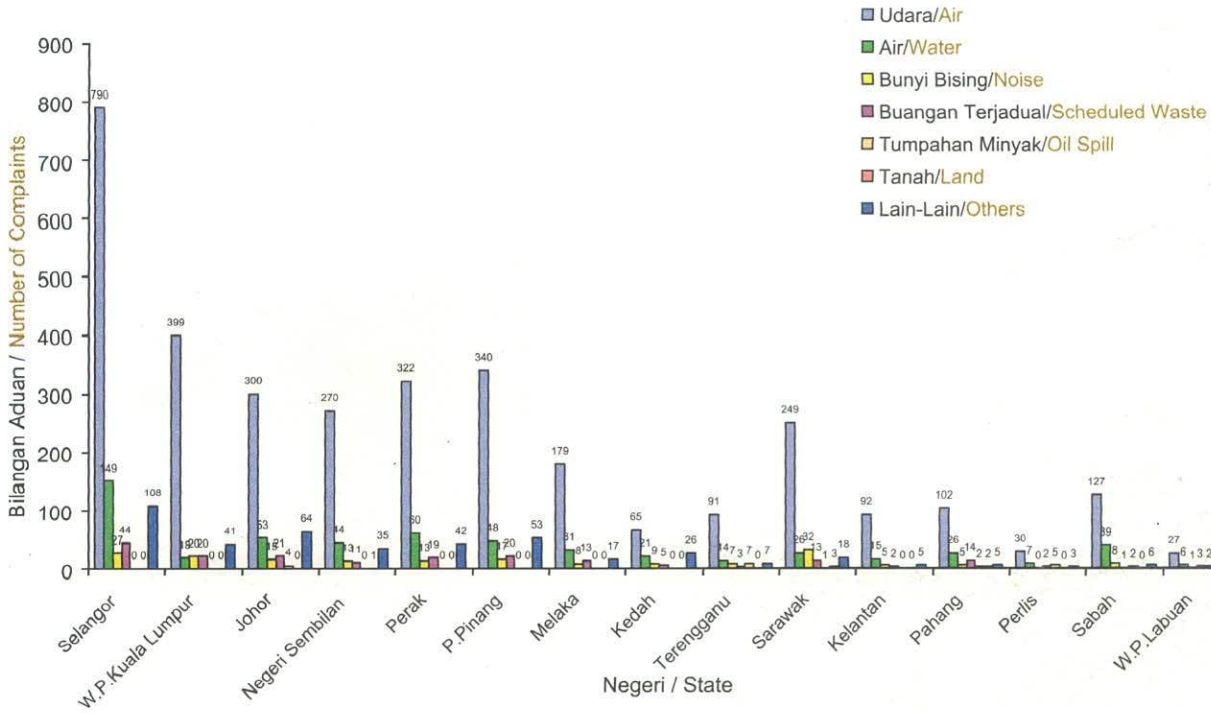
As in the previous years, most of the complaints received pertained to air pollution, 3,383 (71%); followed by water pollution, 557 (12%); 180 (3.8%) noise pollution; 191 (4%) illegal dumping of scheduled or toxic wastes; six (6) (0.1%) land pollution, 23 (0.5%) oil spillage and 434 (9.1%) others (Figure 4.25).

Pembakaran Terbuka
Open Burning



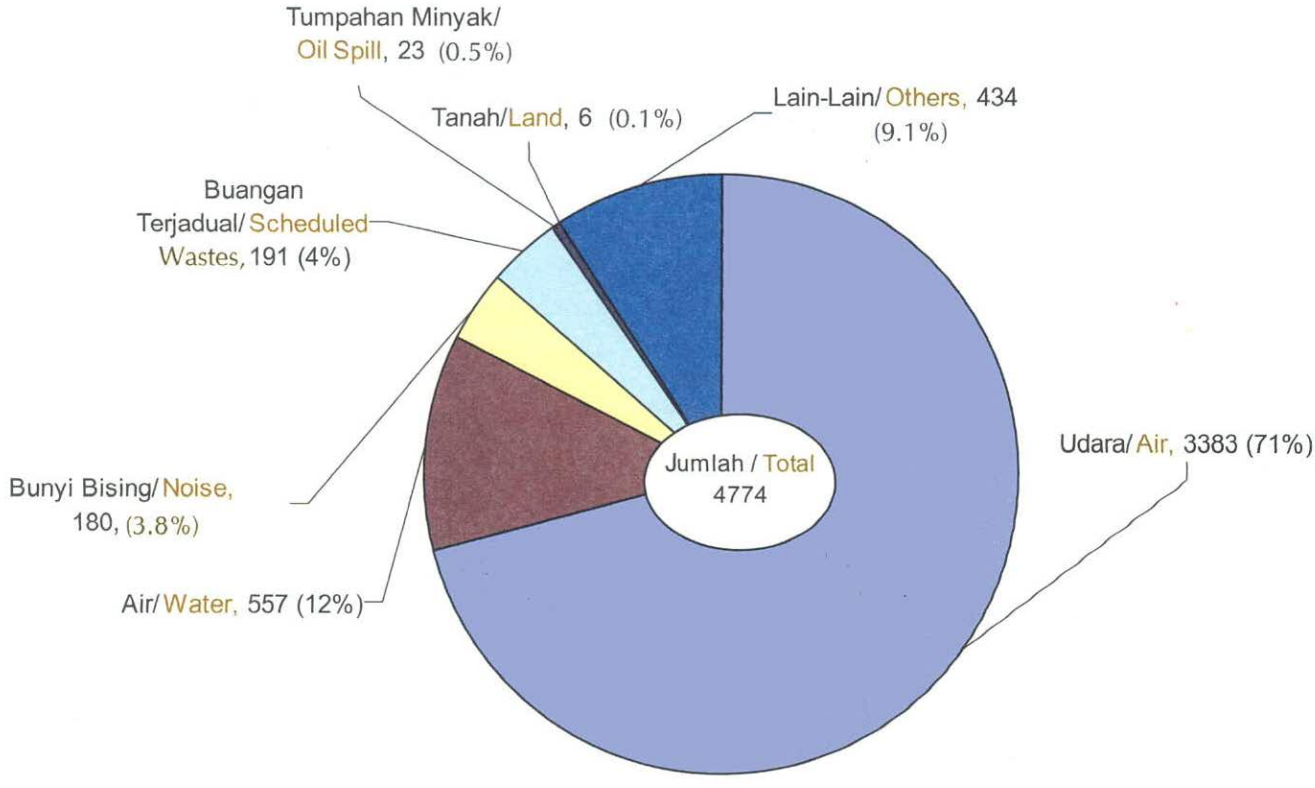
Rajah 4.23 JAS : Kes Aduan Pencemaran Yang Diterima, 1995 - 2006

Figure 4.23 DOE : Environmental Complaints Received, 1995 - 2006

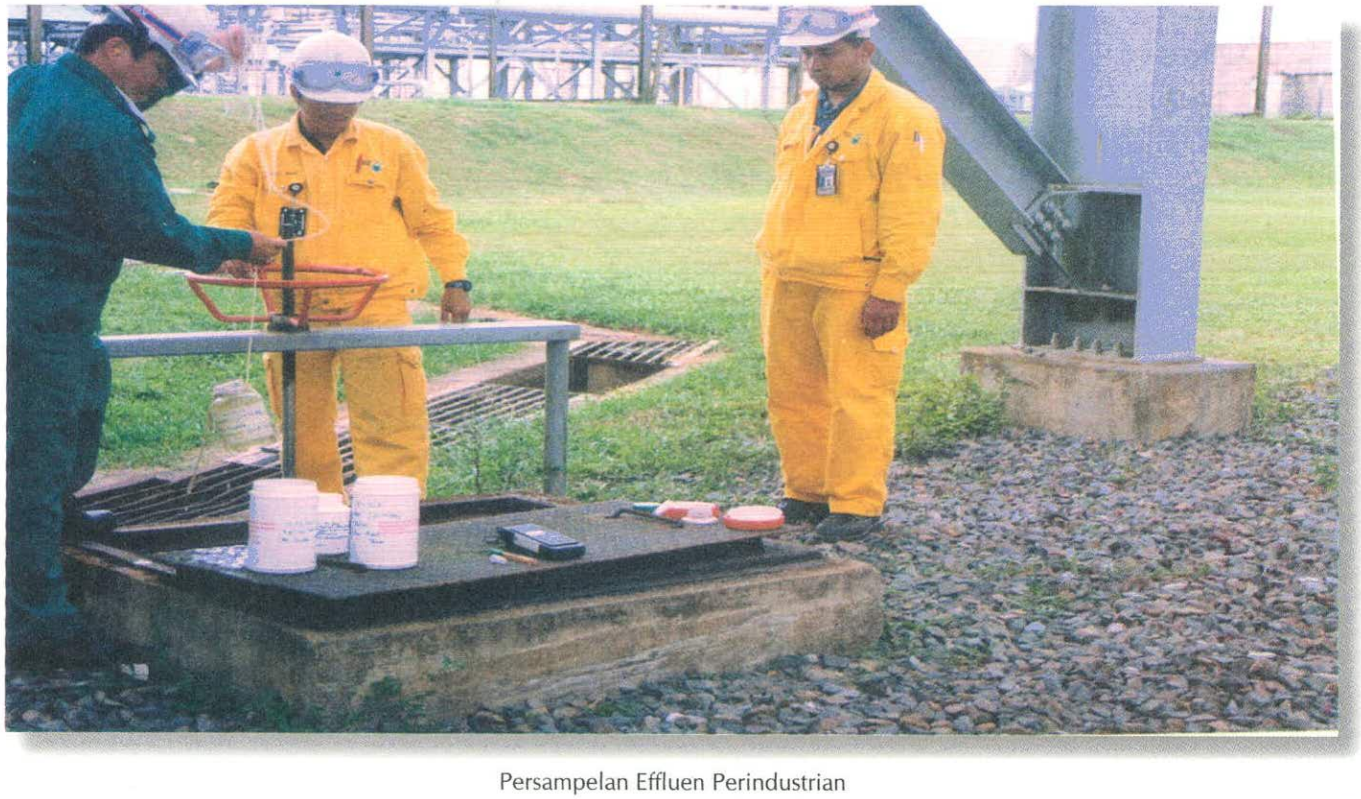


Rajah 4.24 JAS : Bilangan dan Jenis Aduan Pencemaran Mengikut Negeri, 2006

Figure 4.24 DOE : Number and Types of Environmental Complaints by State, 2006



Rajah 4.25 JAS : Jenis Aduan Pencemaran, 2006
Figure 4.25 DOE : Type of Complaints, 2006



Persampelan Effluen Perindustrian
Sampling of Industrial Effluent