BAB 4 / CHAPTER 4

PENGAWASAN KUALITI UDARA
AIR QUALITY MONITORING

Malaysia mempunyai 51 buah rangkaian stesen pengawasan kualiti udara yang ditempatkan di seluruh negara bagi memantau sebarang perubahan ketara kepada status kualiti udara sesuatu tempat atau kawasan yang mungkin memberi kesan kepada kesihatan awam dan alam sekitar.

Malaysia's air quality monitoring network consists of 51 stations that are located throughout the country to monitor and to detect any significant change in the air quality that can contribute to the negative impact to human health and the environment.

Lokasi-lokasi yang strategik (**Peta 4.1** dan **4.2**) dipilih bagi penempatan stesen-stesen pengawasan kualiti udara ini sejajar dengan objektif-objektif program pengawasan yang spesifik. Bagi memastikan tahap pendedahan pencemar udara kepada orang awam sentiasa diawasi, kebanyakan penempatan stesen diutamakan dalam kawasan perumahan dan selebihnya ditempatkan dalam kawasan industri dan kawasan yang sibuk dengan trafik.

These monitoring stations are strategically located (**Map 4.1** and **4.2**) to meet specific monitoring objectives. Most stations are located in residential areas to ensure the air quality exposed to the public is continuously monitored. The rest of the stations are located within industrial areas and areas with high traffic volume.

Rangkaian stesen pengawasan kualiti udara ini turut dilengkapi dengan stesen-stesen pengawasan kualiti udara manual yang ditempatkan di 21 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 diukur setiap enam (6) hari menggunakan alat "High Volume Samplers".

The National Air Quality Monitoring Network is also complemented by manual air quality monitoring stations located at 21 different sites. At these sites, total suspended particulate, particulate matter (PM_{10}) and several heavy metals including lead are measured at intervals of six (6) days using "High Volume Samplers".

Status Kualiti Udara

Secara keseluruhan, status kualiti udara Malaysia pada tahun 2009 adalah di antara baik dan sederhana. Lembah Klang, Melaka, Negeri Sembilan, Johor, Sabah dan Sarawak mengalami sedikit kemerosotan berbanding pada tahun sebelumnya. Ini kerana berlaku episod jerebu jangka pendek pada bulan Jun hingga Ogos disebabkan oleh kebakaran tanah gambut dan juga pencemaran jerebu merentasi sempadan serta pengaruh dari fenomena El Nino.

Air Quality Status

The overall air quality status for Malaysia in 2009 was between good and moderate. Klang Valley, Melaka, Negeri Sembilan, Johor, Sabah and Sarawak had slightly deteriorated compared to the previous year. This was due to occurrence of short-term haze episodes from June to August which were caused mainly from peatland fires and transboundary haze pollution and as well as the influence of moderate to strong El Nino condition in the region.

Peta 4.1 Semenanjung Malaysia: Lokasi Stesen Pengawasan Udara Automatik, Semenanjung Malaysia, 2009

Map 4.1 Peninsular Malaysia: Location of Continuous Air Quality Monitoring Station, Peninsular Malaysia, 2009

Peta 4.2: Lokasi Stesen Pengawasan Kualiti Udara Berterusan (CAQM) Di Sabah & Sarawak, 2009
Map 4.2: Location of Continuous Air Quality Monitoring Station (CAQM), Sabah & Sarawak East Malaysia, 2009

PENGAWASAN BUNYI BISING AMBIEN
AMBIENT NOISE MONITORING

Punca dan Kesan Pencemaran Bunyi Bising

Pencemaran bunyi bising boleh didefinisikan sebagai bunyi atau getaran yang keterlaluan dan boleh memekakkan telinga. Pencemaran bunyi bising sering dikesan di kawasan seperti perindustrian, trafik dan projek pembangunan.

Pencemaran bunyi boleh menjejaskan kesihatan, produktiviti dan menyebabkan gangguan psikologi. Selain daripada menjadi kacauganggu terhadap masyarakat, bunyi yang disertai dengan amplitud getaran yang tinggi contohnya aktiviti seperti letupan batu dari kuari boleh mengakibatkan kemusnahan pada infrastruktur jalan dan bangunan.

Pengukuran biasanya dilakukan di lokasi punca bunyi bising seperti di kawasan yang sesak dengan trafik dan kawasan perindustrian. Selain daripada itu, pengukuran juga dilakukan di kawasan penerima bunyi seperti kawasan sensitif iaitu sekolah dan hospital, untuk menilai kesannya terhadap penerima.

Program Pengawasan Bunyi Bising Ambien Kebangsaan

Mulai Jun 2006, Jabatan Alam Sekitar (JAS) telah melaksanakan Program Pengawasan Bunyi Bising Kebangsaan. Program ini telah diteruskan sepanjang tahun 2009 dengan tujuan utama untuk mewujudkan data garis dasar bagi input pembangunan pada masa akan datang.

Pengukuran paras bunyi bising ambien tertumpu kepada tiga (3) kategori utama iaitu trafik jalanraya (18 stesen), perindustrian (11 stesen) dan kawasan sensitif seperti hospital, sekolah dan tempat ibadat (9 stesen) (**Jadual 4.1**). Bagi kes aduan, pengawasan berkala telah dijalankan oleh Pejabat JAS Negeri.

Pematuhan bunyi bising ambien adalah berdasarkan had-had yang disyorkan dalam *"The Planning Guidelines for Environmental Noise Limits and Control"* .

Sources and Effect of Noise Pollution

Noise pollution can be defined as excessive sound or vibration that would cause hearing impairment. Noise pollution often occurs in places such as industrial area, traffic and development projects.

Noise pollution has an impact on health productivity and psychology. Besides being a nuisance to 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.

Normally, measurement of noise level is carried out at source for example in areas with heavy traffic and noise from factories. The measurement could also be done at the receiver locations such as at schools and hospitals, so as to assess impacts of noise to the recipients.

National Ambient Noise Monitoring Programme

Since June 2006, the Department of Environment (DOE) had started the National Ambient Noise Monitoring Programme. The programme continued throughout 2009 with the aim of collecting baseline data as inputs to future development projects.

The ambient noise monitoring programme focused at three (3) major sources of noise: road traffic (18 stations), industrial areas (11 stations) and noise sensitive areas such as hospitals, schools and places of worship (9 stations) (**Table 4.1**). For complaint cases, periodic monitoring had also been carried out by the DOE States Officers.

Compliance to the noise level is based on the limits recommended in "The Planning Guidelines for Environmental Noise Limits and Control". Generally,

Hasil pengukuran menunjukkan kebanyakan kawasan daripada ketiga-tiga kategori mencatatkan bacaan bunyi bising melebihi garispanduan yang ditetapkan.

Satu buku panduan bertajuk "Panduan Pengukuran Bunyi Bising Ambien" juga telah diterbitkan sebagai rujukan di semua pejabat JAS Negeri.

Latihan Praktikal

Latihan praktikal berkaitan penggunaan peralatan untuk mengukur bunyi bising persekitaran bagi pegawai-pegawai JAS Negeri telah diadakan mulai pada 20 Oktober 2009 hingga 25 November 2009.

the results showed that most areas at the above three (3) categories exceeded the guideline limits.

A guidebook entitled "Guide on Ambient Noise Measurement" had been printed as a reference for DOE States Offices.

Hands-On Training

A hands – on training for DOE States officers on handling and operating of sound level meter was held from 20 October - 25 November 2009.

Jadual 4.1 JAS: Pengawasan Bunyi Bising Ambien, 2009
Table 4.1 DOE: Ambient Noise Monitoring, 2009

Kategori / Category	Lokasi / Location	Bilangan Pengukuran / No. of Measurement	Pematuhan (%) / Compliance (%)
Trafik/Traffic	**Terengganu**		
	1. Kompleks Sri Iman, Jalan Bukit Besar	34	0
	Pahang		
	1. Jalan Endau-Rompin, Tg. Gemok, Kuala Rompin	15	0
	2. KM. 4, Jalan Gambang-Kuantan, Tanah Puteh	14	0
	Selangor		
	1. Lebuhraya Persekutuan, Petaling Jaya	18	0
	Pulau Pinang		
	1. Lebuhraya Lingkaran Luar Butterworth (BORR),	6	66.7
	2. Jalan Sultan Azlan Shah	4	0
	Melaka		
	1. Lapangan Terbang Batu Berendam, Melaka	8	62.5
	Kedah		
	1. Simpang Empat Kuala, Alor Setar	33	6.1
	Sabah		
	1. Jalan UMS-Sulaman	17	0
	2. Jalan Tunku Abdul Rahman	17	0
	Kelantan		
	1. Jalan Kota Bharu-Kuala Krai	4	0
	2. Jalan Sultan Yahya Petra	4	0
	Sarawak		
	1. Bulatan Matang, Siburan	4	0
	2. Bulatan Batu 3, Jalan Kuching-Serian	4	25
	Johor		
	1. Persimpangan Pasir Gudang	2	0
	Perak		
	1. Taman Panorama	3	0

Jadual 4.1 JAS: Pengawasan Bunyi Bising Ambien, 2008
Table 4.1 DOE: Ambient Noise Monitoring, 2008

Kategori / Category	Lokasi / Location	Bilangan Pengukuran / No. of Measurement	Pematuhan (%) / Compliance (%)
Trafik/Traffic	**Putrajaya**		
	1. Presint 8	4	0
	Kuala Lumpur		
	1. Taman Seri Petaling	2	0
Industri/ Industries	**Pahang**		
	1. Kawasan Perindustrian Mentakab	14	100
	Selangor		
	1. Kawasan Perindustrian Seksyen 15, Shah Alam	18	5.6
	Pulau Pinang		
	1. Kawasan Industri Bertam – NAZA	6	100
	Kedah		
	1. Kawasan Perindustrian Bakar Arang, Sg. Petani	33	3.0
	2. Kawasan Perindustrian Bukit Kayu Hitam	30	60.0
	Sabah		
	1. Kawasan Perindustrian Hosba	3	66.7
	2. Kawasan Perindustrian Inanam	18	27.8
	Negeri Sembilan		
	1. Kilang MCIS	4	100
	2. Stesen Taman Bukit Mahkota, Kawasan Perindustrian Arab Malaysian	6	66.7
	Perlis		
	1. Taman 20, Kangar	3	0
	Sarawak		
	1. Kawasan Perindustrian Demak Laut	4	100
Pengukuran Mengikut Kategori Tanah / Measurement According to Receiving Land Use Category			
KawasanSensitif/ Sensitive Areas	**Selangor**		
	1. Hospital Tengku Ampuan Rahimah, Klang	16	0
	Pulau Pinang		
	1. Sek. Ren. Keb. Taman Senangan	2	0
	Johor		
	1. Masjid Jamek Taman Damai Jaya, Skudai	2	33.3
	2. Sek. Ren. Keb. Taman Damai Jaya, Skudai	2	0
	3. Sek. Ren. Keb. Pulai Sebatang	2	0
	4. Sek. Agama Pulai Sebatang	2	0
	5. Sek. Men. Pasir Gudang 2	4	0
	6. Masjid Jamek Pasir Gudang	4	0
	Perlis		
	1. Sek. Keb. Jalan Raja Syed Alwi	6	16.7
	2. Masjid Barakah, Jelempok	6	0

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

Latarbelakang

Malaysia yang dikategorikan sebagai Negara Artikel 5 di bawah Protokol Montreal untuk Bahan-Bahan Yang Menipiskan Lapisan Ozon telah ratifikasi Konvensyen Vienna bagi Perlindungan Lapisan Ozon dan Protokol Montreal pada 29 Ogos 1989. Sebagai negara parti kepada Protokol Montreal, Malaysia mempunyai obligasi untuk menghentikan pengimportan kloroflorokarbon (CFC), halon dan karbon tetraklorida (CTC) mulai 1 Januari 2010.

Pematuhan Terhadap Protokol Montreal

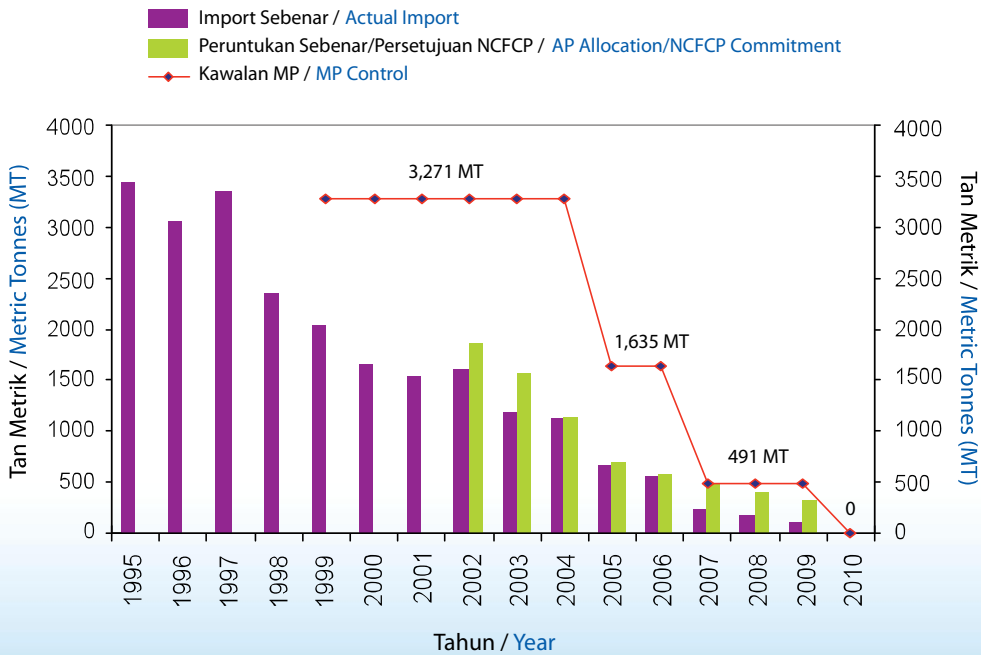
Bagi tahun 2009, peruntukan kuota yang diagihkan untuk mengimport bahan CFC ialah sebanyak 149.58 tan metrik dan pengimportan sebenar ialah sebanyak 105.2 tan metrik. Tren penggunaan CFC bagi Malaysia (sebenar dan diunjurkan) adalah seperti ditunjukkan dalam **Rajah 4.1**.

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. As a party to the Montreal Protocol, Malaysia has the obligation to stop the importation of chlorofluorocarbon (CFC), halon and carbon tetrachloride (CTC) by 1 January, 2010.

Compliance to Montreal Protocol

In 2009, the approved quota for the importation of CFC was 149.58 metric tonnes and the amount of CFC imported was 105.2 metric tonnes. Malaysia's CFC consumption trend (actual and projected) is shown in **Figure 4.1**.



Rajah 4.1 JAS: Tren Penggunaan CFC Di Malaysia, 1995-2010
Figure 4.1 DOE: Malaysia CFC Consumption Trend, 1995-2010

Pelancaran “Education Packs” oleh Y.Bhg. Dato’ Hajah Rosnani Ibarahim, Ketua Pengarah Alam Sekitar di Majlis Sambutan Hari Ozon Antarabangsa

Launching of Education Packs by Y.Bhg. Dato’ Hajah Rosnani Ibarahim, Director General of Environment at the International Ozone Day Celebration

Pelan Kebangsaan Penghapusan CFC (NCFCP) 2002 – 2010

Di bawah Pelan NCFCP 2002 – 2010, baki sebanyak 2,125 tan "ozone depleting potential (ODP)" (termasuk Halon dan Metil Bromid) akan dihapuskan dalam tempoh sembilan tahun. Peruntukan tambahan sejumlah USD 11.5 juta (RM43.7 juta) telah diluluskan oleh "Multilateral Ozone Trust Fund" (MLF) melalui Bank Dunia. Sehingga kini, terdapat beberapa projek bantuan teknikal dan program-program industri yang dijalankan oleh JAS, selaku agensi pelaksana, termasuklah:

i. Program *CFCs-Metered Dosed Inhaler (MDIs);*
ii. Program *Mobile Air Conditioning (MAC) Inspection* oleh PUSPAKOM;
iii. Program Latihan ODS Kastam (COTP);
iv. Program Sektor Servis MAC;
v. Program Sektor Bahan Pelarut;
vi. Program Sektor Servis Pendingin;
vii. Program Sektor Busa; dan
viii. Program Kesedaran Awam.

Sepanjang tahun 2009, sejumlah USD814,394 (RM2,768,939) dana telah dibelanjakan bagi pelaksanaan projek-projek di bawah program ini seperti tersenarai dalam **Jadual 4.3.**

National Chlorofluorocarbons Phase-out Plan (NCFCP) 2002 - 2010

Under the NCFCP 2002 – 2010 the remaining 2,125 tonnes of ozone depleting potential (including Halon and Methyl Bromide) 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 (MLF) through the World Bank. To date, various on-going technical assistance projects and industrial programmes undertaken by DOE as the implementing agency include the following:

i. CFCs-Metered Dosed Inhaler (MDIs) Programme;
ii. Mobile Air Conditioning (MAC) Inspection Programme by PUSPAKOM;
iii. Custom-ODS Training Programme (COTP);
iv. MAC Servicing Sector Programme;
v. ODS Solvent Sector Programme;
vi. Refrigeration Service Sector Programme;
vii. Foam Sector Programme; and
viii. Public Awareness Programme.

In 2009, a total of USD814,384 (RM2,768,939) funds were utilized for the implementation of projects as tabulated in **Table 4.3.**

Jadual 4.3 JAS : Aktiviti-Aktiviti Kesedaran NCFCP, 2009
Table 4.3 DOE : Public Awareness Activities NCFCP, 2009

Tarikh / Date	Aktiviti & Program / Activities & Programmes	Tempat / Venue
9 Jan / Jan 9	Roadshow Seminar MDI / MDI Seminar Roadshow	Pulau Pinang
16 Jan / Jan 16	Roadshow Seminar MDI / MDI Seminar Roadshow	Perak
5 Feb / Feb 5	Roadshow Seminar MDI / MDI Seminar Roadshow	Kedah & Perlis
10 Feb / Feb 10	Roadshow Seminar MDI / MDI Seminar Roadshow	Kelantan
11 Feb / Feb 11	Roadshow Seminar MDI / MDI Seminar Roadshow	Terengganu
12 Feb / Feb 12	Roadshow Seminar MDI / MDI Seminar Roadshow	Pahang
20 Feb / Feb 20	Roadshow Seminar MDI / MDI Seminar Roadshow	Johor
14-15 Feb / Feb 14-15	Pengumuman terakhir tentang penutupan NCFCP di surat khabar/ Final Announcement on NCFCP Closing	The Star, Sin Chew Jit Poh, Mingguan Malaysia
5 Mac, 1, 2 & 12 Ogos / March 5, Aug 1, 2 & 12	Program Kesedaran Perlindungan Ozon Peringkat Negeri Pahang/ Awareness Programme on Ozone Protection at State Level-Pahang	Pahang
13-15 Mac / March 13-15	Kem Kesedaran Alam Sekitar (Slot: Perlindungan Lapisan Ozon)/ Environmental Awareness Camp (Slot: Ozone Layer Protection)	Telok Batik, Perak

Jadual 4.3 JAS : Aktiviti-Aktiviti Kesedaran NCFCP, 2009
Table 4.3 DOE : Public Awareness Activities NCFCP, 2009

Tarikh / Date	Aktiviti & Program / Activities & Programmes	Tempat / Venue
14-15 Mac / March 14-15	Pameran Perlindungan Lapisan Ozon sempena MY Career & Education Fair / Exhibition on Ozone Layer Protection during MY Career & Education Fair	KLCC
15 Mac-1 Dis / March 15 - Dec 1	Iklan di dalam keretapi tentang perlindungan ozon In-Train Panel Advertisement on Ozone Protection	Kelana Jaya Line (PUTRA), Ampang Line (STAR)
9-11 April, 15 Julai / April 9-11, July 15	Program Kesedaran Perlindungan Ozon Peringkat Negeri Melaka/ Awareness Programme on Ozone Protection at State Level- Melaka	Melaka
23-27 April / April 23-27	Pameran Perlindungan Lapisan Ozon sempena Expo Cintai Barangan Malaysia / Exhibition on Ozone Layer Protection during "Expo Cintai Barangan Malaysia'	Kuala Terengganu
4 Mei / May 4	Pameran Perlindungan Lapisan Ozon Sempena Perasmian RAS dan sambutan Hari Alam Sekitar Sedunia / Exhibition on Ozone Layer Protection during Launching of RAS and celebration of World Environment Day	Muar, Johor
Jun-Oktober / June-October	Sambutan Hari Ozon Antarabangsa (Iklan perlindungan di televisyen -Pakej Media Prima) / International Ozone Day Celebration (TV Advertisement – Media Prima Package)	TV3, NTV7, TV8 & TV9
3-5 Jun / June 3-5	Pengumuman terakhir tentang penutupan projek NCFCP dan pembukaan projek HCFC sempena Hari Alam Sekitar Sedunia (5 Jun) / Final Announcement on Closing of NCFCP Project and Opening of HCFC Project on World Environment Day (5 June)	NST, Sin Chew Jit Poh, Utusan Malaysia
2 Julai / July 2	Seminar Penghapusan ODS dalam sektor "Chiller" di kalangan ahli Persatuan Hotel Malaysia (MAH) / Seminar on ODS Phase-Out for Chiller Sector among Malaysia Association of Hotels (MAH)	Hotel Corus, KL
30 Julai, 20 & 27 Okt / July 30, Oct 20 & 27	Program Kesedaran Perlindungan Ozon Peringkat Negeri Pulau Pinang / Awareness Programme on Ozone Protection at State Level- Pulau Pinang	Pulau Pinang
31 Julai / July 31	Program Kesedaran Perlindungan Ozon Peringkat Negeri Kedah/ Awareness Programme on Ozone Protection at State Level- Kedah	Kedah
31 Julai, 13-15 Nov / July 31, Nov 13-15	Program Kesedaran Perlindungan Ozon Peringkat Negeri Sabah/ Awareness Programme on Ozone Protection at State Level- Sabah	Sabah
1 Ogos-30 Sept / Aug 1-Sept 30	Iklan LCD di Pasaraya Carrefour, KLIA & LCCT (Balai Berlepas)/ LCD Advertisement at Carrefour Hypermarket, KLIA & LCCT (Departure Hall)	Rangkaian Pasaraya Carrefour di seluruh Malaysia, KLIA & LCCT / Carrefour Hypermarket all over Malaysia, KLIA & LCCT
12 Ogos / Aug 12	Program Kesedaran Perlindungan Ozon Peringkat Negeri Sembilan / Awareness Programme on Ozone Protection at State Level- Negeri Sembilan	Negeri Sembilan
16 Ogos-14Okt / Aug 16-Oct 14	Iklan di badan Bas tentang Perlindungan Lapisan Ozon dan Hari Ozon Antarabangsa. / Bus Advertisement on Ozone Layer Protection and International Ozone Day	Lembah Klang

Jadual 4.3 JAS : Aktiviti-Aktiviti Kesedaran NCFCP, 2009
Table 4.3 DOE : Public Awareness Activities NCFCP, 2009

Tarikh / Date	Aktiviti & Program / Activities & Programmes	Tempat / Venue
21 Ogos, 9 & 21 Dis / Aug 21, Dec 9 & 21	Pameran Perlindungan Ozon sempena Sambutan Hari Kemerdekaan dan Hari Bersama Pelanggan / Exhibition on Ozone Protection during Malaysia Independence Day and Clients Day	Dewan Marjan & Dewan Baiduri, NRE
1-30 Sept / Sept 1-30	Iklan (Infocapsule) di Radio selama sebulan sepanjang bulan Sept / Infocapsule advertisement on Radio for month of September	RadioTraxx fm, National fm, Minnal fm, Muzik fm, Ai fm
12-18 Sept / Sept 12-18	Iklan Hari Ozon Antarabangsa di papan iklan utama digital / Advertisement on International Ozone Day at main digital billboard	Sekitar Semenanjung Malaysia Peninsular Malaysia
12-18 Sept / Sept 12-18	Iklan 30 saat di TV (spot buy) semasa Buletin Utama / 30 seconds Advertisement on TV (spot buy) during Prime News	TV3
15-17 Sept / Sept 15-17	Iklan di Surat Khabar tentang Hari Ozon Antarabangsa / Newspaper advertisement on International Ozone Day	NST, Sin Chew Jit Poh, Utusan Malaysia
15-17 Sept / Sept 15-17	Pengumuman terakhir tentang Program RSS CSTP (NCFCP) / Final Announcement on RSS CSTP Programme (NCFCP)	NST, Utusan Malaysia, Sin Chew Jit Poh
16 Sep / Sept 16	Perutusan Menteri di Surat Khabar tentang Hari Ozon Antarabangsa / Minister's Message in Newspaper on International Ozone Day	The Star, Sin Chew Jit Poh, Utusan Malaysia, Borneo Post, See Hua Daily, Utusan Borneo
5 Okt / 5 Oct	Sambutan Hari Ozon Antarabangsa / International Ozone Day Celebration	Institut Perguruan Teknik, Cheras
22 Okt / 22 Oct	Program Kesedaran Perlindungan Ozon Peringkat Negeri Perlis / Awareness Programme on Ozone Protection at State Level- Perlis	Perlis
26 Okt / Oct 26	Program Kesedaran Perlindungan Ozon Peringkat Negeri Selangor / Awareness Programme on Ozone Protection at State Level- Selangor	Selangor
2 Nov / Nov 2	Program Kesedaran Perlindungan Ozon Peringkat Negeri Perak / Awareness Programme on Ozone Protection at State Level- Perak	Perak
3 & 21 Nov / Nov 3 & 21	Program Kesedaran Perlindungan Ozon Peringkat Negeri WP Labuan / Awareness Programme on Ozone Protection at State Level- FT Labuan	WP Labuan / FT Labuan
16 Nov / Nov 16	Program Kesedaran Perlindungan Ozon Peringkat Negeri Sarawak/ Awareness Programme on Ozone Protection at State Level- Sarawak	Sarawak
5-9 Nov / Nov 5-9	Pameran Perlindungan Lapisan Ozon Sempena MAPEX / Exhibition on Ozone Layer Protection during MAPEX	Johor Bahru

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. Walau bagaimanapun, kegunaan halon masih dibenarkan untuk tujuan terhad kepada sistem keselamatan kawalan kebakaran tentera dan penerbangan awam sepertimana dipersetujui di bawah Program Protokol Montreal. Sehingga tahun 2009, sebanyak 10,287 kg Halon 1211 dan sebanyak 174,206 kg Halon 1301 yang dikumpulkan disimpan di Pusat Bank Halon Kebangsaan di Kuala Kubu Bahru, Selangor. Penggunaan sebarang sistem pencegahan kebakaran yang menggunakan alternatif kepada halon perlu merujuk kepada Jabatan Bomba dan Penyelamat Malaysia untuk mendapatkan kelulusan bertulis terlebih dahulu sebelum sistem tersebut digunakan.

Halon Management

Halon is no longer used in Malaysia for new installation of fire protection system and fire extinguishers. Instead, carbon dioxide or chemical powders are now being used as alternatives. However, halon is still allowed and restricted for use in military and civil aviation fire safety protection systems, as agreed under the Montreal Protocol. Up to 2009, 10,287 kg Halon 1211 and 174,206 kg Halon 1301 were collected and stored at the National Halon Bank Centre at Kuala Kubu Bahru, Selangor. Prior written approval from the Fire and Rescue Department of Malaysia is required for usage of alternatives to halon in any new fire fighting system.

Penghapusan Metil Bromida

Tabung MLF telah menyediakan dana projek sebanyak USD 200,000 bagi bantuan teknikal penggunaan alternatif untuk menghapuskan penggunaan Metil Bromida di Malaysia di dalam aktiviti bukan kuarantin dan pra-perkapalan.

Sistem pelabelan baru diperkenalkan oleh Jabatan Pertanian untuk pengimportan metil bromida bagi kedua-dua penggunaan kuarantin dan bukan kuarantin serta kegunaan pra-perkapalan telah berkuatkuasa pada 1 Januari 2009.

Methyl Bromide Phase Out

The MLF provided a project grant of USD 200,000 for technical assistance in the usage of alternatives to phase out all remaining non-quarantine and pre-shipment (non-QPS) uses of Methyl Bromide in Malaysia.

The new labeling introduced by the Department of Agriculture for the importation of methyl bromide for both quarantine and pre-shipment and non-quarantine and pre-shipment came into force on 1 January 2009.

Penggunaan ODS dan Permit Kawalan Import

Kaedah utama yang dilaksanakan untuk mengawal penggunaan ODS di negara ini ialah melalui Sistem Permit Import (AP). Jumlah kuantiti ODS yang dibenarkan diimport setahun ditetapkan oleh Kementerian Perdagangan Antarabangsa dan Industri setelah perundingan dengan JAS dan Jabatan Kastam. Sebanyak enam (6) syarikat yang berdaftar telah diberi kuota import bahan CFC bagi tahun 2009, berjumlah 149.58 tan metrik.

Consumption of ODS and Import Control Permit

The main instrument of control for 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. In 2009, a total of 149.58 metric tonnes of import quota for CFC were given to six (6) registered companies.

Program dan Kempen Kesedaran

Sempena sambutan Hari Ozon Antarabangsa iaitu pada 16 September 2009, pengumumannya telah dibuat di stesen televisyen utama dari bulan Mac sehingga Disember 2009. Tema Hari Ozon 2009 ialah ***Universal Participation: Ozone Protection Unifies the World***.

Sempena sambutan tersebut, JAS telah melancarkan dua (2) buah buku terbitan UNEP bertajuk *'Ozonaction Education Pack for Secondary Schools: Teacher's Book'* dan *'Ozonaction Education Pack for Secondary Schools: Student's Book'* di Institut Pendidikan Guru Malaysia, Kampus Pendidikan Teknik, Cheras, Kuala Lumpur pada 5 Oktober 2009.

Risalah-risalah mengenai perlindungan lapisan ozon dan penghapusan bahan pemusnah ozon diterbitkan termasuk Buletin Ozon. Seminar Penghapusan Bahan Pemusnah Ozon bagi pengusaha-pengusaha hotel diadakan pada Julai 2009.

Perincian program kesedaran yang dijalankan sepanjang tahun 2009 disenaraikan di **Jadual 4.3**, manakala **Jadual 4.4** menyenaraikan mesyuarat-mesyuarat berkaitan di peringkat serantau dan antarabangsa yang dihadiri oleh pegawai JAS.

Awareness Programmes and Campaigns

In conjunction with the International Ozone Day Celebration on 16 September 2009, announcements were made on television from March to December 2009. The theme for the 2009 Ozone Day was: **Universal Participation: Ozone Protection Unifies the World.**

On this occasion, DOE launched two (2) books published by UNEP entitled "Ozonaction Education Pack for Secondary Schools: Teacher's Book"; and Ozonaction Education Pack for Secondary Schools: Student's Book at *Institut Pendidikan Guru Malaysia, Kampus Pendidikan Teknik*, Cheras, Kuala Lumpur on 5 October 2009.

Pamphlets on ozone layer protection and the ozone depleting substances phase-out plan as well as the Ozone Bulletin were published. Seminar on the Ozone Depleting Substances Phase-Out for hotel operators was held in July 2009.

The list of awareness programmes carried out in 2009 is shown in **Table 4.3**. Various meetings at regional and international level attended by the DOE officers are listed in **Table 4.4**.

Y.B. Tan Sri Joseph Kurup, Timbalan Menteri Sumber Asli dan Alam Sekitar, Menyampaikan Kenyataan Malaysia di Mesyuarat Parti Protokol Montreal Ke 21 di Port Ghalib, Egypt, 4-8 November 2009
Y.B. Tan Sri Joseph Kurup, Deputy Minister of Natural Resources and Environment, Delivering Malaysia's Statement at the 21st Meeting of Parties to the Montreal Protocol at Port Ghalib, Egypt, 4-8 November 2009

Jadual 4.2 JAS : Projek-projek dan Aktiviti-aktiviti yang Dilaksanakan di bawah NCFCP, 2009
Table 4.2 DOE : Projects and Activities Implemented under NCFCP, 2009

Bil. / No.	Sektor / Sector	Bil. Aktiviti/Lawatan yang Selesai / No. of Completed Activities / Visits	Bil. Lawatan Pemeriksaan / Penguatkuasaan 2009 No. of Inspection / Enforcement Visits 2009
1	Metered Dosed Inhaler (MDI)	7	-
2	Program Pemeriksaaan Penghawa Dingin Kenderaan (MAC) oleh PUSPAKOM / Mobile Air Conditioning (MAC) Inspection Programme by PUSPAKOM	Projek selesai (2004) / Project Completed (2004)	-
3	Program Kursus Kastam-ODS (COTP) / Customs ODS Training Programme (COTP)	2	-
4	Sektor Servis Peghawa dingin Kenderaan / Mobile Air Conditioning Servicing Sector (MAC)	22	113
	Program Pentauliahan Juruteknik Servis MAC (CSTP) / Certification of MAC Service Technicians Programme (CSTP)	829	
	Jumlah peserta / Number of participants	77	
	Lawatan Verifikasi untuk bengkel MAC / Verification visits for MAC workshops	65	
	Baucer Mesin R&R MAC / Vouchers for MAC R&R machines	Projek selesai (2006) Project completed (2006)	
5	Pelarut / Solvent		
6	Sektor Servis Penyejukan / Refrigeration Service Sector (RSS)	33	122
	Pentauliahan Juruteknik Servis RSS (CSTP) / Certification Service Technicians Programme (CSTP)	1,973	
	Jumlah peserta / Number of participants	122	
	Lawatan Verifikasi untuk bengkel RSS / Verification visits for RSS workshops	526 170	
	Baucer Mesin R&R RSS / Vouchers for RSS R&R machines	Projek selesai (2005) Project completed (2005)	
7	Busar / Foam Projek Kumpulan/Projek Individu Group Sub-Project/Individual Sub-Project		
8	Aktiviti Kesedaran / Awareness Activity	Sila rujuk Jadual 4.2 Please refer to Table 4.2	

Jadual 4.4 JAS : Mesyuarat-Mesyuarat Peringkat Serantau dan Antarabangsa, 2009
Table 4.4 DOE : Regional and International Meetings, 2009

Tarikh / Date	Aktiviti & Program / Activities & Programmes	Tempat / Venue
30 Mac-3 April March 30-April 3	The 57th Meeting of Executive Committee for Implementation of the Montreal Protocol	Montreal, Canada
6-8 April April 6-8	The OORG and the 13th Financial Agents Workshop World Bank	Washington DC
27-30 April April 27-30	Southeast Asia and the Pacific (SEAP) and South Asia (SA) Network Meeting of Ozone Officers	Bangkok, Thailand
6-10 Julai July 6-10	The 58th Meeting of Executive Committee for Implementation of the Montreal Protocol	Montreal, Canada
13 Julai July 13	Workshop on Ozone Depleting Substances (ODS) Destruction	Geneva, Switzerland
14 Julai July 14	Workshop on High GWP Alternatives	Geneva, Switzerland
15-18 Julai July 15-18	The 29th Meeting of Open-Ended Working Group on Montreal Protocol	Geneva, Switzerland
2-3 September September 2-3	Compliance Assistance Program (CAP) Group Advisory Meeting	Paris, France
8-10 Oktober October 8-10	Joint SEAP/SA Ozone Officers Network Meeting	Chiangmai, Thailand
12-15 Oktober October 12-15	3rd MEA Regional Enforcement Network Meeting	Chiang Mai, Thailand
3 Nov Nov 3	Workshop on Methyl Bromide Use in QPS	Port Ghalib, Egypt
4-8 November November 4-8	The 21st Meeting of Parties (MOP 21) to the Montreal Protocol	Port Ghalib, Egypt
10-14 November November 10-14	The 56th Meeting of Executive Committee for Implementation of the Montreal Protocol	Port Ghalib, Egypt
3-4 Disember December 3- 4	The 5th EAP/ENV ODS Regional Workshop, World Bank	Kuala Lumpur, Malaysia

PROGRAM PENCEGAHAN PENCEMARAN DAN PENINGKATAN KUALITI AIR SUNGAI
RIVER POLLUTION PREVENTION AND WATER QUALITY IMPROVEMENT PROGRAMME

Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai telah mula dilaksanakan sejak tahun 2001 di bawah Rancangan Malaysia Kelapan (RMK-8) dan masih diteruskan di bawah Rancangan Malaysia Kesembilan (RMK-9). Program ini bertujuan meningkatkan kualiti air lembangan-lembangan sungai yang telah dikategorikan sebagai tercemar atau sederhana tercemar berdasarkan hasil pemantauan kualiti air sungai yang telah dijalankan oleh Jabatan Alam Sekitar.

River Pollution Prevention and Water Quality Improvement Programme have been implemented since the year 2001 under the 8th Malaysia Plan (8thMP) and continued under the 9th Malaysia Plan (9thMP). The purpose of this programme is to improve the water quality of the river which has been categorised as polluted or slightly polluted based on the Department of Environment's monitoring programme.

Dua aktiviti utama di bawah program ini adalah pelaksanaan kajian pencemaran lembangan sungai yang tercemar dan perlaksanaan tindakan penguatkuasaan serta kesedaran awam dalam lembangan-lembangan sungai yang terpilih. Bagi tahun 2009, sebanyak 33 lembangan sungai telah dipilih untuk program ini dengan melaksanakan kajian Lembangan Sungai Kinabatangan di Sabah (**Peta 4.3 Malaysia**).

The two main activities under this program are the implementation of a study on a polluted river basin and the enforcement action as well as public awareness for the selected river basin. In 2009, 33 river basins have been selected for this programme with the implementation of the detailed study of Kinabatangan River Basin in Sabah (**Map 4.3 Malaysia**).

Kriteria pemilihan sungai-sungai tersebut adalah berdasarkan kepada kegunaan berfaedah sumber-sumber airnya 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.

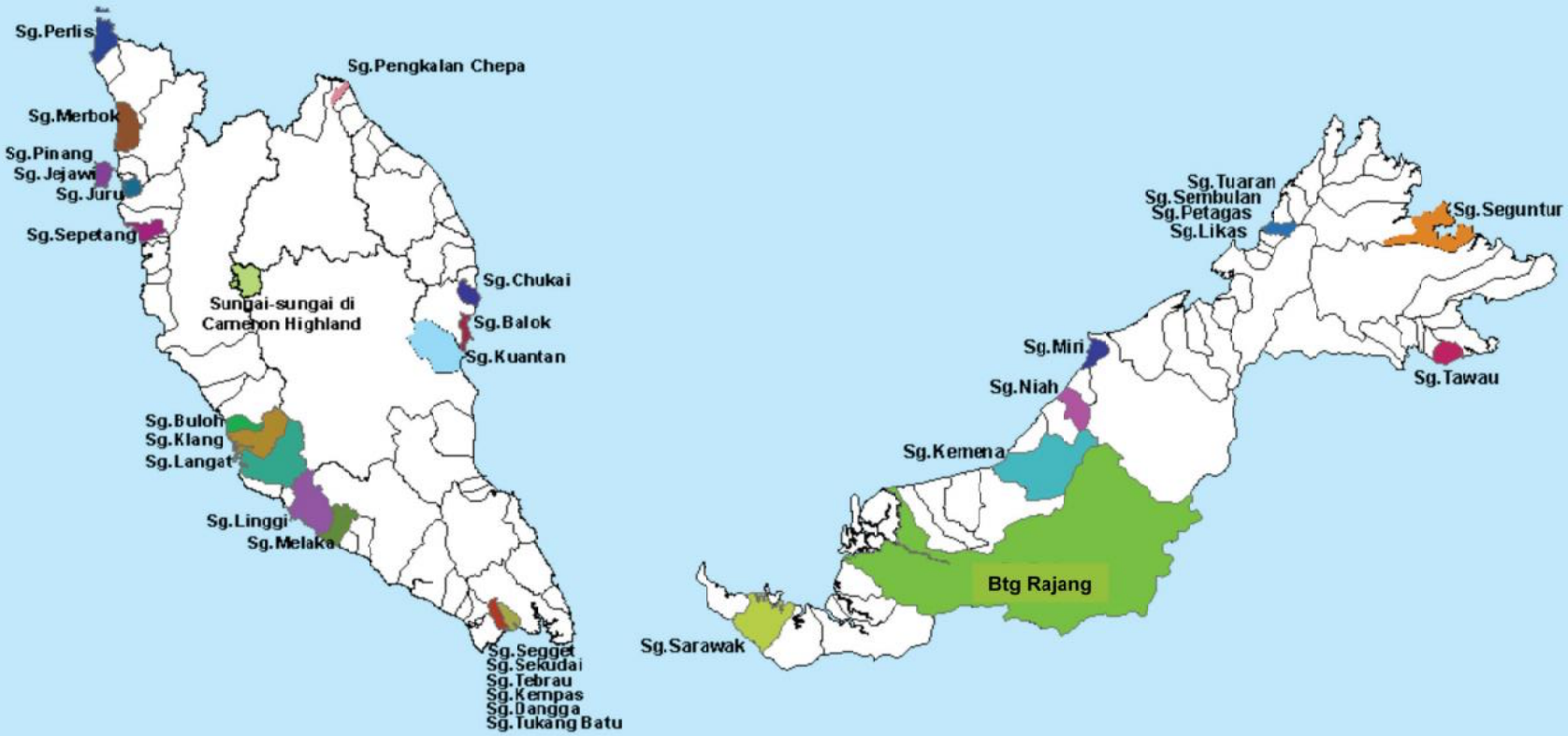
The selection criteria for the river were based on their beneficial uses such as water supply, fisheries, recreational and tourism potential as well as those rivers which are seriously affected by pollutions or categorised as Class III and below, which need to be improved to Class II which is suitable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

Kajian Pencegahan Pencemaran dan Peningkatan Kualiti Lembangan Air Sungai

Study on Pollution Prevention and River Basin Water Quality Improvement

Pada tahun 2009, kajian terperinci terhadap pencemaran sungai telah dijalankan di Lembangan Sungai Kinabatangan, Sabah dan Lembangan Sungai Kuantan, Pahang. Tujuan kajian adalah untuk mengenalpasti punca-punca pencemaran yang menyebabkan kemerosotan kualiti air sungai dan merumuskan pelan-pelan tindakan bagi pencegahan pencemaran dan peningkatan kualiti air sungai berkenaan.

In 2009, a detailed study on river pollution was implemented for Kinabatangan River Basin in Sabah and Kuantan River Basin in Pahang. The purpose of the study was to identify the pollution sources responsible for the deterioration of the river water quality and to formulate action plans to prevent pollution and improve its water quality.



Peta 4.3 Malaysia: Lembangan Sungai yang Dipilih Di Bawah Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai di Malaysia
Map 4.3 Malaysia: Selected River Basins for River Pollution Prevention and Water Quality Improvement Programme in Malaysia

Projek Kajian Pencegahan Pencemaran dan Peningkatan Kualiti Air Lembangan Sungai Kinabatangan yang bermula pada penghujung tahun 2008 telah selesai pada November 2009 manakala bagi projek kajian bagi Lembangan Sungai Kuantan telah dimulakan pada Ogos 2009 dan dijangka siap pada tahun 2010. Pelan-pelan tindakan yang dirumuskan itu akan dikemukakan kepada agensi-agensi yang berkaitan untuk pertimbangan peruntukan dan perlaksanaan.

The study on Pollution Prevention and Water Quality Improvement Programme for Kinabatangan River Basin which started in 2008 was completed in November 2009 while the study for Kuantan River Basin started in August 2009 and will be completed in 2010. The formulated action plans will be presented to all relevant agencies for financial consideration and implementation.

Selain itu, kajian inventori punca-punca pencemaran bagi Lembangan Sungai Sarawak telah dimulakan pada November 2009 dijangka dapat diselesaikan dalam tahun 2010. Kajian inventori ini bertujuan untuk mengenalpasti semua jenis punca pencemaran di lembangan sungai dan membolehkan agensi-agensi terlibat memperkemaskan strategi penguatkuasaan seterusnya pencegahan dan kawalan pencemaran dapat dibuat dengan lebih berkesan.

Besides that, a study to inventorise all pollution sources for Sarawak River Basin started in November 2009 and is expected to be completed in 2010. The purpose of the study was to identify all pollution sources in the river basin and enable the relevant agencies to strategise their enforcement action, thus effectively preventing and controlling water pollution.

Penguatkuasaan

Enforcement

Penguatkuasaan berkesan adalah merupakan salah satu hasil rumusan pelan-pelan tindakan yang dicadangkan oleh kajian bagi mengurangkan beban pencemaran dan seterusnya meningkatkan kualiti air sungai. Pada tahun 2009, sebanyak 9,495 punca-punca pencemaran di 33 lembangan sungai di bawah program ini telah dikenalpasti tertakluk di bawah Akta Kualiti Alam Sekeliling, 1974.

Effective enforcement is one of the essential measures in the action plans under the study to reduce pollution loads and improve river water quality. In 2009, a total of 9,495 premises within the 33 river basins were identified to be subjected to the Environmental Quality Act.,1974.

Dari jumlah ini, sebanyak 461 premis telah diberi notis arahan supaya mempertingkatkan keupayaan loji pengolahan efluen dan 102 premis telah dihadapkan ke mahkamah dan 1 premis telah dikenakan perintah larangan **(Rajah 4.2)**.

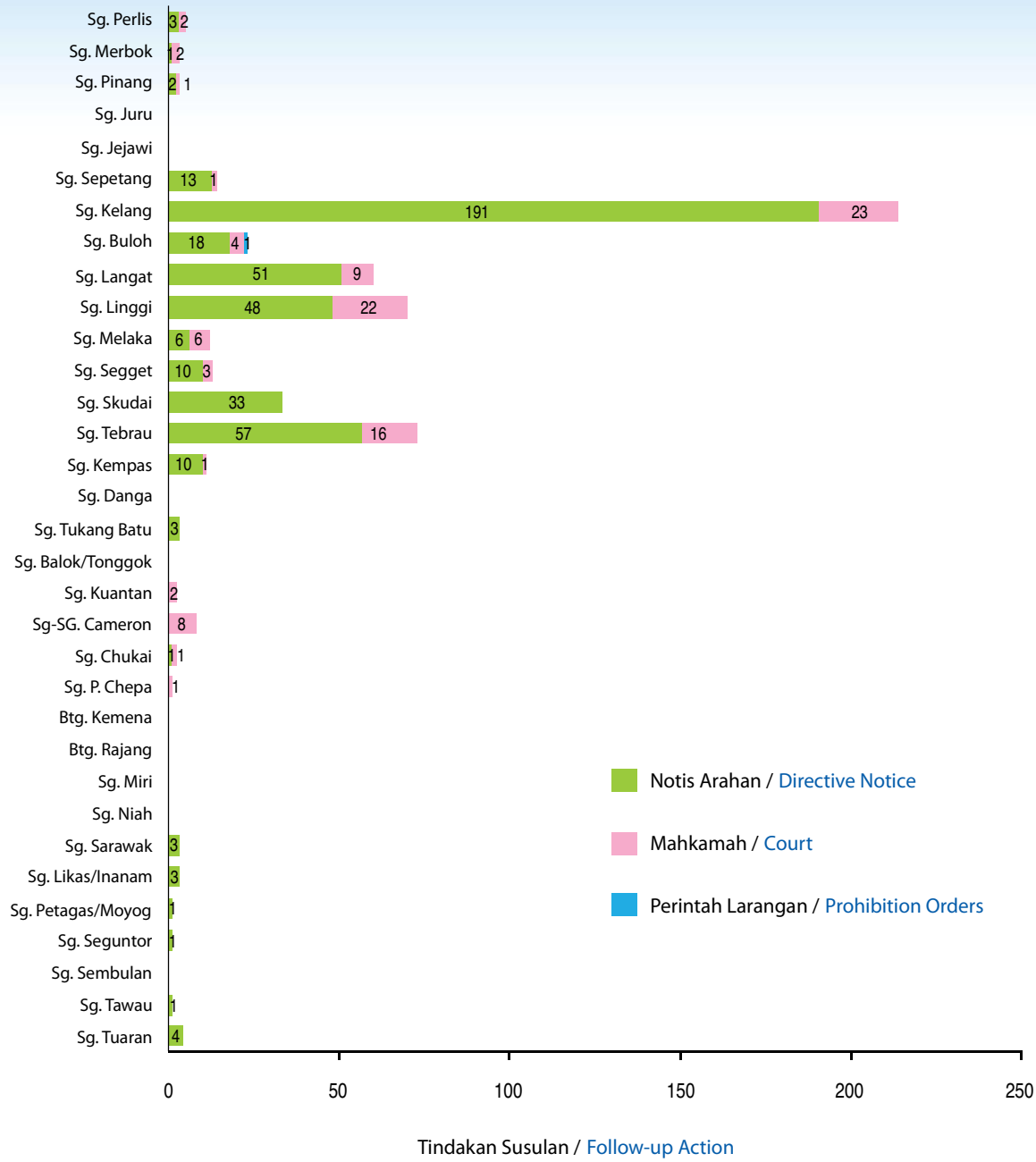
Of these premises, 461 premises were given notices to upgrade their treatment systems and 102 premises were taken to court and one (1) premises was given prohibition order. **(Figure 4.2)**.

Selaras dengan Indikator Prestasi Utama (KPI) yang disasarkan bagi program pada tahun 2009, lapan (8) lembangan sungai telah berjaya mencapai 100% pematuhan bagi punca-punca yang tertakluk di bawah Akta Kualiti Alam Sekeliling (AKAS), 1974, pencapaian yang awal dari jangka waktu sebenar yang disasarkan iaitu pada akhir tahun 2010.

In line with the Key Performance Indicator (KPI) set for the programme in 2009, eight (8) river basins had achieved 100% compliance for the pollution sources subjected to the Environmental Quality Act (EQA), 1974 earlier than the actual time frame targeted which is before the end of 2010.

Dua puluh dua (22) lembangan lagi pula telah melebihi 90% pematuhan terhadap AKAS, 1974 berbanding hanya 17 lembangan sungai pada tahun lepas.

Twenty two (22) river basins had achieved more than 90% compliance towards EQA, 1974 compared to only 17 river basins last year.



Rajah 4.2 JAS: Tindakan Susulan Ke Atas Punca-punca Pencemaran di Bawah Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai, 2009
Figure 4.2 DOE: Follow-up Actions on Sources under River Pollution Prevention and Water Quality Improvement Programme, 2009

Peratus pematuhan yang agak rendah dicatatkan di Lembangan Sungai Pengkalan Chepa dengan 77% pematuhan menunjukkan keperluan pihak JAS memperkemaskan strategi-strategi penguatkuasaan di lembangan sungai berkenaan **(Rajah 4.3)**.

A low percentage of compliance of 77% was observed in Pengkalan Chepa River Basin indicating the need for DOE to strengthen up the enforcement strategy for this river basin **(Figure 4.3**).

Selain daripada itu, bagi memantapkan lagi tindakan penguatkuasaan oleh JAS Negeri di lembangan-lembangan sungai ini, aktiviti inventori punca-punca tetap yang tertakluk di bawah AKAS, 1974 bagi 33 lembangan sungai ini juga telah dikemaskini dari masa ke semasa bagi memperkemas dan memantapkan program penguatkuasaan yang dijalankan.

Besides enforcement activities, the inventory of point pollution sources within these 33 river basins subjected to the EQA, 1974 was regularly updated to enhance and strengthen the implementation of the enforcement programme.

Kesedaran Awam

Public Awareness

Kesedaran awam merupakan satu lagi langkah yang berkesan dalam mencegah pencemaran dan meningkatkan kualiti air sungai. Pada tahun 2009, JAS telah menjalankan aktiviti-aktiviti kesedaran awam kepada pelbagai kumpulan sasaran seperti pihak industri, pihak pelaksana-pelaksana projek pembangunan, murid-murid sekolah dan juga komuniti setempat.

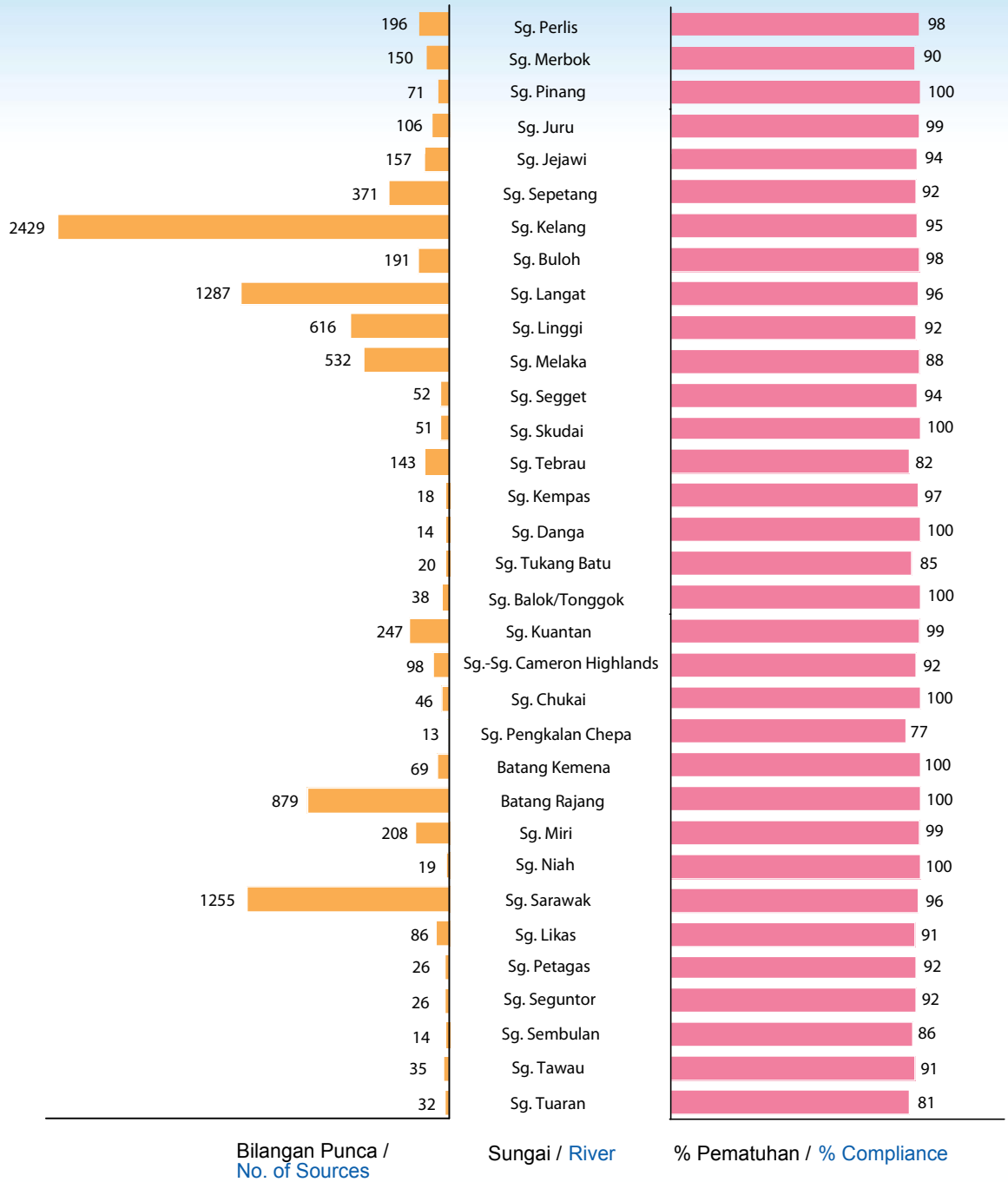
Promoting awareness is another effective measure to prevent pollution and improves the river water quality. In 2009, DOE had organised awareness programme to various target groups namely the industries, developers, school children and also to the local communities.

Aktiviti-aktiviti kesedaran awam yang dijalankan adalah seperti di **Rajah 4.4**. Sebanyak 548 aktiviti kesedaran awam seperti sesi dialog/seminar/pameran telah dilaksanakan di bawah program ini termasuk 41 aktiviti gotong-royong yang dijalankan oleh komuniti setempat di sepanjang sungai yang berkenaan.

Public awareness activities implemented are listed in **Figure 4.4**. A total of 548 awareness activities such as dialogue sessions/seminars/exhibitions had been organised in these 33 river basins including of 41 clean-up (*gotong-royong*) activities organised by the local communities along the river system.

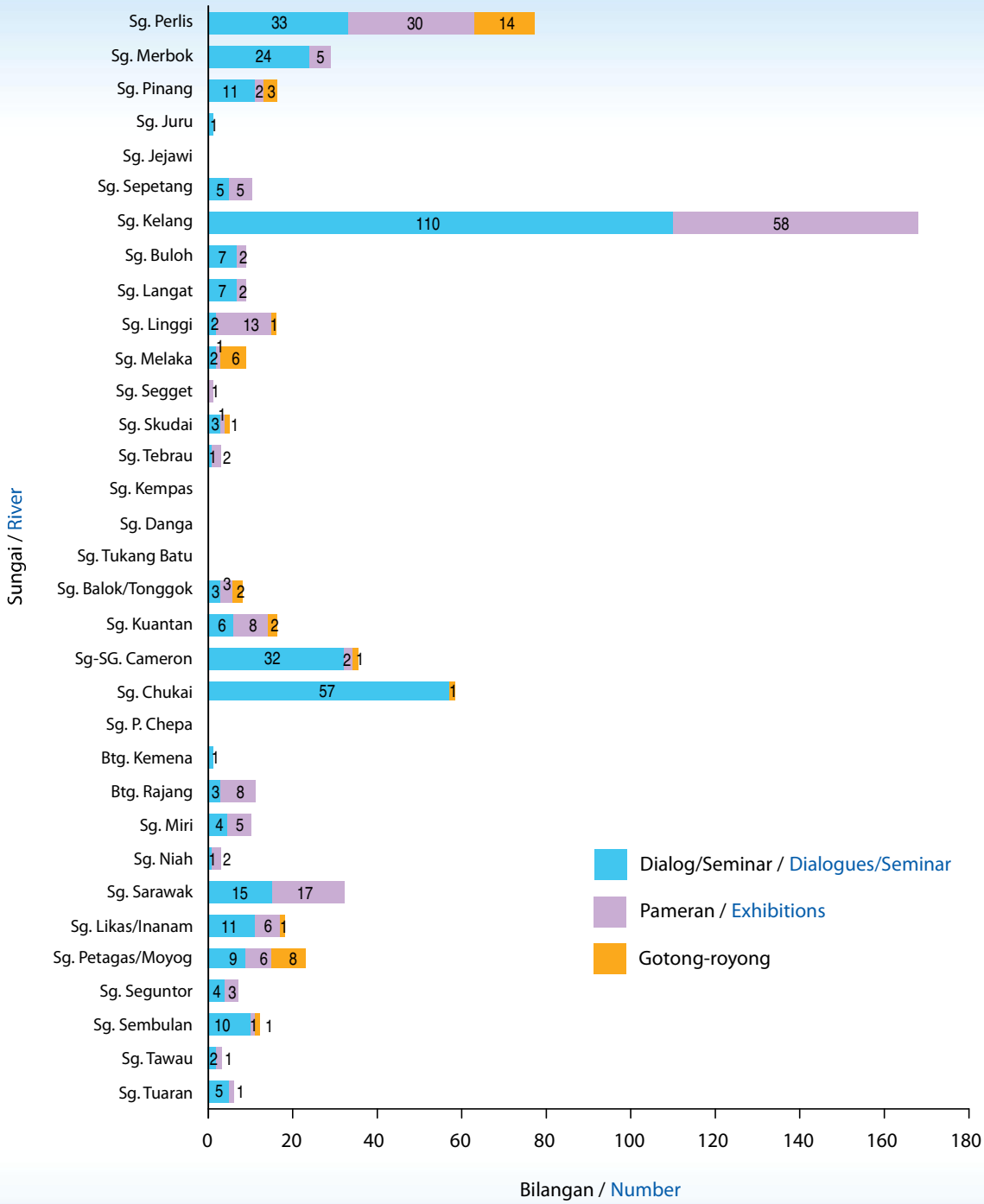
Sejak tahun 2006 hingga 2009, sebanyak 548 sesi dialog/seminar/pameran dan 41 aktiviti gotong-royong telah dilaksanakan. Sejumlah 660 sesi dialog/seminar/pameran dan 33 aktiviti gotong royong dijangka akan dilaksanakan sebelum tamatnya RMK9.

Since 2006 until 2009, 548 dialogue sessions/seminars/exhibitions and 41 clean-up activities had been organised. A total of 660 dialogue sessions/seminars/exhibitions and 33 clean-up activities are expected to be achieved at the end of 9 th MP.



Rajah 4.3 JAS: Bilangan Punca Pencemaran/Status Pematuhan Punca-punca Terhadap AKAS, 1974 di Bawah Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai, 2009

Figure 4.3 DOE: Number of Pollution Sources/Status of Compliance toward EQA, 1974 under River Pollution Prevention and Water Quality Improvement Programme, 2009



Rajah 4.4 JAS: Aktiviti-Aktiviti Kesedaran di Bawah Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai, 2009.

Figure 4.4 DOE: Awareness Activities under River Pollution Prevention and Water Ouality Improvement Programme, 2009

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 (JAS) bagi menduduki dan/atau menggunakan premis.

Kilang Getah Asli Mentah

Pada tahun 2009, sejumlah 80 buah kilang getah asli mentah telah dilesenkan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Getah Asli Mentah), 1978. Dari jumlah ini 68 buah kilang telah dilesenkan untuk melepaskan efluen yang telah diolah ke alur air, sebuah (1) kilang telah dilesenkan untuk melepaskan efluen ke atas tanah, manakala 11 buah kilang dibenarkan untuk mengitar semula efluen. 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. **Rajah 4.5** menunjukkan taburan kilang getah asli mentah di Malaysia.

Dalam tahun 2009, pegawai-pegawai penguatkuasa JAS negeri telah menjalankan sebanyak 224 pemeriksaan ke atas kesemua 80 buah kilang getah asli mentah yang telah dilesenkan. Kilang-kilang yang mempunyai rekod pematuhan yang rendah telah diberi keutamaan.

Sebanyak 47 surat arahan dan sembilan (9) notis arahan telah dikeluarkan kepada premis-premis tersebut untuk mengambil tindakan pembaikan. Sebanyak tujuh (7) kompaun telah dikeluarkan bagi kesalahan-kesalahan yang telah dilakukan dan enam (6) tindakan mahkamah telah diambil bagi kesalahan melanggar syarat-syarat lesen dan denda sebanyak RM51,000 telah dikenakan **(Rajah 4.5)**.

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 the premises are required to obtain a license from the Department of Environment (DOE) for the occupation and/or use of the said premises.

Raw Natural Rubber

In 2009, there were 80 raw natural rubber factories licensed under the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations, 1978. Out of these, 68 factories were licensed to discharge treated effluent into inland watercourse, one (1) was permitted to practise land disposal while the remaining 11 were allowed to recycle their effluent. The licensing periods of each premises varied from one (1) to three (3) years depending on the level of compliance to the conditions of the licences. **Figure 4.5** shows the distribution of raw natural rubber factories in Malaysia.

Throughout 2009, DOE state enforcement officers conducted 224 inspections on 80 licensed raw natural rubber factories. Factories with low compliance record were given the priority.

A total of 47 directives and nine (9) notices were issued to the concerned premises to take corrective actions. Six (6) compounds were issued for the offences committed and four (4) court actions were taken with a total fine of RM51,000 for failure to comply with conditions of the licence **(Figure 4.5)**.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Getah Asli Mentah), 1978

Pada tahun 2009, pencapaian pematuhan keseluruhan kilang getah asli mentah yang tertakluk di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Getah Asli Mentah), 1978 adalah 95%.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih), 1978

Kilang Getah Asli Mentah juga tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih), 1978. Pada tahun 2009, pencapaian pematuhan keseluruhan oleh kilang getah asli mentah adalah 100%.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 2005

Kilang Getah Asli Mentah adalah juga tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 2005. Pada tahun 2009, pencapaian pematuhan keseluruhan oleh premis yang ditetapkan adalah 99%.

Kilang Kelapa Sawit Mentah

Sejumlah 416 buah kilang kelapa sawit mentah telah dilesenkan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Kelapa Sawit Mentah), 1977 pada tahun 2009. Daripada 416 buah kilang yang dilesenkan, sebanyak 267 buah kilang telah dilesenkan untuk melepaskan efluen yang diolah ke dalam alur air, 95 buah kilang untuk melupuskan efluen ke atas tanah, 35 buah kilang melupuskan efluen dengan menggunakan gabungan kaedah alur air dan atas tanah, 10 buah kilang menggunakan kaedah kompos, tujuh (7) buah kilang menggunakan gabungan kaedah alur air dan kompos manakala dua (2) kilang menggunakan gabungan kaedah atas tanah dan kompos. **Rajah 4.6** menunjukkan taburan bilangan kilang kelapa sawit mentah mengikut negeri.

Sepanjang tahun 2009, 1,142 pemeriksaan ke atas kesemua 416 kilang kelapa sawit yang telah dilesenkan di seluruh negara telah dilaksanakan oleh pegawai-pegawai penguatkuasa JAS negeri.

Status Of Compliance With The Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Order, 1978

In 2009, the overall compliance performance by the raw natural rubber factories that were subjected to the Environmental Quality Prescribed Premises) (Raw Natural Rubber) Order, 1978 was 95%.

Status Of Compliance With The Environmental Quality (Clean Air) Regulations, 1978

Raw natural rubber factories are also subjected to the control under the Environmental Quality (Clean Air) Regulations, 1978. In 2009, overall compliance performance by the raw natural rubber factories was 100%.

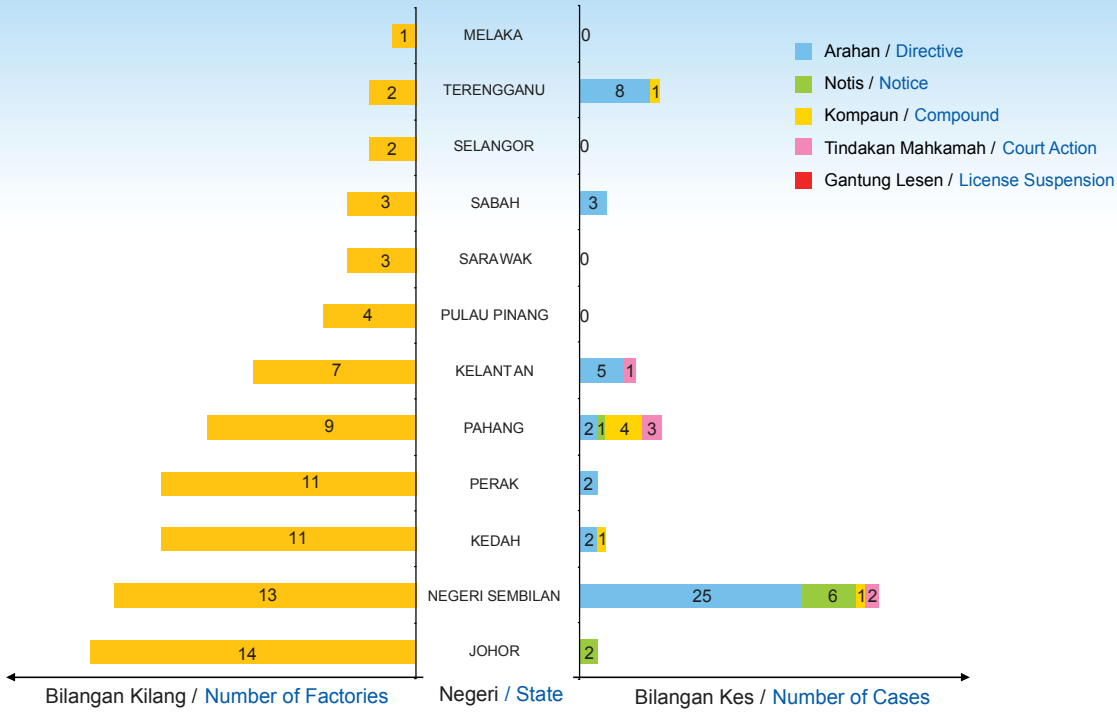
Status Of Compliance With The Environmental Quality (Scheduled Waste) Regulations, 2005

Raw natural rubber factories are also subjected to the control under the Environmental Quality (Scheduled Waste) Regulations, 2005. In 2009, overall compliance performance by the raw natural rubber factories was 99%.

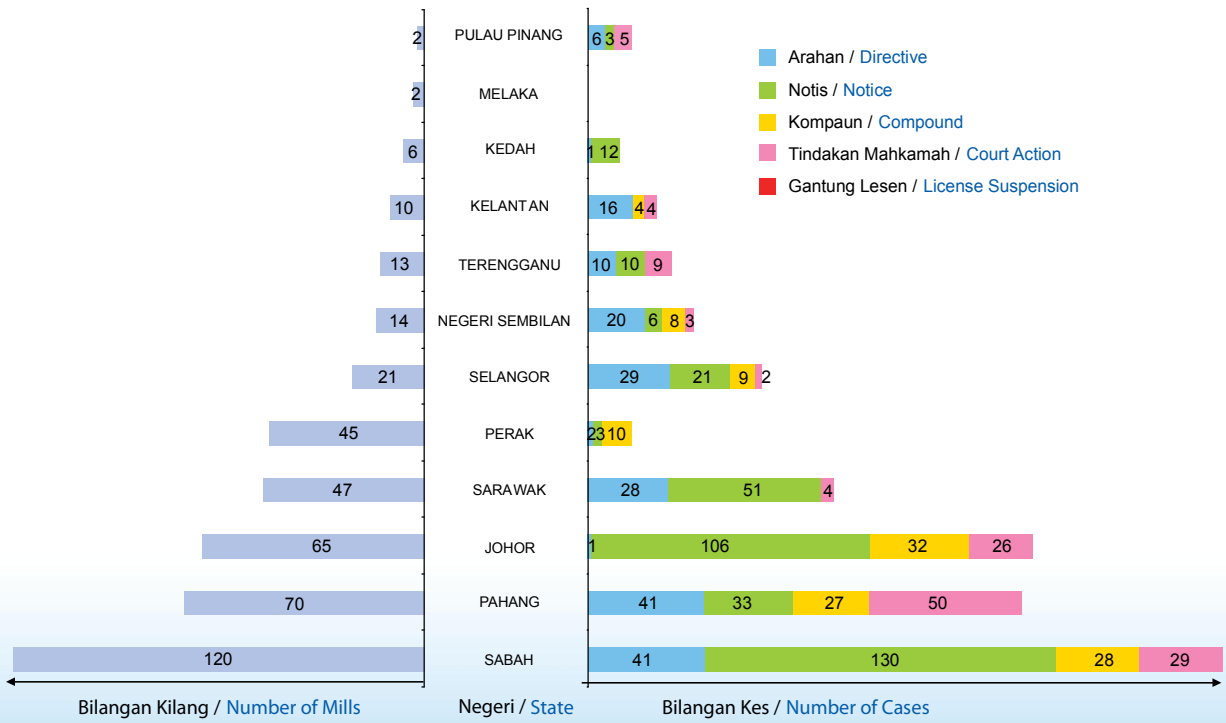
Crude Palm Oil

There were 416 palm oil processing mills licensed under the Environmental Quality (Prescribed Premises)(Crude Palm Oil Mill) Regulations, 1977 in the year 2009. Of these 416 licensed prescribed premises, 267 were granted permission to discharge treated effluent into inland watercourse, 95 to practice land disposal, 35 to discharge into inland watercourse and land disposal, 10 to practice composting, seven (7) to discharge treated effluent into inland watercourse and composting and dua (2) to practice land disposal and composting. **Figure 4.6** shows the distribution of palm oil processing mills according to states.

Throughout the year,1,142 inspections on 416 licensed palm oil mills were conducted by DOE state enforcement officers.



Rajah 4.5 JAS: Bilangan Kes Tindakan Undang-Undang Terhadap Kilang Getah Asli Mentah, 2009
Figure 4.5 DOE: Legal Action Againts Raw Natural Rubber Factories, 2009



Rajah 4.6 JAS: Bilangan Kes Tindakan Undang-Undang Terhadap Kilang Sawit Mentah, 2009
Figure 4.6 DOE: Legal Action Againts Crude Oil Mills, 2009

Sebanyak 195 surat arahan dan 376 notis telah dikeluarkan kepada premis-premis tersebut untuk mengambil tindakan bagi mematuhi keperluan perundangan. Sebanyak 120 kompaun dikeluarkan bagi kesalahan yang dilakukan dan 130 tindakan mahkamah telah diambil bagi kegagalan mematuhi syarat-syarat lesen dan denda sebanyak RM1,742,000 telah dikenakan (**Rajah 4.6**).

A total of 195 directive letters and 376 notices were issued to the mills to take actions to comply with the legal requirement. 120 compounds were issued for offences committed and 130 court actions were taken with a total fine of RM1,742,000 for failure to comply with conditions of the licences (**Figure 4.6**).

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Minyak Sawit Mentah), 1977

Pada tahun 2009, pencapaian pematuhan keseluruhan kilang kelapa sawit mentah yang tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Minyak Sawit Mentah) 1977 adalah 88%.

Status Of Compliance With The Environmental Quality (Prescribed Premises) (Crude Palm Oil) Order, 1977

In 2009, the overall compliance of the palm oil processing mills that were subjected to the Environmental Quality (Prescribed Premises) (Crude Palm Oil) Order, 1977 was 88%.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih), 1978

Kilang Kelapa Sawit Mentah juga tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih), 1978. Pada tahun 2009, pematuhan keseluruhan oleh kilang kelapa sawit adalah 94%.

Status Of Compliance With The Environmental Quality (Clean Air) Regulations, 1978

Palm oil processing mills are also subjected to the Environmental Quality (Clean Air) Regulations, 1978. In 2009, the overall compliance of palm oil processing mills was 94%.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 2005

Kilang Kelapa Sawit Mentah adalah juga tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 2005. Pada tahun 2009 pencapaian pematuhan keseluruhan oleh premis yang ditetapkan adalah 94%.

Status Of Compliance With The Environmental Quality (Scheduled Waste) Regulations, 2005

Palm oil processing mills are also subjected to the control under the Environmental Quality (Scheduled Waste) Regulations, 2005. In 2009, the overall compliance performance of palm oil processing mills was 94%.

Air Sungai yang Jernih / Clean River

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

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

Premis-premis yang bukan ditetapkan yang melepaskan efluen adalah tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan dan Efluen-Efluen Perindustrian), 1979. Pada tahun 2009, Jabatan Alam Sekitar (JAS) telah menjalankan 7,864 pemeriksaan penguatkuasaan ke atas 5,878 industri pembuatan dan premis-premis yang bukan ditetapkan yang tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan dan Efluen-Efluen Perindustrian), 1979.

Pencapaian pematuhan keseluruhan oleh premis yang bukan ditetapkan adalah 93%. Sejumlah 7% premis lain yang diperiksa didapati menghadapi berbagai kesukaran pematuhan seperti tidak mematuhi standard pelepasan efluen (Peraturan 8) dan pembinaan loji pengolahan efluen tanpa Kebenaran Bertulis daripada JAS (Peraturan 4).

Pada tahun 2009, status pematuhan industri dan premis-premis yang bukan ditetapkan menunjukkan kilang padi, industri kulit, loji rawatan air dan kuari mencapai pematuhan 100%, sementara industri-industri yang masih menunjukkan pematuhan kurang dari 75% ialah loji pengolahan IWK dan loji pengolahan persendirian (**Rajah 4.7**). Beberapa industri ini didapati beroperasi tanpa mempunyai loji pengolahan efluen atau ada diantaranya mempunyai loji pengolahan efluen yang ada tidak effisien untuk mengolah efluen bagi mematuhi standard pelepasan yang ditetapkan.

Pada umumnya, parameter-parameter yang sukar dipatuhi ialah keperluan oksigen biokimia (BOD), keperluan oksigen kimia (COD), pepejal terampai (SS), logam berat serta minyak dan gris (O&G).

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih), 1978

Premis-premis yang bukan ditetapkan adalah juga tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih), 1978. Pada tahun 2009,

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 2009, the Department of Environment (DOE) conducted 7,864 inspections on 5,878 industrial premises and other non-prescribed premises that were subjected to the Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979.

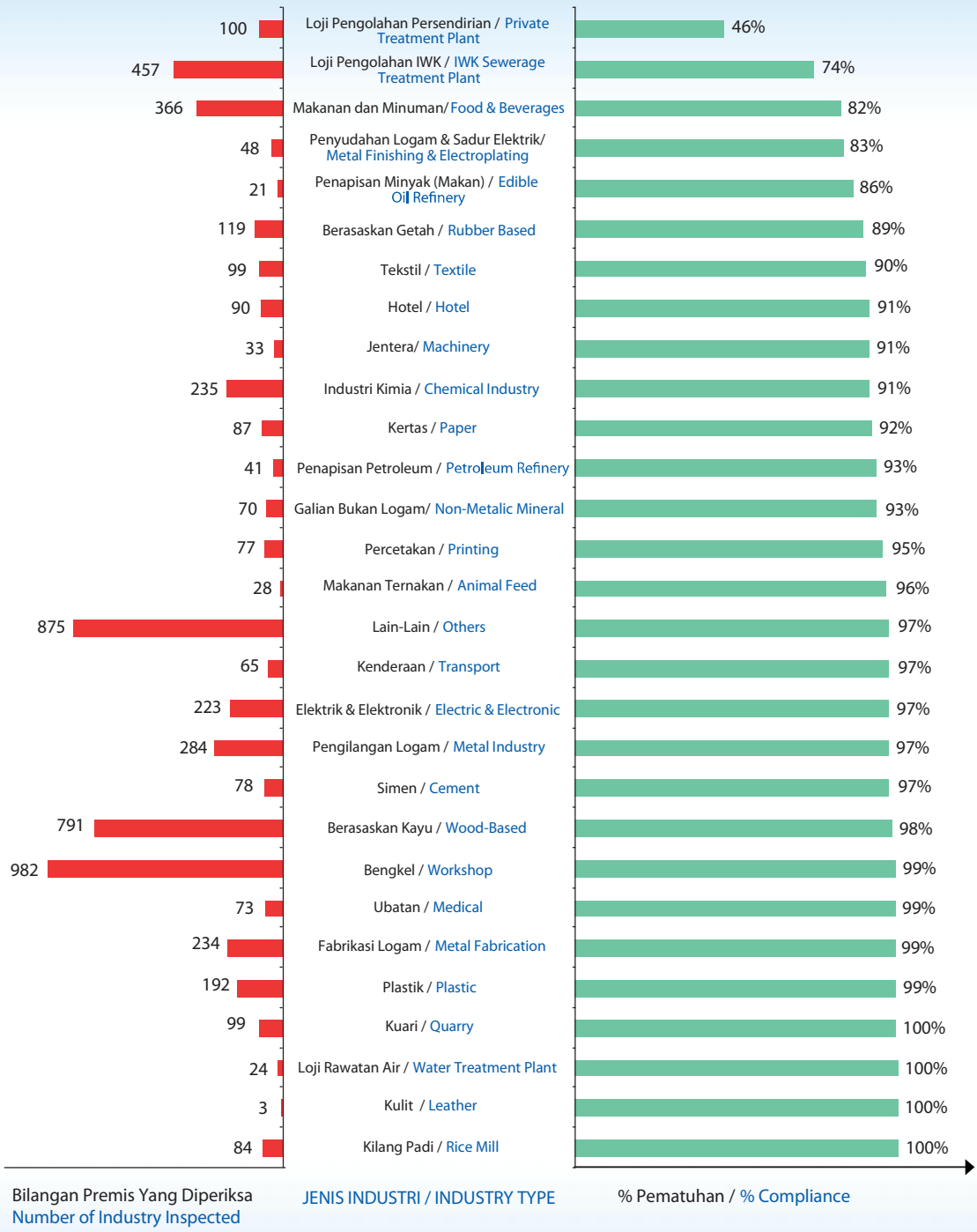
The overall compliance by the non-prescribed premises was 93%. The remaining 7% of the premises inspected committed offences relating to non-compliance of effluent discharge standards (Regulation 8) and did not have written approval for construction of effluent treatment plants (Regulation 4).

In 2009, the compliance status of industries and other non-prescribed premises indicated that rice mills, leather industries, water treatment plants and quarries achieved 100% compliance, while industries that showed less than 75% compliance are IWK sewerage treatment plant and private treatment plant **(Figure 4.7)**. Some of these industries were found to be operating without effluent treatment plants or some had effluent treatment plants that are not capable of treating the effluent to the stipulated standards.

Generally, the problematic parameters are biochemical oxygen demand (BOD), chemical oxygen demand (COD), suspended solids (SS), heavy metals and oil and grease (O&G).

Status of Compliance With The Environmental Quality (Clean Air) Regulations, 1978

Non-prescribed premises are also subjected to the Environmental Quality (Clean Air) Regulations, 1978. In 2009, the DOE conducted 7,864 inspections on



Rajah 4.7 JAS: Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan dan Efluen-Efluen Perindustrian) 1979, Status Pematuhan Industri, 2009

Figure 4.7 DOE: Environmental Quality (Sewage and Industrial Effluent) Regulations 1979, Compliance Status, 2009

JAS telah menjalankan 7,864 pemeriksaan terhadap sejumlah 5,878 industri pembuatan dan premis-premis yang bukan ditetapkan. Pencapaian pematuhan keseluruhan adalah 92%. Baki sebanyak 8% premis lain yang diperiksa didapati menghadapi berbagai kesukaran pematuhan seperti penyelenggaraan alat kawalan pencemaran udara yang kurang cekap (Peraturan 40) dan tidak ada Kelulusan Bertulis bagi pembinaan alat pembakaran bahanapi serta cerobong (Peraturan 36 dan 38).

5,878 industrial premises and other non-prescribed premises. The overall compliance was 92%. The remaining 8% of the premises inspected commited offences relating to inefficient maintenance of pollution control equipment (Regulation 40) and did not have written approval for installing of fuel burning equipment and chimney (Regulations 36 and 38).

Pada tahun 2009, status pematuhan industri dan premis-premis yang bukan ditetapkan menunjukkan bahawa loji rawatan air dan bengkel mencapai pematuhan 100%, sementara industri yang masih menunjukkan pematuhan kurang dari 75% ialah industri makanan ternakan, industri kulit dan loji pengolahan persendirian (**Rajah 4.8**). Beberapa industri ini didapati beroperasi tanpa mempunyai alat kawalan pencemaran udara ataupun penyelenggaraan alat kawalan pencemaran udara yang kurang cekap.

In 2009, the compliance status of industries and other non-prescribed premises showed that water treatment plants and workshops achieved 100% compliance, while animal feed industries, leather industries and private treatment plant showed less than 75% compliance (**Figure 4.8**). Some of these industries were found to be operating without air pollution control equipment or due to inefficient maintenance of pollution control equipment.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 2005

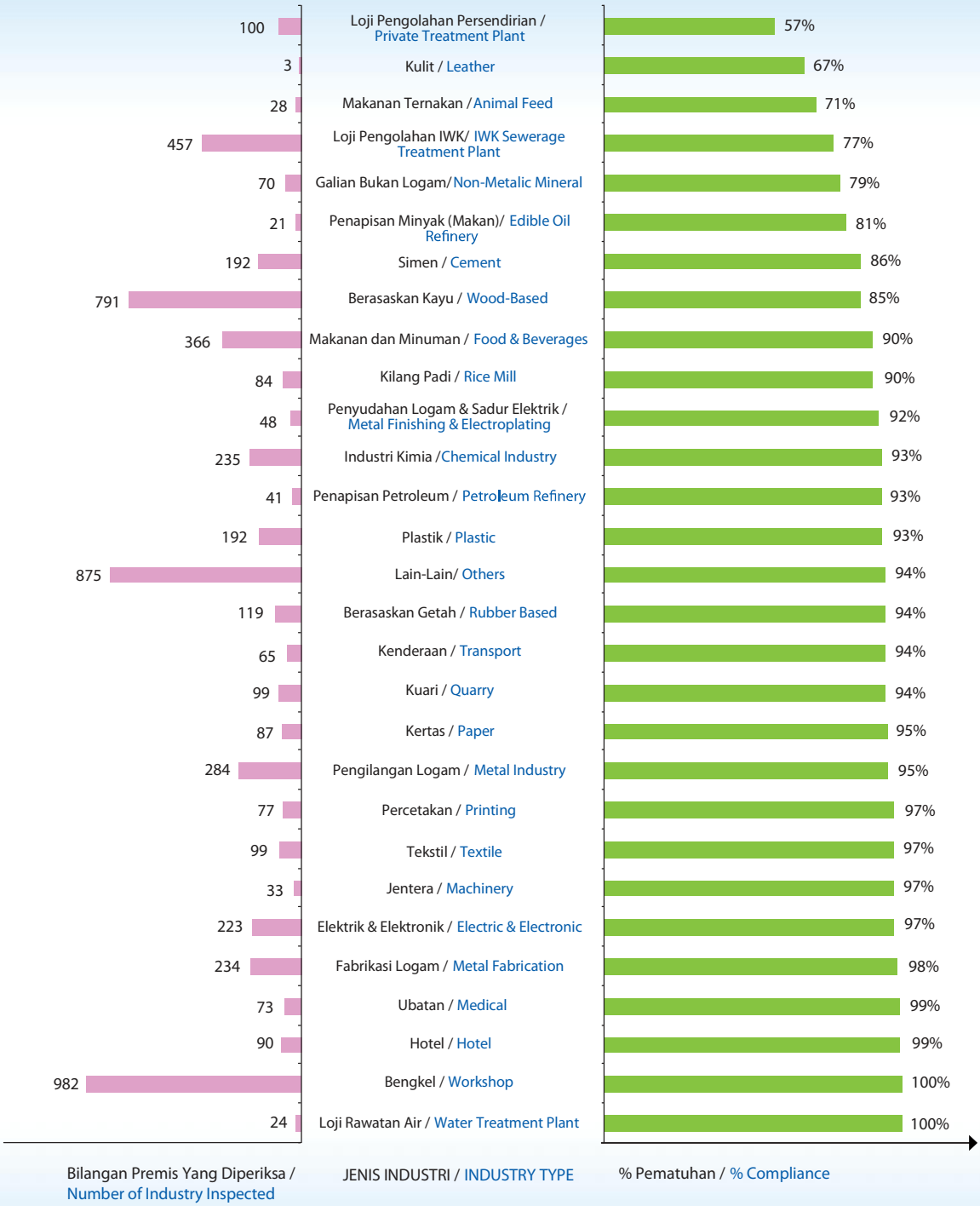
Premis-premis yang bukan ditetapkan adalah juga tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 2005. Pada tahun 2009, JAS telah menjalankan 7,864 pemeriksaan terhadap sejumlah 5,878 industri pembuatan dan premis-premis yang bukan ditetapkan. Pencapaian pematuhan keseluruhan adalah 90%. Baki sebanyak 10% premis lain yang diperiksa didapati menghadapi berbagai kesukaran pematuhan seperti tidak mengemukakan pemberitahuan mengenai pengeluaran buangan terjadual kepada JAS, penstoran dan pelabelan buangan terjadual yang tidak sempurna dan tidak menyimpan inventori buangan terjadual yang tepat dan terkini (Peraturan 3, 8, 9, 10 dan 11).

Status of Compliance With The Environmental Quality (Scheduled Waste) Regulations, 2005

Non-prescribed premises are also subjected to the Environmental Quality (Scheduled Waste) Regulations, 2005. In 2009, the DOE conducted 7,864 inspections on 5,878 industrial premises and other non-prescribed premises.The overall compliance was 90%. The remaining 10% of the premises inspected committed offences relating to not submitting notifications of scheduled waste generation to DOE, improper storage and labelling of scheduled waste, and not keeping accurate and up-to-date inventory of scheduled waste (Regulations 3, 8, 9, 10 and 11).

Pada tahun 2009, status pematuhan industri dan premis-premis yang bukan ditetapkan yang tertakluk kepada Akta Kualiti Alam Sekeliling, 1974 di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 2005 menunjukkan industri kulit dan hotel mencapai pematuhan 100%, sementara industri-industri yang masih menunjukkan pematuhan kurang dari 75% ialah kenderaan dan loji pengolahan persendirian (**Rajah 4.9**). Beberapa industri ini didapati

In 2009, the compliance status of industries and other non-prescribed premises that were subjected to the Environmental Quality Act, 1974 under the Environmental Quality (Scheduled Wastes) Regulations, 2005 showed that leather industries and hotels achieved 100% compliance, while industries that showed less than 75% compliance are transport industries and private treatment plant (**Figure 4.9**). Some of these industries were found to be operating



Rajah 4.8 JAS: Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978, Status Pematuhan Industri, 2009

Figure 4.8 DOE: Environmental Quality (Clean Air) Regulations 1978, Compliance Status, 2009

beroperasi tanpa mengemukakan pemberitahuan mengenai pengeluaran buangan terjadual kepada JAS, buangan terjadual tidak distor dengan baik, buangan terjadual tidak dilabel dengan sempurna dan tiada menyimpan inventori buangan terjadual.

TINDAKAN PENGUATKUASAAN

Sebanyak 206 kes premis yang tidak patuh adalah tertakluk kepada tindakan undang-undang dan telah dituduh di mahkamah. Sejumlah RM3,277,800.00 denda telah dikenakan. Tindakan-tindakan lain yang diambil adalah pengeluaran 1,672 surat arahan dan 820 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 Efluen-Efluen Perindustrian), 1979, Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih), 1978 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005.

Bagi meningkatkan pematuhan, JAS telah mengeluarkan arahan-arahan kepada pihak industri supaya memasang alat kawalan pencemaran yang sesuai dan 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, berbagai aktiviti kesedaran dilaksanakan sepanjang tahun untuk kumpulan sasaran yang spesifik. Aktiviti-aktiviti tersebut termasuklah dialog, seminar dan bengkel untuk industri dengan tujuan untuk meningkatkan tahap pematuhan undang-undang. JAS juga dalam usaha memastikan pematuhan sepenuhnya, mempromosi penggunaan teknologi kawalan yang efisien, amalan pengeluaran bersih serta pematuhan kendiri. Pihak industri juga dinasihatkan untuk mewujudkan sistem pengurusan alam sekitar yang baik dan mendapatkan pensijilan ISO 14000.

LESEN PELANGGARAN

Di dalam Akta Kualiti Alam Sekeliling (AKAS), 1974 Lesen Pelanggaran boleh dikeluarkan untuk tempoh masa yang spesifik bagi membenarkan industri yang menghadapi kesukaran untuk mematuhi standard pelepasan melanggar syarat-syarat yang dibenarkan untuk pelepasan effluen ke dalam pengairan daratan

without submitting notification of scheduled waste generation to DOE, improper storage and improper labelling of scheduled waste, and failure to keep accurate and up-to-date inventory of scheduled waste.

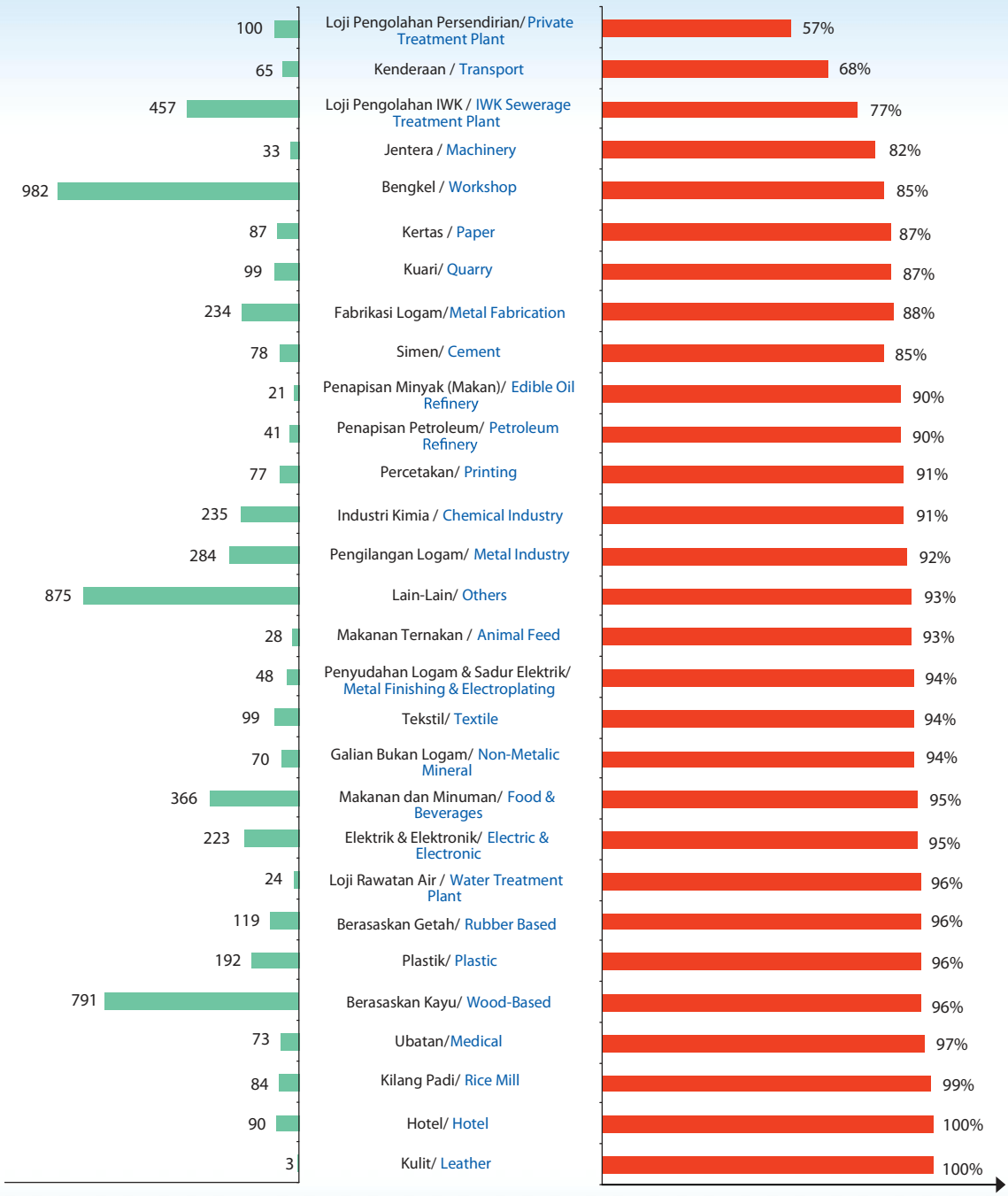
ENFORCEMENT ACTIONS

Of these non-complying premises, 206 cases were subjected to legal actions and were charged in courts. A total fine of RM3,277,800.00 were collected. Other actions taken were issuance of 1,672 written directives and 820 written notices to the industries, for them to take appropriate actions in order to comply with the Environmental Quality Act, 1974 and the Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979, Environmental Quality (Clean Air) Regulations, 1978 and Environmental Quality (Scheduled Wastes) Regulations, 2005.

In order to improve compliance, the DOE had issued directives to the industries to install more appropriate and efficient control equipment, upgrade the existing pollution control facilities and to have a good planning and implementation schedule of environmental management systems. In addition, various awareness activities were implemented throughout the year for specific target groups. Such activities included dialogues, seminars and workshops for industries with the aim of improving the level of regulatory compliance. The DOE, in its effort to ensure full compliance, also promoted the adoption of more efficient control technologies, cleaner production practices as well as self-regulations. Industries were also advised to set up a good environmental management system and be ISO 14000 certification.

CONTRAVENTION LICENSES

Under the Environmental Quality Act, 1974 contravention licences 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 discharges into watercourses or air emissions



Rajah 4.9 JAS: Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005, Status Pematuhan Industri, 2009

Figure 4.9 DOE: Environmental Quality (Scheduled Waste) Regulations 2005, Compliance Status, 2009

atau pelepasan bendasing udara ke atmosfera sebagaimana yang diperuntukkan di bawah Seksyen 25(1) dan Seksyen 22(1), AKAS 1974.

Lesen Pelanggaran ini merupakan satu langkah atau mekanisma untuk membantu, memudah dan membolehkan industri yang bermasalah memasang atau meningkatkan peralatan kawalan pencemaran dalam tempoh masa yang mencukupi. Kelulusan lesen pelanggaran adalah bergantung kepada penilaian mengenai situasi sosio-ekonomi, kualiti alam sekitar sedia ada dan juga komitmen pihak industri yang bermasalah untuk mematuhi Akta dan Peraturan-Peraturan di bawahnya.

Pada tahun 2009, jumlah permohonan lesen pelanggaran di bawah Seksyen 25, Akta adalah sebanyak 1,380 (**Rajah 4.10**). Dari 1,380 permohonan, 1,153 telah diluluskan dan 227 ditolak. Daripada 1,153 lesen pelanggaran yang diluluskan, 1,133 (98%) lesen adalah untuk loji pengolahan IWK, 9 (0.8%) untuk industri makanan dan minuman, 2 (0.2%) untuk industri penapisan petroleum, elektrik dan elektronik, berasaskan getah, kertas dan tekstil masing-masingnya, serta 1 (0.1%) untuk penapisan minyak (makan) (**Rajah 4.11**).

Antara parameter yang sukar dipatuhi oleh industri-industri yang diluluskan lesen pelanggaran 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. Pemeriksaan penguatkuasaan telah dijalankan terhadap premis-premis yang dilesenkan bagi menentukan tahap pematuhan. Pematuhan keseluruhan terhadap syarat-syarat lesen pelanggaran yang dikenakan pada tahun 2009 adalah 99%.

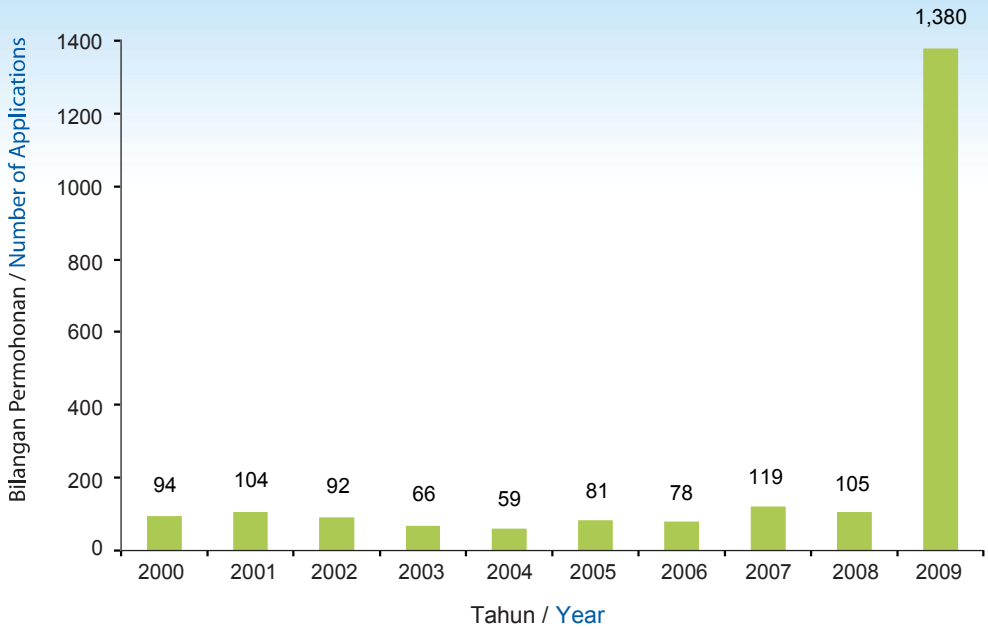
into the atmosphere as stipulated under Section 25(1) and Section 22(1) of the EQA 1974 respectively.

These contravention licences serve as a measure to assist, facilitate and enable the problematic industries adequate time to install or upgrade their pollution control equipment. Approval for such contravention licences would depend on the assessment of the socio-economic situation, the existing of environmental quality and also the commitment of the problematic industries to comply with the Act and Regulations made thereunder.

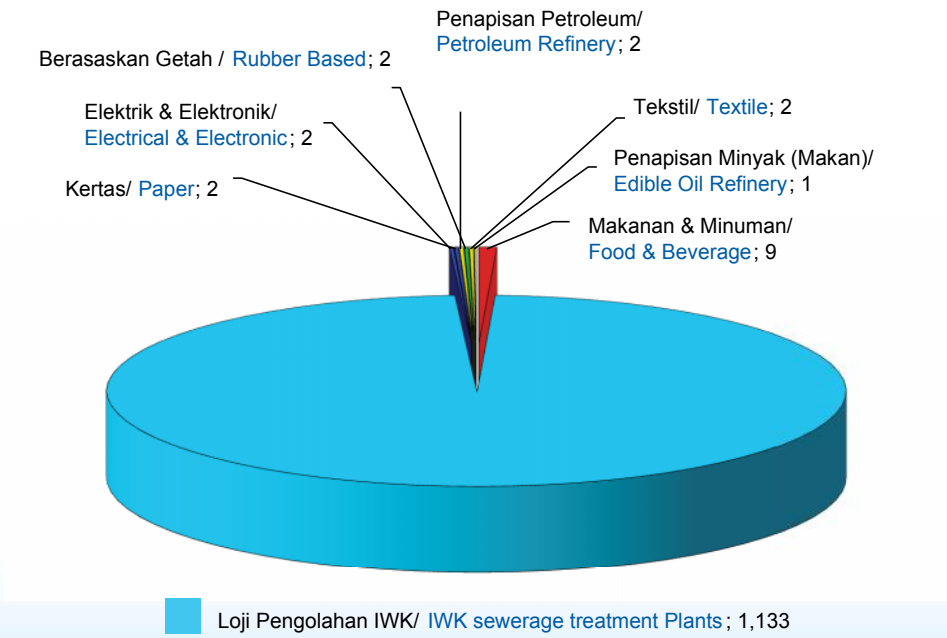
In 2009, the total number of applications for contravention licences under Section 25 of the Act are 1,380 (**Figure 4.10**). Out of the 1,380 applications, 1,153 were approved and 227 were rejected. Of 1,153 approved contravention licences, 1,133 (98%) were for IWK sewerage treatment plants, 9 (0.8%) for food and beverages industries, 2 (0.2%) each for petroleum refineries, electric and electronics, rubber-based, paper and textile industries and 1 (0.1%) for edible oil refinery (**Figure 4.11**).

Among the parameters granted contravention were biochemical oxygen demand, chemical oxygen demand, suspended solids, ammoniacal nitrogen, total nitrogen, oil and grease, pH, boron, lead, sulphide, phenol. cadmium, zinc, silver and iron. Enforcement inspections were conducted on the licenced premises to determine the level of compliance. The overall compliance with the conditions of contravention licences in 2009 was 99%.

Keindahan Alam / Nature's Beauty



Rajah 4.10 JAS: Lesen Pelanggaran di bawah Seksyen 25(1) AKAS 1974, (2000-2009)
Figure 4.10 DOE: Number of Contravention Licenses Under Section 25(1)EQA 1974, (2000-2009)



Rajah 4.11 JAS: Lesen Pelanggaran di Bawah Seksyen 25(1)
AKAS 1974, Mengikut Jenis Industri, 2009
Figure 4.11 DOE: Contravention Licenses Under Section 25(1) by Industri Type 2009

PENGAWASAN KUALITI AIR MARIN KEBANGSAAN
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.

Dalam tahun 2009, terdapat 233 stesen pengawasan di seluruh Malaysia; Perlis (2 stesen), Kedah (3 stesen), Pulau Langkawi (7 stesen), Pulau Pinang (22 stesen), Perak (13 stesen), Selangor (14 stesen), Negeri Sembilan (13 stesen), Melaka (12 stesen), Johor (51 stesen), Pahang (11 stesen), Terengganu (19 stesen), Kelantan (10 stesen), W.P Labuan (5 stesen), Sabah (26 stesen), dan Sarawak (25 stesen) (**Jadual 4.5**). Empat (4) stesen baru telah dibuka pada tahun 2009 (**Jadual 4.6**) manakala dua (2) stesen telah ditutup kerana kewujudan stesen program pengawasan pulau-pulau yang sedia ada (**Jadual 4.7**).

Sebagai tambahan di bawah Program Pengawasan Selat Johor di bawah 'Malaysia-Singapore Joint Committee on the Environment' (MSJCE), 20 stesen telah dipantau pada tahun 2009 (**Jadual 4.8**).

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 estuaries and coastal areas to monitor marine water quality with respect to their beneficial uses such as recreation, fishing and marine parks.

In 2009, a total of 233 monitoring stations were set up throughout Malaysia; Perlis (2 stations), Kedah (3 stations), Pulau Langkawi (7 stations), Pulau Pinang (22 stations), Perak (13 stations), Selangor (14 stations), Negeri Sembilan (13 stations), Melaka (12 stations), Johor (51 stations), Pahang (11 stations), Terengganu (19 stations), Kelantan (10 stations), W.P Labuan (5 stations), Sabah (26 stations) and Sarawak (25 stations) (**Table 4.5**). Four (4) monitoring stations were opened in 2009 (**Table 4.6**) while two (2) monitoring stations were closed due to existing stations in the islands monitoring programme (**Table 4.7**).

Under the Malaysia-Singapore Joint Committee on the Environment (MSJCE) Monitoring Programme, 20 stations were monitored in 2009 (**Table 4.8**).

Kawasan Pantai yang Tidak Tercemar: Aktiviti Tangkapan Ikan /
Unpolluted Coastal Area: Fishing Activities

Jadual 4.5 JAS : Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2009
Table 4.5 DOE: Marine Water Quality Monitoring Stations, 2009

Bil. / No.	Negeri / State	Kawasan / Area	Nama Stesen / Station Name	No. Stesen / Station No.	Latitude / Latitude	Longitude / Longitude
1	PERLIS	KUALA / ESTUARINE	KUALA SG. BARU	6302903	N 06° 19' 54.5"	E 100° 09' 20.0"
2			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			KUALA JERLUN	6302925	N 06° 12' 36.0"	E 100° 14' 20.9"
3		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			PANTAI KOK	6397922	N 06° 22' 12.0"	E 099° 40' 43.7"
3			PANTAI KUAH	6398913	N 06° 19' 04.1"	E 099° 51' 04.5"
4			PANTAI PASIR TENGKORAK	6497901	N 06° 25' 46.3"	E 099° 43' 37.1"
5			PANTAI TELUK BURAU	6396923	N 06° 21' 52.4"	E 099° 40' 13.7"
6			PANTAI TELUK NIBUNG	6497915	N 06° 21' 38.9"	E 099° 42' 08.1"
7			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			KUALA SG. JURU	5304904	N 05° 20' 20.0"	E 100° 24' 20.0"
3			KUALA SG. KERIAN	5104901	N 05° 10' 00.0"	E 100° 25' 00.0"
4			KUALA SG. PINANG	5403934	N 05° 24' 00.0"	E 100° 20' 05.0"
5			KUALA SG.PERAI	5303908	N 05° 23' 00.0"	E 100° 22' 00.0"
6		PANTAI / COASTAL	BATU FERINGGI (CASUARINA)	5402904	N 05° 28' 10.0"	E 100° 14' 30.0"
7			KAW. PER. BAYAN LEPAS I	5303932	N 05° 20' 00.0"	E 100° 18' 45.0"
8			KAW. PER. BAYAN LEPAS II	5303933	N 05° 19' 00.0"	E 100° 18' 30.0"
9			KAW. PER. BAYAN LEPAS III	5302939	N 05° 18' 20.0"	E 100° 17' 45.0"
10			LUAR PANTAI TELUK BAHANG	5402930	N 05° 27' 45.0"	E 100° 12' 45.0"
11			PANTAI BERSIH	5403906	N 05° 26' 30.0"	E 100° 22' 40.0"
12			PANTAI MIAMI	5502901	N 05° 28' 30.0"	E 100° 16' 00.0"
13			PANTAI PASIR PANJANG	5201938	N 05° 17' 50.0"	E 100° 11' 00.0"
14			PERSIARAN GURNEY	5403902	N 05° 25' 30.0"	E 100° 19' 30.0"
15			RUMAH PAM BARU PERAI	5304927	N 05° 21' 15.0"	E 100° 23' 15.0"
16			RUMAH PAM LAMA PERAI	5303926	N 05° 20' 00.0"	E 100° 18' 45.0"
17			SELAT PP SELATAN (JELUTONG)	5303911	N 05° 23' 30.0"	E 100° 19' 50.0"
18			TANJUNG BUNGAH	5402937	N 05° 28' 00.0"	E 100° 16' 50.0"
19			GERTAK SANGGUL	5201919	N 05° 16' 50.0"	E 100° 12' 40.0"
20			TELUK TEMPOYAK	5202923	N 05° 28' 30.0"	E 100° 17' 30.0"
21		KUALA / ESTUARINE	KUALA SUNGAI TENGAH	5104901	N 05° 12' 41.0"	E 100° 25' 29.0"
22			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			KUALA SG. TG. PIANDANG	5003921	N 05° 04' 27.0"	E 100° 22' 34.0"
3			KUALA SG. GULA	4906926	N 04° 55' 07.0"	E 100° 28' 57.0"
4			KUALA SG. KURAU	4994919	N 04° 59' 13.0"	E 100° 25' 46.0"
5			KUALA SG. PERAK	4007901	N 03° 59' 03.0"	E 100° 48' 58.0"
6			KUALA SG. SEPETANG	4806925	N 04° 50' 07.0"	E 100° 37' 57.0"
7		PANTAI / COASTAL	PANTAI PASIR BOGAK	4205908	N 04° 12' 58.0"	E 100° 37' 55.0"
8			PANTAI PASIR PANJANG	4305924	N 04° 25' 07.0"	E 100° 35' 35.0"
9			PANTAI PUTERI DEWI	4205907	N 04° 15' 17.0"	E 100° 32' 47.0"
10			PANTAI TANJUNG BATU	4406927	N 04° 25' 07"	E 100° 35' 35"
11			PANTAI TELUK BATIK	4205923	N 04° 11' 14.0"	E 100° 36' 33.0"
12			PANTAI TELUK DALAM	4205928	N 04° 14' 53.0"	E 100° 33' 25.0"
13			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			PANTAI MORIB	2712902	N 02° 45' 00.0"	E 101° 26' 20.0"

Jadual 4.5 JAS : Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2009
Table 4.5 DOE: Marine Water Quality Monitoring Stations, 2009

Bil. / No.	Negeri / State	Kawasan / Area	Nama Stesen / Station Name	No. Stesen / Station No.	Latitude / Latitude	Longitude / Longitude
3	SELANGOR	PANTAI / COASTAL	SELAT PULAU BABI	3012929	N 03° 01' 10.0"	E 101° 15' 55.0"
4		KUALA / ESTUARINE	SELAT KLANG UTARA	3013908	N 03° 04' 00.0"	E 101° 21' 00.0"
5			KUALA SG. SEPANG	2517922	N 02° 35' 35.0"	E 101° 42' 56.0"
6			KUALA SG. SEPANG (KECIL)	2612928	N 02° 36' 40.0"	E 101° 42' 15.0"
7			KUALA SG. SEPANG (KAWALAN)	2616926	N 02° 36' 20.0"	E 101° 41' 30.0"
8			KUALA SUNGAI KLANG	3013909	N 03° 00' 06.0"	E 101° 23' 24.0"
9			KUALA SUNGAI LANGAT (JUGRA)	2814925	N 02° 48' 25.0"	E 101° 24' 15.0"
10			KUALA SUNGAI LANGAT (LUMUT)	2913903	N 02° 55' 50.0"	E 101° 21' 15.0"
11			KUALA SUNGAI BULOH	3212930	N 03° 15' 10.0"	E 101° 15' 50.0"
12			KUALA SUNGAI SELANGOR	3312915	N 03° 20' 00.0"	E 101° 13' 30.0"
13			KUALA SUNGAI TENGI	3311931	N 03° 23' 00.0"	E 101° 10' 20.0"
14			KUALA SUNGAI BERNAM	3808924	N 03° 51' 00.0"	E 100° 49' 00.0"
1	N. SEMBILAN	KUALA / ESTUARINE	KUALA SUNGAI LINGGI	2319901	N 02° 23' 20.0"	E 101° 58' 19.0"
2			KUALA SUNGAI LUKUT	2517910	N 02° 34' 45.0"	E 101° 47' 16.0"
3		PANTAI / COASTAL	PANTAI BAGAN PINANG	2418915	N 02° 30' 31.0"	E 101° 49' 44.0"
4			PANTAI TELUK SINTING PASIR PANJANG	2419908	N 02° 24' 57.0"	E 101° 56' 31.0"
5			PORT DICKSON BANDAR	2517907	N 02° 31' 16.0"	E 101° 47' 51.0"
6			PANTAI PORT DICKSON BATU 10	2418914	N 02° 24' 58.0"	E 101° 51' 23.0"
7			PANTAI PORT DICKSON BATU 5	2418906	N 02° 29' 46.0"	E 101° 50' 15.0"
8			PANTAI PORT DICKSON BATU 6	2418916	N 02° 29' 05.0"	E 101° 50' 46.0"
9			PANTAI PORT DICKSON BATU 7	2418905	N 02° 27' 43.0"	E 101° 51' 04.0"
10			PANTAI PORT DICKSON BATU 8	2418912	N 02° 27' 16.0"	E 101° 51' 20.0"
11			PANTAI PD. BATU 8 (STESEN KAWALAN)	2418913	N 02° 27' 16.0"	E 101° 51' 10.0"
12			PORT DICKSON TNB	2517909	N 02° 32' 09.0"	E 101° 47' 42.0"
13			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			KUALA SG. MELAKA	2122903	N 02° 11' 06.0"	E 102° 14' 52.0"
3			KUALA SG. SRI MELAKA	2121914	N 02° 11' 16.4"	E 102° 14' 39.2"
4			KUALA SG. MERLIMAU	2124912	N 02° 09' 25.0"	E 102° 25' 28.0"
5			KUALA SG. SEBATU	2186904	N 02° 06' 06.0"	E 102° 27' 35"
6		PANTAI / COASTAL	PANTAI KUNDOR TG. KELING	2221908	N 02° 14' 37.0"	E 102° 08' 29.0"
7			PANTAI ROMBANG TG. KELING	2221906	N 02° 13' 35.0"	E 102° 08' 57.0"
8			PANTAI TG. BIDARA	2320909	N 02° 17' 30.0"	E 102° 05' 18"
9			PANTAI TELUK GONG, PENGKALAN BALAK	2320902	N 02° 20' 23.0"	E 102° 03' 30.0"
10			PULAU UPEH	2121913	N 02°11.40.1'	E 102o 14.18.1'
11			PULAU MELAKA POINT A	2121915	N 02°10.44.5'	E 102o 14.59.3'
12			PULAU MELAKA POINT B	2121916	N 02°10.39.5'	E 102o 15.22.4'
1	JOHOR	PANTAI / COASTAL	KG.TANJUNG KOPOK	SJ1	N 01° 25' 31.0"	E 104° 00' 03"
2			KG. PASIR PUTIH	SJ2	N 01° 25' 48.0"	E 103° 55' 40.0"
3			J/K SULTAN ISKANDAR	SJ3	N 01° 26' 49.0"	E 103° 46' 09.0"
4			KG.SENIBUNG	SJ4	N 01° 29' 01.0"	E 103° 48' 47.0"
5		KUALA / ESTUARINE	KUALA SG.TEBRAU	SJ4A	N 01° 28' 56.0"	E 103° 47' 48.0"
6		PANTAI / COASTAL	TANJUNG PUTRI	SJ5	N 01° 27' 20.0"	E 103° 46' 09.0"
7			HADAPAN MPJB	SJ6	N 01° 27' 08.0"	E 103° 45' 43.0"
8			TANJUNG DANGA	SJ7	N 01° 27' 24.0"	E 103° 42' 52.0"
9		KUALA / ESTUARINE	KUALA SG.SKUDAI	SJ7A	N 01° 27' 46.0"	E 103° 43' 22.0"
10		PANTAI / COASTAL	HADAPAN PUSAT ISLAM	SJ7B	N 01° 27' 19.0"	E 103° 44' 51.0"
11			TEBING RUNTUH	SJ8	N 01° 25' 10.0"	E 103° 40' 06.0"
12		KUALA / ESTUARINE	KUALA SG.MELAYU	SJ8A	N 01° 26' 53.0"	E 103° 41' 53.0"

Jadual 4.5 JAS : Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2009
Table 4.5 DOE: Marine Water Quality Monitoring Stations, 2009

Bil. / No.	Negeri / State	Kawasan / Area	Nama Stesen / Station Name	No. Stesen / Station No.	Latitude / Latitude	Longitude / Longitude
13	JOHOR	PANTAI / COASTAL	TANJUNG BUNGA	SJ9	N 01° 23' 07.0"	E 103° 39' 02.0"
14			TANJUNG KUPANG	SJ10	N 01° 23' 36.0"	E 103° 39' 11.0"
15		KUALA / ESTUARINE	KUALA SUNGAI BATU PAHAT	1729930	N 01° 47' 44.0"	E 102° 53' 22.0"
16			KUALA SUNGAI JOHOR	1440916	N 01° 29' 04.0"	E 104° 01' 22.0"
17			KUALA SUNGAI MELAYU	1437946	N 01° 27' 15.0"	E 103° 41' 56.0"
18			KUALA SUNGAI MERSING	2438905	N 02° 26' 10.0"	E 103° 50' 35.0"
19			KUALA SUNGAI MUAR	2024932	N 02° 02' 54.0"	E 102° 33' 11.0"
20			KUALA SUNGAI SEGGET	1437919	N 01° 27' 21.0"	E 103° 45' 58.0"
21			KUALA SUNGAI SKUDAI	1437922	N 01° 28' 28.0"	E 103° 43' 12.0"
22			KUALA SUNGAI TEBRAU	1438943	N 01° 28' 56.0"	E 103° 47' 48.0"
23		PANTAI / COASTAL	HADAPAN HSAJB	1437920	N 01° 27' 19.0"	E 103° 44' 44.0"
24			JETI TANJONG BELUNGKOR	1440963	N 01° 27' 14.0"	E 104° 04' 03.0"
25			KG. TELUK JAWA	1438918	N 01° 28' 17.0"	E 103° 50' 30.0"
26			PANTAI AIR PAPAN	2538959	N 02° 31' 05.0"	E 103° 50' 00.0"
27			PANTAI DESARU	1542914	N 01° 32' 48.0"	E 104° 15' 41.0"
28			LUAR KUKUP	1334925	N 01° 19' 30.0"	E 103° 26' 29.0"
29			PANTAI LIDO	1437921	N 01° 27' 56.0"	E 103° 43' 29.0"
30			PANTAI SRI PANTAI	2339960	N 02° 22' 45.0"	E 103° 53' 19.0"
31			PANTAI STULANG LAUT	1437951	N 01° 28' 02.0"	E 103° 46' 46.0"
32			PANTAI SUNGAI LURUS	1730962	N 01° 43' 42.0"	E 103° 01' 43.0"
33			PANTAI TANJONG SETAPA	1341961	N 01° 20' 33.0"	E 104° 08' 09.0"
34			PANTAI TELUK GOREK	2538958	N 02° 34' 57.0"	E 103° 48' 18.0"
35			PANTAI TELUK MAHKOTA	1841911	N 01° 53' 52.0"	E 104° 06' 15.0"
36			PANTAI TG.LEMAN	2140694	N 02° 08' 43.0"	E 104° 00' 24.0"
37			PASIR GOGOK	1441966	N 01° 25' 02.8'	E 104° 05' 59.7'
38			PEL. PASIR GUDANG	1428939	N 01° 25' 44.0"	E 103° 54' 03.0"
39			TANJUNG BUAI	1340973	N 01° 29' 48.1"	E 104° 02' 43.4"
40			TANJUNG MERAK	1441968	N 01° 21' 45.9'	E 104° 06' 35.5"
41			TANJUNG PENGELIH	1441967	N 01° 22 14.7'	E 104° 05' 19.5"
42			TANJUNG PENYUSUP	1444920	N 01° 22' 12.9"	E 104° 16' 48.3"
43			TANJUNG SEPANG	1443969	N 01° 23' 01.2"	E 104° 06' 44.8"
44			PANTAI PUNGGUR	1531974	N 01° 41' 05.0"	E 103° 05' 54.0"
45		KUALA / ESTUARINE	SUNGAI KIM-KIM	1439965	N 01° 25' 24.0"	E 103° 54' 03.0"
46			PULAU BELUNGKOR	EM4	N 01° 26' 25.8"	E 104° 03' 11.04"
47		PANTAI / COASTAL	PULAU TEKONG	EM5	N 01° 25' 42.3"	E 104° 04' 36.72"
48			PULAU TEKONG	EM6	N 01° 23' 19.2"	E 104° 05' 20.40"
49			JETI PULAREK	EM7	N 01° 21' 26.8"	E 104° 04' 40.65"
50			TANJUNG PENGELIH	WQ10	N 01° 19' 52.62"	E 104° 05' 39.57"
51			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 03° 41' 54.0"	E 103° 20' 19.0"
2			PANTAI BATU HITAM	3833915A	N 03° 53' 06"	E 103° 21' 58"
				3833915B	N 03° 53' 09"	E 103° 21' 59"
3			PANTAI CHERATING (Club Med)	4133903A	N 04° 08' 41.0"	E 103° 24' 31.0"
				4133903B	N 04° 07' 51.0"	E 103° 24' 23"
4			PANTAI CHERATING (Legend)	4133942A	N 04° 06' 16.0"	E 103° 23' 06"
				4133942B	N 04° 06' 12.0"	E 103° 23' 07"
5			PANTAI KUALA API-API	3235917	N 03° 31' 20.0"	E 103° 23' 45.0"
6			PANTAI MUHIBBAH BALOK	3933901A	N 03° 55' 28.0"	E 103° 22' 21.1"
				3933901B	N 03° 55' 30.0"	E 103° 22' 23.0"

Jadual 4.5 JAS : Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2009
Table 4.5 DOE: Marine Water Quality Monitoring Stations, 2009

Bil. / No.	Negeri / State	Kawasan / Area	Nama Stesen / Station Name	No. Stesen / Station No.	Latitude / Latitude	Longitude / Longitude
7	PAHANG	PANTAI / COASTAL	PANTAI BESERAH	3933941A	N 03° 54' 41.0"	E 103° 22' 02.0"
				3933941B	N 03° 54' 39.0"	E 103° 22' 01.0"
8			PANTAI TANJUNG BATU	3334915	N 03° 31' 10.0"	E 103° 23' 45.0"
9			PANTAI TELUK CEMPEDAK	3833910A	N 03° 48' 51"	E 103° 22' 19.0"
				3833910B	N 03° 48' 49.0"	E 103° 22' 21.0"
10			PANTAI TELUK GELORA	3833909A	N 03° 48' 16.0"	E 103° 20' 43.0"
				3833909B	N 03° 48' 20.0"	E 103° 20' 43.0"
11			PANTAI LEGENDA	3534943A	N 03° 12' 16.7"	E 103° 26' 53.7"
				3534943B	N 03° 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			KUALA SG. DUNGUN	4734918	N 04° 46' 48.9"	E 103° 25' 21.6"
3			KUALA SG. IBAI	5231949	N 05° 17' 06.1"	E 103° 10' 06.5"
4			KUALA SG. KERTEH	4534922	N 04° 30' 59.1"	E 103° 26' 52.6"
5			UTARA TIOXIDE	4234950	N 04° 17' 06.3"	E 103° 28' 20.9"
6			TENGAH TIOXIDE (DISCHARGE)	4234951	N 04° 16' 22.8"	E 103° 28' 12.7"
7			SELATAN TIOXIDE	4234952	N 04° 15' 04.1"	E 103° 27' 59.2"
8			KUALA SG. MARANG	5232911	N 05° 12' 24.7"	E 103° 12' 28.9"
9			KUALA SG. PAKA	4634920	N 04° 39' 29.7"	E 103° 25' 57.7"
10			KUALA SG. SETIU	5627953	N 05° 40' 05.9"	E 102° 42' 26.9"
11			KUALA SG. TERENGGANU	5331907	N 05° 20' 22.1"	E 103° 08' 12.6"
12			KUALA SUNGAI KEMAMAN	4234929	N 04° 14' 25.2"	E 102° 26' 48.8"
13		PANTAI / COASTAL	PANTAI BATU BURUK	5331935	N 05° 19' 29.1"	E 103° 09' 01.4"
14			PANTAI BUKIT KELUANG	5825903	N 05° 50' 02.8"	E 102° 36' 01.4"
15			PANTAI CHENDERING	5231934	N 05° 16' 11.8"	E 103° 10' 51.9"
16			PANTAI RANTAU ABANG	4833917	N 04° 52' 11.4"	E 103° 23' 17.4"
17			KIPC UTARA	4634953	N 04° 36' 37.9"	E 103° 26' 39.2"
18			KIPC TENGAH	4534954	N 04° 34' 54.9"	E 103° 27' 19.5"
19			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			KUALA SG. GOLOK	6220911	N 6° 14' 05.0"	E 102° 05' 35.0"
3			KUALA SG. KELANTAN	6222901	N 6° 13' 12.0"	E 102° 13' 50.0"
4			KUALA SG. PENG. DATU	6123913	N 6° 10' 20.0"	E 102° 20' 40.0"
5			KUALA SG.PENG.CHEPA	6223912	N 6° 12' 20.0"	E 102° 18' 10.0"
6		PANTAI / COASTAL	PANTAI BISIKAN BAYU	5825905	N 5° 52' 00.0"	E 102° 31' 00.0"
7			PANTAI CAHAYA BULAN	6122903	N 6° 10' 45.0"	E 102° 16' 50.0"
8			PANTAI IRAMA BACHOK	6024908	N 6° 03' 00.0"	E 102° 25' 15.0"
9			PANTAI SABAK	6123909	N 6° 10' 25.0"	E 102° 20' 10.0"
10			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			TANJUNG ARU	5251903	N 05° 21' 02.0"	E 115° 14' 39.0"
3			PULAU PAPAN	5151905	N 05° 15' 22.0"	E 115° 16' 03.0"
4			KIAMSAM	5151906	N 05° 15' 22.0"	E 115° 10' 28.0"
5			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			KUALA SG.PENYU	5453901	N 05° 34' 13.0"	E 115° 35' 55.0"
3		PANTAI / COASTAL	BORNEO GOLF SEAWATER	5355901	N 05° 33' 00.0"	E 115° 47' 01.0"
4			PANTAI BAK-BAK KUDAT	6665901	N 06° 56' 44.0"	E 116° 50' 23.0"
5			PANTAI ULU TUNGKU, LAHAD DATU	5085901	N 05° 01' 09.0"	E 118° 53' 09.0"
6			PANTAI BATU SAPI	5580903	N 05° 47' 42.0"	E 118° 02' 22.0"

Jadual 4.5 JAS : Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2009
Table 4.5 DOE: Marine Water Quality Monitoring Stations, 2009

Bil. / No.	Negeri / State	Kawasan / Area	Nama Stesen / Station Name	No. Stesen / Station No.	Latitude / Latitude	Longitude / Longitude
7	SABAH	PANTAI / COASTAL	PANTAI DALIT, TUARAN	6161901	N 06° 11' 25.0"	E 116° 09' 45.0"
8			PANTAI LOK KAWI	5560904	N 05° 55' 00.0"	E 116° 02' 00.0"
9			PANTAI MANGROVE PARADISE, TUARAN	6161902	N 06° 15' 02.0"	E 116° 13' 50.0"
10			PANTAI MANIS, PAPAR	5555901	N 05° 45' 15.0"	E 115° 52' 04.0"
11			PANTAI MELINSUNG, PAPAR	5565902	N 05° 50' 18.0"	E 115° 50' 45.0"
12			PANTAI PASIR PUTIH, SANDAKAN	5580901	N 05° 49' 26.0"	E 118° 04' 58.0"
13			PANTAI SABANDAR, TUARAN	6161903	N 06° 15' 02.2"	E 116° 13' 50.0"
14			PANTAI SARINA, KUNAK	4481901	N 04° 39' 41.0"	E 118° 17' 01.0"
15			PANTAI SILAM LAHAD DATU	4681902	N 04° 58' 08.0"	E 118° 14' 46.0"
16			PANTAI TELUK BRUNEI 1	5053901	N 05° 09' 55.0"	E 115° 32' 53.0"
17			PANTAI TELUK BRUNEI 2	5053902	N 05° 09' 55.0"	E 115° 32' 53.0"
18			PANTAI TELUK BRUNEI 3	5053903	N 05° 09' 55.0"	E 115° 32' 53.0"
19			PANTAI TELUK BRUNEI 4	5053904	N 05° 09' 55.0"	E 115° 32' 53.0"
20			PANTAI TELUK BRUNEI 5	5053905	N 05° 09' 55.0"	E 115° 32' 53.0"
21			PANTAI TELUK BRUNEI 6	5053906	N 05° 09' 55.0"	E 115° 32' 53.0"
22			PANTAI TG. ARU (REST LIDO)	5656901	N 05° 55' 01.0"	E 115° 59' 03.0"
23			PANTAI TG. ARU (ROLLER SKATING)	5656902	N 05° 55' 01.0"	E 115° 59' 03.0"
24			PANTAI TG.ARU (No. 3)	5656903	N 05° 55' 01.0"	E 115° 59' 03.0"
25			PANTAI TINAGAT, TAWAU	4473901	N 04° 13' 22.0"	E 117° 59' 04.0"
26			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			KUALA BATANG KEMENA	3130911	N 03° 10' 53.0"	E 113° 01' 40.0"
3			KUALA BATANG RAJANG	2111909	N 02° 07' 22.0"	E 111° 11' 21"
4			KUALA SG. MIRI	4349915	N 04° 23' 59.0"	E 113° 58' 25.0"
5			KUALA SG. SANTUBONG	1702903	N 01° 46' 38.0"	E 110° 16' 46.0"
6			KUALA SG. SEMATAN	1898901	N 01° 48' 49.0"	E 109° 46' 29.0"
7			KUALA SG.SARAWAK	1604907	N 01° 36' 44.0"	E 110° 29' 44.0"
8			KUALA MUKAH	2920920	N 02° 54' 41.0"	E 112° 05' 25.0"
9			KUALA KRIAN	1710924	N 01° 47' 20.0"	E 111° 05' 58.0"
10		PANTAI / COASTAL	PANTAI BAKO	1704906	N 01° 42' 49.0"	E 110° 25' 40.0"
11			PANTAI BELAWAI	2212913	N 02° 14' 27.0"	E 111° 12' 51.0"
12			PANTAI BRIGHTON	4449917	N 04° 22' 25.0"	E 113° 57' 51.0"
13			PANTAI DAMAI	1702904	N 01° 47' 55.0"	E 110° 17' 58.0"
14			PANTAI LIKAU	3230915	N 03° 20' 49.0"	E 113° 08' 57.0"
15			PANTAI PANDAN	1824918	N 01° 50' 16.0"	E 109° 40' 11.0"
16			PANTAI PASIR PUTIH	1604910	N 01° 30' 14.0"	E 110° 30' 00.0"
17			PANTAI PIASAU	4539918	N 04° 27' 27.0"	E 113° 59' 38.0"
18			PANTAI SEMATAN	1898902	N 01° 49' 38.0"	E 109° 46' 29.0"
19			PANTAI TANJUNG BATU	3230913	N 03° 12' 38.0"	E 113° 02' 26.0"
20			PANTAI HARMONI	2920921	N 02° 54' 35.0"	E 112° 03' 22.0"
21			PANTAI TANJUNG KEMBANG	1810923	N 01° 49' 28.0"	E 111° 05' 44.0"
22		KUALA / ESTUARINE	KUALA SG BARAM	4539919	N 04° 34' 50.9"	E 113° 58' 48.0"
23		PANTAI / COASTAL	PANTAI ESPLANED	4339920	N 04° 19' 04.6"	E 113° 57' 31.0"
24			PANTAI BERAYA	4238921	N 04° 12' 45.1"	E 113° 53' 30.6"
25			PANTAI BUNGAI	4137922	N 04° 03' 42.2"	E 113° 46' 50.3"

Kuala / Estuarine : 77
Pantai / Coastal : 156
Jumlah / Total : 233

Jadual 4.6 JAS : Senarai Stesen Yang Telah Dibuka, 200 9
Table 4.5 DOE: List of Newly-Opened Station, 2009

Bil. / No.	Negeri / State	Kawasan / Area	Nama Stesen / Station Name	No. Stesen / Station No.	Latitude / Latitude	Longitude / Longitude
1	MELAKA	KUALA / ESTUARINE	KUALA SG. SRI MELAKA	2121914	N 02° 11' 16.4"	E 102° 14' 39.2"
2		PANTAI / COASTAL	PULAU UPEH	2121913	N 02° 11.40.1'	E 102° 14.18.1'
3			PULAU MELAKA POINT A	2121915	N 02° 10.44.5'	E 102° 14.59.3'
4			PULAU MELAKA POINT B	2121916	N 02° 10.39.5'	E 102° 15.22.4'

Jadual 4.7 JAS : Senarai Stesen Yang Telah Ditutup, 200 9
Table 4.7 DOE: List of Closed Station, 2009

Bil. / No.	Negeri / State	Kawasan / Area	Nama Stesen / Station Name	No. Stesen / Station No.	Latitude / Latitude	Longitude / Longitude
1	PULAU PINANG	PANTAI / COASTAL	PULAU AMAN	5203910	N 05° 15' 50.0"	E 100° 23' 35.0"
2			BATU MAUNG	5202901	N 05° 17' 10.0"	E 100° 17' 25.0"

Jadual 4.8 JAS : Senarai Stesen Pengawasan 'Malaysia-Singapore Joint Committee on the Environment' (MSJCE), 200 9
Table 4.8 DOE: Monitoring Stations under the Malaysia-Singapore Joint Committee on the Environtment' (MSJCE), 2009

Bil. / No.	Negeri State	Kawasan / Area	Nama Stesen / Station Name	No. Stesen / Station No.	Latitude / Latitude	Longitude / Longitude
1	JOHOR	PANTAI / COASTAL	KG.TANJUNG KOPOK	SJ1	N 01° 25' 31.0"	E 104° 00' 03"
2			KG. PASIR PUTIH	SJ2	N 01° 25' 48.0"	E 103° 55' 40.0"
3			J/K SULTAN ISKANDAR	SJ3	N 01° 26' 49.0"	E 103° 46' 09.0"
4			KG.SENIBUNG	SJ4	N 01° 29' 01.0"	E 103° 48' 47.0"
5		KUALA / ESTUARINE	KUALA SG.TEBRAU	SJ4A	N 01° 28' 56.0"	E 103° 47' 48.0"
6		PANTAI / COASTAL	TANJUNG PUTRI	SJ5	N 01° 27' 20.0"	E 103° 46' 09.0"
7			HADAPAN MPJB	SJ6	N 01° 27' 08.0"	E 103° 45' 43.0"
8			TANJUNG DANGA	SJ7	N 01° 27' 24.0"	E 103° 42' 52.0"
9		KUALA / ESTUARINE	KUALA SG.SKUDAI	SJ7A	N 01° 27' 46.0"	E 103° 43' 22.0"
10		PANTAI / COASTAL	HADAPAN PUSAT ISLAM	SJ7B	N 01° 27' 19.0"	E 103° 44' 51.0"
11			TEBING RUNTUH	SJ8	N 01° 25' 10.0"	E 103° 40' 06.0"
12		KUALA / ESTUARINE	KUALA SG.MELAYU	SJ8A	N 01° 26' 53.0"	E 103° 41' 53.0"
13		PANTAI / COASTAL	TANJUNG BUNGA	SJ9	N 01° 23' 07.0"	E 103° 39' 02.0"
14			TANJUNG KUPANG	SJ10	N 01° 23' 36.0"	E 103° 39' 11.0"
15			PULAU BELUNGKOR	EM4	N 01° 26' 25.8"	E 104° 03' 11.04"
16			PULAU TEKONG	EM5	N 01° 25' 42.3"	E 104° 04' 36.72"
17			PULAU TEKONG	EM6	N 01° 23' 19.2"	E 104° 05' 20.40"
18			JETI PULAREK	EM7	N 01° 21' 26.8"	E 104° 04' 40.65"
19			TANJUNG PENGELIH	WQ10	N 01° 19' 52.62"	E 104° 05' 39.57"
20			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 banyak pulau yang kaya dengan sumber akuatik. Kualiti air marin memainkan peranan yang penting dalam pemuliharaan sumber semulajadi ini. Sehubungan dengan itu, Program Pengawasan Kualiti Air Marin Pulau-Pulau telah dimulakan pada Julai 1998.

Bagi tahun 2009, program ini melibatkan sekitar 73 buah pulau terpilih dengan 86 buah stesen pengawasan. Pulau-Pulau ini dikelaskan mengikut empat kategori iaitu pulau-pulau pembangunan (3), pulau-pulau peranginan (31), pulau-pulau Taman Laut (21), dan pulau-pulau yang dilindungi (18) (**Jadual 4.9**).

Frekuensi persampelan bagi Pulau Pembangunan adalah sebanyak enam (6) kali setahun manakala bagi pulau yang lainnya adalah sebanyak empat (4) kali setahun. Sebanyak 21 stesen pulau-pulau taman laut digugurkan kerana bertindih dengan aktiviti yang sama oleh Jabatan Taman Laut Malaysia (JTLM) (**Jadual 4.10**) manakala 22 stesen baru merangkumi pelbagai kategori pulau telah ditambah (**Jadual 4.11**).

Pengukuran parameter-parameter fizikal kualiti air marin dibuat secara *in-situ* seperti suhu, pH, konduktiviti, kemasinan, oksigen terlarut dan kekeruhan manakala 14 parameter yang dianalisis di makmal pula adalah seperti jumlah pepejal terampai, *Escherichia Coli*, nitrat, fosfat, jumlah karbon organik, minyak dan gris termasuk logam berat seperti Merkuri (Hg), Kadmium (Cd), Kromium (Cr), Kuprum (Cu), Plumbum (Pb), Arsenik (As), Tributiltin (TBT) dan Trifeniltin (TPT) (**Jadual 4.12**). Percontohan bebola tar di pantai juga dilaksanakan.

Malaysia is endowed with many islands with rich marine aquatic resources. The quality of marine water plays an important role in the conservation of these resources. As a step towards this, the Island Marine Water Quality Monitoring Programme was started in July 1998.

In 2009, the monitoring programme covers 73 selected islands with 86 monitoring stations. These islands are classified into four categories, development islands (3), resort islands (31), Marine Park Islands (21), and protected islands (18) (**Table 4.9**).

The sampling frequency for development islands was six (6) times per year, and four (4) times per year for the other islands. Twenty-one (21) stations classified as marine park islands were dropped due to overlapping monitoring activities with the Department of Marine Park Malaysia (**Table 4.10**) and 22 new stations were added representing all four (4) categories (**Table 4.11**).

Marine water quality monitoring includes measurement of in-situ parameters such as temperature, pH, conductivity, salinity, dissolved oxygen, turbidity; while laboratory analysis involves 14 other parameters such as total suspended solids, *Escherechia Coli*, nitrate, phosphate, total organic carbon, oil and grease, and heavy metals like Mercury (Hg), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Arsenic (As), Tributyltin (TBT) and Triphenitin (TPT) **(Table 4.12**). Tarball samplings on beaches were also conducted.

Jadual 4.9 JAS : Pengawasan Kualiti Air Marin Pulau, 200 9
Table 4.9 DOE: Island Water Quality Monitoring, 2009

Bil. / No.	Negeri / State	Pulau / Island	Kategori / Category	Bilangan Stesen / No. of Station	Latitude / Latitude	Longitude / Longitude
1.	PERLIS	Perak	P	1	N 05° 41' 8.00"	E 098° 56' 49.0"
1.	KEDAH	Singa Besar	R	1	N 06° 13' 36.3"	E 099° 44' 42.9"
2.		Dayang Bunting	R	1	N 06° 12' 26.2"	E 099° 46' 48.9"
3.		Langkawi	D	1	N 06° 18' 34.8"	E 099° 51' 00.3"
4.		Langkawi	D	1	N 06° 25' 51.1"	E 099° 45' 49.0"
5.		Langkawi	D	1	N 06° 18' 51.9"	E 099° 42' 30.1"
6.		Langkawi	D	1	N 06° 27' 24.6"	E 099° 49' 27.6"
1.	PERAK	Pangkor	R	1	N 04° 11' 33.8"	E 100° 34' 51.8"
2.		Pangkor	R	1	N 04° 15' 10.7"	E 100° 32' 39.3"
3.		Pangkor Laut	R	1	N 04° 12' 14.1"	E 100° 32' 53.0"
4.		Sembilan	R	1	N 04° 00' 30.7"	E 100° 32' 38.4"
5.		Tukun Perak	P	1	N 04° 07' 32.4"	E 100° 33' 40.3"
1.	P. PINANG	Aman	R	1	N 05° 17' 09.7"	E 100° 17' 28.5"
2.		Jerejak	R	1	N 05° 16' 51.2"	E 100° 11' 24.6"
3.		Kendi	R	1	N 05° 27' 41.4"	E 100° 12' 51.9"
4.		Rimau	R	1	N 05° 25' 12.7"	E 100° 20' 47.9"
5.		Gedong	R	1	N 05° 16' 02.6"	E 100° 23' 35.9"
6.		Pulau Pinang	D	1	N 05° 20' 02.3"	E 100° 19' 03.6"
7.		Pulau Pinang	D	1	N 05° 13' 56.6"	E 100° 11' 04.8"
8.		Pulau Pinang	D	1	N 05° 15' 01.9"	E 100° 16' 19.3"
9.		Pulau Pinang	D	1	N 05° 16' 26.4"	E 100° 23' 30.6"
1.	SELANGOR	Ketam	R	1	N 03° 01' 17.5"	E 101° 15' 46.4"
2.		Angsa	R	1	N 03° 11' 08.0"	E 101° 13' 07.1"
3.		Lumut	R	1	N 02° 59' 54.6"	E 101° 21' 42.6"
6.	NEGERI SEMBILAN	Arang	P	1	N 02° 31' 03.5"	E 101° 47' 37.8"
1.	MELAKA	Besar	R	1	N 02° 06' 55.8"	E 102° 20' 10.6"
2.		Upeh	R	1	N 02° 11' 39.5"	E 102° 12' 17.2"
3.		Undan	R	1	N 02° 02' 50.5"	E 102° 20' 07.2"
1.	PAHANG	Tioman	M	1	N 02° 44' 22.0"	E 104° 07' 53.4"
2.		Seri Buat	M	1	N 02° 41' 07.4"	E 103° 55' 24.6"
3.		Cebeh	M	1	N 02° 55' 53.6"	E 104° 05' 51.4"
4.		Tulai	M	1	N 02° 54' 42.1"	E 104° 06' 51.9"
5.		Labas	M	1	N 02° 53' 23.7"	E 104° 03' 56.6"
6.		Sembilang	M	1	N 02° 40' 53.8"	E 103° 53' 28.4"
1.	JOHOR	Setindan	R	1	N 02° 28' 35.9"	E 103° 51' 28.7"
2.		Babi Tengah	M	1	N 02° 28' 20.4"	E 103° 51' 41.9"
3.		Dayang	R	1	N 02° 28' 12.8"	E 104° 30' 12.9"
4.		Nanga Besar	M	1	N 02° 16' 18.0"	E 104° 37' 37.5"
5.		Sibu Tengah	R	1	N 02° 10' 54.9"	E 104° 05' 45.4"
6.		Pemanggil	M	1	N 02° 04' 52.1"	E 104° 18' 54.8"
7.		Kukup	P	1	N 01° 19' 41.9"	E 103° 26' 12.0"
8.		Pisang	P	1	N 01° 28' 05.8"	E 103° 15' 45.5"
1.	TERENGGANU	Gumia	R	1	N 05° 13' 51.8"	E 103° 15' 39.3"
2.		Bidong Laut	R	1	N 05° 36' 43.6"	E 103° 03' 23.7"
3.		Duyong	R	1	N 05° 20' 05.6"	E 103° 07' 44.7"
4.		Perhentian Besar	M	1	N 05° 53' 21.5"	E 102° 45' 01.8"
5.		Perhentian Besar	M	1	N 05° 53' 21.5"	E 102° 45' 01.8"

Jadual 4.9 JAS : Pengawasan Kualiti Air Marin Pulau, 200 9
Table 4.9 DOE: Island Water Quality Monitoring, 2009

Bil. / No.	Negeri / State	Pulau / Island	Kategori / Category	Bilangan Stesen / No. of Station	Latitude / Latitude	Longitude / Longitude
5.		Perhentian Kecil	M	1	N 05° 55‘ 04.5”	E 102° 43’ 30.4”
7.		Redang	M	1	N 05° 46’ 32.2”	E 103° 02’ 13.4”
8.		Redang	M	1	N 05° 46’ 32.2”	E 103° 02’ 13.4”
9.		Pinang	M	1	N 05° 44‘ 52.7”	E 103° 00’ 09.4”
10.		Ekor Tebu	M	1	N 05° 44’ 25.6”	E 103° 01’ 45.4”
11.		Lima	M	1	N 05° 46’ 11.5”	E 103° 03’ 32.6”
12.		Tenggol	P	1	N 04° 48’ 33.8”	E 103° 40’ 32.1”
13.		Nyireh	P	1	N 04° 50’ 39.9”	E 103° 39’ 47.5”
1.	KELANTAN	Panjang	P	1	N 06° 11’ 15.8”	E 102° 18’ 32.7”
2.		Kundur	P	1	N 06° 13’ 00.6”	E 102° 14’ 87.1”
1.	SABAH	Gaya	R	1	N 06° 00‘ 58.7”	E 116° 03’ 12.1”
2.		Layang-Layang	R	1	N 07° 22’ 12.6”	E 113° 50’ 16.4”
3.		Mabul	R	1	N 04° 15’ 04.0”	E 118° 38’ 02.4”
4.		Sipadan	R	1	N 04° 07’ 05.2”	E 118° 37’ 37.3”
5.		Sipadan	R	1	N 04° 06’ 51.0”	E 118° 37’ 32.9”
6.		Sapi	M	1	N 06° 00’ 59.9”	E 116° 00’ 53.6”
7.		Manukan	R	1	N 05° 58’ 39.8”	E 116° 00’ 44.7”
8.		Tiga	R	1	N 05° 43’ 17.4”	E 115° 39’ 02.4”
9.		Kalampunian Besar	M	1	N 05° 45’ 51.0”	E 115° 40’ 71.0”
10.		Kapalai	R	1	N 04° 13’ 52.0”	E 118° 41’ 08.2”
11.		Ligitan	R	1	N 04° 09’ 52.0”	E 118° 50’ 35.9”
12.		Molleangan Besar	R	1	N 07° 04’ 90.6”	E 117° 02’ 51.5”
13.		Banggi	R	1	N 07° 06’ 53.0”	E 117° 05’ 13.4”
14.		Balambangan	R	1	N 07° 11’ 76.9”	E 116° 52’ 19.5”
15.		Silingan	P	1	N 06° 10’ 43.3”	E 118° 03’ 50.0”
16.		Gulisan	P	1	N 06° 08’ 93.3”	E 118° 03’ 33.3”
17.		Bakungan Kecil	P	1	N 06° 09’ 92.6”	E 118° 06’ 49.8”
1.	SARAWAK	Satang Besar	P	1	N 01° 46’ 39.0”	E 110° 09’ 53.7”
2.		Talang-Talang Kecil	P	1	N 01° 53’ 42.9”	E 109° 45’ 58.2”
3.		Talang-Talang Besar	P	1	N 01° 54’ 39.7”	E 109° 46’ 36.0”
4.		Patuk	P	1	N 02° 43’ 86.0”	E 111° 24’ 03.6”
5.		Bruit	P	1	N 02° 44’ 43.4”	E 111° 23’ 11.0”
1.	W. P LABUAN	Labuan	D	1	N 05° 22’ 49.9”	E 115° 13’ 43.8”
2.		Labuan	D	1	N 05° 16’ 21.9”	E 115° 14’ 55.5”
3.		Labuan	D	1	N 05° 22’ 18.6”	E 115° 14’ 48.0”
4.		Labuan	D	1	N 05° 14’ 30.9”	E 115° 14’ 23.3”
5.		Kuraman	M	1	N 05° 13’ 07.5”	E 115° 08’ 25.5”
6.		Rusukan Kecil	M	1	N 05° 12’ 06.4”	E 115° 08’ 53.9”
7.		Rusukan besar	M	1	N 05° 11’ 24.0”	E 115° 08’ 31.2”

		Bilangan Pulau / No. of Island	Bilangan Stesen / No. of Station
	Pulau Peranginan / Resort Island (R)	31	33
	PulauTaman Laut / Marine Park Island (M)	21	23
	Pulau Dilindungi / Protected Island (P)	18	18
	Pulau pembangunan / Development Island (D)	3	12
	Jumlah / Total	**73**	**86**

Jadual 4.10 JAS : Senarai Stesen Yang Telah Ditutup, 2009
Table 4.10 DOE: List of Closed Stations, 2009

Bil. / No.	Negeri / State	Pulau / Island	Kategori / Category	Bilangan Stesen / No. of Station	Latitude / Latitude	Longitude / Longitude
1.	KEDAH	Payar	M	1	N 06° 03' 52.0"	E 100° 02' 33.5"
2.		Kaca	M	1	N 06° 04' 18.2"	E 100° 03' 06.5"
3.		Lembu	M	1	N 06° 04' 28.2"	E 100° 03' 29.6"
4.		Segantang	M	1	N 06° 02' 36.7"	E 099° 55' 34.0"
1.	PAHANG	Tioman	M	1	N 02° 44' 22.0"	E 104° 07' 53.4"
2.		Sepui	M	1	N 02° 53' 53.8"	E 104° 03' 09.7"
3.		Tokong Bahara	M	1	N 02° 39' 48.2"	E 104° 03' 43.9"
4.		But	M	1	N 02° 39' 59.5"	E 104° 03' 36.4"
1.	JOHOR	Harimau	M	1	N 02° 33' 26.5"	E 103° 56' 46.3"
2.		Mensirip	M	1	N 02° 33' 04.8"	E 103° 57' 28.9"
3.		Gual	M	1	N 02° 32' 03.0"	E 103° 58' 03.0"
4.		Babi Hujung	M	1	N 02° 29' 24.8"	E 103° 56' 21.9"
5.		Sibu Besar	M	1	N 02° 12' 21.0"	E 104° 04' 22.0"
6.		Sibu Hujung	M	1	N 02° 10' 20.0"	E 104° 06' 39.7"
7.		Rawa	M	1	N 02° 31' 03.0"	E 103° 58' 09.6"
8.		Tinggi	M	1	N 02° 17' 33.7"	E 104° 06' 03.7"
9.		Besar	M	1	N 02° 25' 51.8"	E 103° 58' 37.1"
10.		Aur	M	1	N 02° 27' 24.3"	E 104° 30' 08.5"
1.	TERENGGANU	Kapas	M	1	N 05° 13' 01.1"	E 103° 15' 35.4"
2.		Susu Dara	M	1	N 05° 57' 34.8"	E 102° 40' 30.8"
3.		Lang Tengah	M	1	N 05° 47' 32.9"	E 102° 53' 27.1"

Jadual 4.11 JAS : Senarai Stesen Yang Baru Dibuka, 2009
Table 4.10 DOE: List of Newly-Opened Stations, 2009

Bil. / No.	Negeri / State	Pulau / Island	Kategori / Category	Bilangan Stesen / No. of Station	Latitude / Latitude	Longitude / Longitude
1.	PERLIS	Perak	P	1	N 05° 41' 8.00"	E 098° 56' 49.0"
1.	PERAK	Tukun Perak	P	1	N 04° 07' 32.4"	E 100° 33' 40.3"
1.	NEGERI SEMBILAN	Arang	P	1	N 02° 31' 03.5"	E 101° 47' 37.8"
1.	MELAKA	Undan	R	1	N 02° 02' 50.5"	E 102° 20' 07.2"
1.	JOHOR	Kukup	P	1	N 01° 19' 41.9"	E 103° 26' 12.0"
2.		Pisang	P	1	N 01° 28' 05.8"	E 103° 15' 45.5"
1.	KELANTAN	Panjang	P	1	N 06° 11' 15.8"	E 102° 18' 32.7"
2.		Kundur	P	1	N 06° 13' 00.6"	E 102° 14' 87.1"
1.	SABAH	Sapi	M	1	N 06° 00' 59.9"	E 116° 00' 53.6"
2.		Manukan	R	1	N 05° 58' 39.8"	E 116° 00' 44.7"
3.		Tiga	R	1	N 05° 43' 17.4"	E 115° 39' 02.4"
4.		Kalampunian Besar	M	1	N 05° 45' 51.0"	E 115° 40' 71.0"
5.		Kapalai	R	1	N 04° 13' 52.0"	E 118° 41' 08.2"
6.		Ligitan	R	1	N 04° 09' 52.0"	E 118° 50' 35.9"
7.		Molleangan Besar	R	1	N 07° 04' 90.6"	E 117° 02' 51.5"
8.		Banggi	R	1	N 07° 06' 53.0"	E 117° 05' 13.4"
9.		Balambangan	R	1	N 07° 11' 76.9"	E 116° 52' 19.5"
10.		Silingan	P	1	N 06° 10' 43.3"	E 118° 03' 50.0"
11.		Gulisan	P	1	N 06° 08' 93.3"	E 118° 03' 33.3"
12.		Bakungan Kecil	P	1	N 06° 09' 92.6"	E 118° 06' 49.8"
1.	SARAWAK	Patuk	P	1	N 02° 43' 86.0"	E 111° 24' 03.6"
2.		Bruit	P	1	N 02° 44' 43.4"	E 111° 23' 11.0"

Jadual 4.12 JAS : Parameter Kualiti Air Marin, 2009
Table 4.12 DOE: Marine Water Quality Parameters, 2009

Bil. / No.	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	°C
4.	Konduktiviti / Conductivity	Cond	mS/cm
5.	Kekeruhan / Turbidity	Turb	NTU/FTU
6.	pH	pH	-
	PENGUKURAN MAKMAL / LABORATORY MEASUREMENT		
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	µg/l
5.	Kadmium / Cadmium	Cd	µg/l
6.	Plumbum / Lead	Pb	µg/l
7.	Arsenik / Arsenic	As	µg/l
8.	Merkuri / Mercury	Hg	µg/l
9.	Kromium/ Chromium	Cr	µg/l
10.	Bebola tar/ Tarball	Tar	g/100m
11.	Jumlah karbon organik / Total Organic Carbon	TOC	mg/l
12.	Nitrat / Nitrate	NO_3^-	mg/l
13.	Fosfat /Phosphate	PO_4	mg/l
14.	Tributiltin /Tributyltin	TBT	µg/l
15.	Trifeniltin /Tripheniltin	TPT	µg/l

Sungai Tidak Tercemar: Aktiviti Ternakan Ikan / Unpolluted River: Fish Farming

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

Jabatan Alam Sekitar telah melaksanakan Program Pengawasan Kualiti Air Kebangsaan sejak tahun 1978. Bermula tahun 1995, kerja-kerja ini telah diswastakan kepada Alam Sekitar Malaysia Sdn. Bhd. (ASMA).

Pada tahun 2009, sebanyak 1,063 buah stesen daripada 143 buah lembangan sungai di seluruh negara telah dipantau (**Jadual 4.9**). Sampel air yang diambil dari 1,063 buah stesen dianalisa bagi 6 parameter berikut untuk mengira 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 (WPKL), Sg. Linggi (Negeri Sembilan), Sg. Melaka (Melaka), Sg. Skudai (Johor), Sg. Keratong (Pahang), Sg. Terengganu (Terengganu) dan Sg. Sarawak (Sarawak).

Di bawah Program Pencegahan Pencemaran dan Peningkatan Kualiti Air Sungai, lima (5) stesen automatik telah ditubuhkan di Sg. Langat (Selangor), Sg. Labu (N. Sembilan), Sg Batang Benar (N. Sembilan), Sg. Putat (Melaka) dan Sg. Rajang (Sarawak).

The Department of Environment (DOE) implemented the National River Water Monitoring Program in 1978. However since 1995 this work was privatized to Alam Sekitar Malaysia Sdn. Bhd. (ASMA).

In 2009, a total of 1,063 stations located within 143 river basins in Malaysia were monitored (**Table 4.9**). Water samples taken from the 1,063 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 bacteria would be measured depending on site requirement. 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 (WPKL), Sg. Linggi (Negeri Sembilan), Sg. Melaka (Melaka), Sg. Skudai (Johor), Sg. Keratong (Pahang), Sg. Terengganu (Terengganu) and Sg. Sarawak (Sarawak).

Under the Pollution Prevention and Water Quality Improvement Programme, five (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).

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
PERLIS	01	PERLIS	9	JARUM	1
				JERNIH	2
				KOK MAK	1
				NGULANG	1
				PELARIT	1
				PERLIS	1
				SERAI	1
				WANG KELIAN	1
KEDAH	01PLA	KISAP	1	KISAP	1
	01PLB	KUAH	1	KUAH	1
	01PLC	MELAKA	2	PETANG	1
				ULU MELAKA	1
	03	KEDAH	9	JANING	1
				KEDAH	1
				PDG TERAP	4
				PEDU	1
				PENDANG	1
				TEKAI	1
	04	MERBOK	10	BAKAR ARANG	1
				BATU	1
				BONGKOK	1
				BUKIT MERAH	1
				KOROK	1
				MERBOK	1
				PETANI	1
				TOK PAWANG	2
				TUPAH	1
	05	MUDA	13	CHEPIR	1
				JERUNG	2
				KARANGAN	1
				KETIL	2
				MUDA	4
				PEGANG	1
				SEDIM	1
				TAWAR	1
P. PINANG	06J	JURU	12	ARA	1
				PMTG RAWA	1
				JURU	2
				KILANG UBI	5
				PASIR	1
				RAMBAI	2
P. PINANG/ KEDAH	06P	PERAI	20	AIR MELINTAS	1
				JARAK	5
				KARANGAN	1
				KELADI	1
				KEREH	2
				KUBANG SEMANG	1
				KULIM	3
				PERAI	2
				PERTAMA	1
				SELUANG	1

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
P. PINANG		PERAI		SELUANG BAWAH	2
	06K	KLUANG	4	ARA	2
				KLUANG	1
				RELAU	1
	06PP	PINANG	11	AIR ITAM	5
				AIR TERJUN	1
				DONDANG	3
				JELUTONG	1
				PINANG	1
	06PBL	BAYAN LEPAS	3	BAYAN LEPAS	1
				TIRAM	2
	07	JAWI	7	CHEMPEDAK	1
				JAWI	1
				JUNJUNG	3
				MACHANG BUBOK	1
				TENGAH	1
P. PINANG/ PERAK	08	KERIAN	9	KECHIL	2
				KERIAN	4
				SELAMA	2
				SERDANG	1
PERAK	09	KURAU	6	ARA	1
				KURAU	5
	10	SEPETANG	15	BATU TEGOH	4
				JANA	1
				LARUT	1
				LIDIN	1
				LIMAU	1
				MALAI	1
				SEPETANG	2
				TEMERLOH	2
				TRONG	1
				TUPAI	1
	11	BRUAS	6	BRUAS	3
				DANDANG	1
				ROTAN	2
	12	RAJA HITAM	8	DERHAKA	2
				MANJONG	2
				NYIOR	1
				RAJA HITAM	3
	12W	WANGI	4	DERALIK	2
				WANGI	2
	13	PERAK	58	BATANG PADANG	3
				BIDOR	3
				CHENDERIANG	2
				CHEPOR	1
				CUAR	1
				KAMPAR	2
				KANGSAR	2
				KEPAYANG	2
				KERDAH	2
				KINJANG	1

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
PERAK		PERAK		KINTA	8
				KLAH	2
				KLIAN BARU	2
				KUANG	1
				NYAMOK	1
				PARI	2
				PELUS	2
				PERAK	8
				PINJI	2
				RAIA	2
				SELUANG	1
				SEROKAI	2
				SINTANG	1
				SUNGKAI	2
				SUNGKAI MATI	2
				TUMBOH	1
PERAK/ SELANGOR	14	BERNAM	13	BERNAM	7
				INKI	1
				SLIM	2
				TROLAK	3
SELANGOR	15	TENGI	3	TENGI	3
	16	SELANGOR	13	AIR HITAM	1
				BATANG KALI	1
				KANCHING	1
				KERLING	1
				KUNDANG	1
				RAWANG	1
				SELANGOR	5
				SEMBAH	1
				SERENDAH	1
	17	BULOH	5	BULOH	5
SELANGOR/ W.P.KL	18	KLANG	30	AMPANG	1
				BATU	3
				BUNOS	1
				DAMANSARA	3
				GOMBAK	3
				JINJANG	2
				KERAYONG	2
				KEROH	2
				KLANG	11
				KUYOH	1
				PENCHALA	1
SELANGOR	19	LANGAT	28	ANAK CHUAU	1
				BALAK	1
				BATANG BENAR	2
				BATANG LABU	2
				BATANG NILAI	2
				BERANANG	1
				BUAN	1
				CHUAU	2
				JIJAN	1

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
SELANGOR		LANGAT		LANGAT	8
				LIMAU MANIS	1
				LUI	1
				PAJAM	1
				RINCHING	1
				SEMENYIH	3
	20	SEPANG	4	RAMBAI	1
				SEPANG	3
N.SEMBILAN	20L	LUKUT	1	LUKUT	1
	21	LINGGI	24	BATANG PENAR	3
				CHEMBONG	1
				KAYU ARA	1
				KEPAYONG	1
				KUNDUR BESAR	1
				LINGGI	6
				PAROI	1
				PEDAS	1
				REMBAU	2
				SENAWANG	1
				SIMIN	1
				SIMPANG EMPAT	1
				SIPUT	2
				TEMIANG	2
MELAKA	22	MELAKA	21	BTG.MELAKA	2
				DURIAN TUNGGAL	1
				KEMUNTING	1
				KERU	1
				MELAKA	9
				PUTAT	2
				REMBIA	2
				TAMPIN	3
	23	DUYONG	4	DUYONG	3
				GAPAM	1
	24	KESANG	7	CHIN-CHIN	1
				CHOHONG	2
				KESANG	3
				TANGKAK	1
	24A	MERLIMAU	4	MERLIMAU	4
	24BT	BARU	2	BARU	1
				TUANG	1
	24SM	SRI MELAKA	2	AIR SALAK	1
				SRI MELAKA	1
JOHOR/ N.SEMBILAN	25	MUAR	39	AIR PANAS	1
				GEMAS	1
				GEMENCHEH	2
				JUASSEH	2
				KELAMAH	1
				LABIS	3
				MEDA	1
				MERBUDU	1
				MERLIMAU	1

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
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Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
JOHOR/ N.SEMBILAN		MUAR		MUAR	17
				P. MENKUANG	1
				PALONG	2
				SARANG BUAYA	1
				SEGAMAT	1
				SENARUT	1
				SEROM	1
				SPG. LOI	1
				TENANG	1
JOHOR	26	BATU PAHAT	20	AMRAN	1
				BANTANG	1
				BATU PAHAT	1
				BEKOK	5
				BERLIAN	1
				CHAAH	1
				LENIK	1
				MEREK	1
				MERPO	1
				SEMBERONG	2
				SIMPANG KANAN	2
				SIMPANG KIRI	3
	27A	AIR BALOI	3	AIR BALOI	3
	27B	BENUT	7	BENUT	4
				PARIT HJ. YASSIN	1
				PINGGAN	1
				ULU BENUT	1
	28	SEGGET	5	SEGGET	5
	28A	PONTIAN BESAR	7	AIR HITAM	1
				AYER MERAH	1
				KELAPA SAWIT	1
				PONTIAN BESAR	4
	28B	PONTIAN KECIL	2	PONTIAN KECIL	2
	28C	SKUDAI	11	MELANA	2
				SKUDAI	9
	28D	TEBRAU	11	ANAK TEBRAU	3
				BALA	1
				CAW TEBRAU	1
				PANDAN	1
				PLENTONG	1
				SEBULUNG	1
				SENGKUANG	1
				TAMPOI	1
				TEBRAU	1
	28E	KEMPAS	2	KEMPAS	2
	28F	DANGA	2	DANGA	2
	28G	RAMBAH	2	RAMBAH	2
	29	JOHOR	39	ANAK SG. SAYONG	2
				BELITONG	1
				BERANGAN	1
				BKT. BESAR	2
				CHEMANGAR	1

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
JOHOR		JOHOR		JOHOR	5
				LAYANG	1
				LAYAU KIRI	1
				LEBAM	1
				LINGGIU	1
				PANTI	1
				PAPAN	1
				PELEPAH	1
				PENGGELI	1
				REMIS	1
				SANTI	1
				SAYONG	5
				SEBOL	1
				SELUYUT	1
				SEMANGAR	1
				SEMENCHU	1
				SENING	1
				SERAI	1
				TELOR	1
				TEMOH	1
				TIRAM	4
	29B	KAW. PASIR GUDANG	5	BULUH	1
				LATOH	1
				MASAI	1
				PEREMBI	1
				TUKANG BATU	1
	29C	SANGLANG	1	SANGLANG	1
	30	PULAI	3	CHOH	1
				PULAI	2
	30A	SEDILI BESAR	10	AMBAT	1
				DOHOL	1
				MUPUR	1
				PASIR PANJANG	1
				SEDILI BESAR	5
				TEMUBOR KANAN	1
	30B	SEDILI KECIL	6	ANAK SEDILI KECIL	1
				BAHAN	2
				SEDILI KECIL	3
	30C	PALOI	1	PALOI	1
	31A	MERSING	2	MERSING	2
	31B	JEMALUANG	2	JEMALUANG	2
	31C	KIM-KIM	2	KIM-KIM	2
	32	ENDAU	25	ANAK SG. SEMBERONG	1
				DENGAR	1
				ENDAU	2
				JASIN	1
				JEBONG	1
				KAHANG	1
				LENGA	1
				LENGGOR	1
				MAMAI	1

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
JOHOR		ENDAU		MELATAI	1
				MENGKIBOL	3
				PALOH	1
				PAMOL	1
				SELAI	1
				SEMBERONG	6
				SINGOL	1
				TAMOK	1
PAHANG	32AE	ANAK ENDAU	2	ANAK ENDAU	2
	33	ROMPIN	18	AUR	1
				BAKAR	1
				JEKATIH	2
				JERAM	1
				KEPASING	1
				KERATONG	3
				PONTIAN	1
				PUKIN	3
				ROMPIN	4
				SEPAYANG	1
	34B	BEBAR	5	BEBAR	1
				MERBA	1
				SERAI	2
				TEMIANG	1
	34M	MERCHONG	2	KELAYAT	1
				MERCHONG	1
	35P	PAHANG	91	ANAK SG. LEPAR	1
				BATU	1
				BELAYAR	1
				BENTONG	4
				BENUS	2
				BERA	3
				BERKAPOR	1
				BERTAM	3
				BILUT	1
				BURUNG	1
				CHINI	1
				HABU	1
				JELAI	2
				JEMPOL	2
				JENGKA	2
				KELAU	2
				KERTAM	1
				KOYAN	1
				KUNDANG	1
				LENGGOK	1
				LEPAR	3
				LIPIS	3
				LUIT	1
				MARAN	1
				MENTIGA	2
				PAHANG	8

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
PAHANG		PAHANG		PENJURING	1
				PERTANG	2
				PERTING	1
				RINGLET	1
				SEMANTAN	3
				SERTING	5
				T. PAYA BUNGOR	1
				TAHAN	1
				TANGLIR	1
				TASIK BERA	1
				TASIK CHINI	10
				TEKAL	1
				TEKAM	2
				TELANG	1
				TELEMONG	1
				TELOM	2
				TEMBELING	1
				TERANUM	1
				TERAS	1
				TERLA	1
				TRIANG	2
				TRINGKAP	1
	36	KUANTAN	15	BELAT	1
				CHARU	1
				GALING BESAR	1
				GALING KECIL	1
				KENAU	1
				KUANTAN	5
				PANDAN	1
				PINANG	1
				REMAN	1
				RIAU	1
				TALAM	1
	37	BALOK	4	BALOK	2
				YIOR	1
				PANJANG	1
	37A	CHERATING	1	CHERATING	1
	37B	TONGGOK	2	TONGGOK	2
TERENGGANU	38	KEMAMAN	9	CHERUL	2
				KEMAMAN	3
				NERAM	1
				PERASING	1
				RANSAN	2
	39C	CHUKAI	6	BUNGKUS	1
				CHUKAI	1
				IBOK	2
				RUANG	2
	39K	KERTIH	2	KERTIH	2
	40	PAKA	6	BESUL	1
				PAKA	2
				RASAU	2

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
TERENGGANU		PAKA		RENGAT	1
	41	DUNGUN	5	DUNGUN	4
				TELEMBOH	1
	42I	IBAI	3	IBAI	3
	42L	MERCHANG	2	LANDAS	1
				MERCHANG	1
	42M	MARANG	3	KERAK	1
				MARANG	1
				TEMALA	1
	43	TERENGGANU	12	BERANG	2
				NERUS	4
				PUEH	2
				TELEMONG	1
				TERENGGANU	3
	44	SETIU	5	SETIU	4
				TAROM	1
	45	MERANG	1	MERANG	1
	46	BESUT	4	BESUT	3
				JERTIH	1
	47	KLUANG	1	KLUANG	1
KELANTAN	47K	KEMASIN	5	KEMASIN	2
				SEMERAK	3
	48	KELANTAN	42	ARING	1
				BELATOP	2
				BER	1
				BEROK	3
				BETIS	1
				CHIKU	1
				GALAS	5
				KELANTAN	3
				KELESA	1
				KERILLA	2
				KETIL	1
				LEBIR	4
				NAL	3
				NENGGIRI	3
				PEHI	1
				PERGAU	6
				RELAI	2
				SOKOR	1
				TUANG	1
	48C	PENGKALAN CHEPA	6	ALOR B	1
				ALOR LINTAH	1
				KELADI	1
				PENGKALAN CHEPA	3
	48D	PENGKALAN DATU	3	PENGKALAN DATU	3
	49	GOLOK	7	GOLOK	5
				LANAS	1
				TASIK GARU	1

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
SARAWAK	50	KAYAN	3	KAYAN	3
	50S	SEMUNSAM	1	SEMUNSAM	1
	51	SARAWAK	17	KELANTAN	1
				KUAP	2
				MAONG KIRI	1
				SARAWAK	5
				SARAWAK KANAN	2
				SARAWAK KIRI	1
				SEMADANG	1
				SEMENGGOH	1
				TABUAN	1
				SAMARAHAN	2
	52	SADONG	7	KARANGAN	2
				SADONG	4
				TARAT	1
	53	LUPAR	8	AI	2
				LUPAR	3
				SEKERANG	1
				SETERAP	1
				UNDUP	1
	54	SARIBAS	3	LAYAR	2
				SARIBAS	1
	55	KERIAN	3	KERIAN	2
				SEBLAK	1
	56	RAJANG	19	BALOI	1
				BINATANG	1
				JULAU	1
				KANOWIT	1
				MERADONG	1
				RAJANG	12
				SALIM	1
				SARIKEI	1
	57	OYA	3	OYA	3
	58	MUKAH	4	MUKAH	4
	59	BALINGIAN	2	BALINGIAN	2
	60	TATAU	1	TATAU	1
	61	KEMENA	5	KEMENA	4
				SIBIU	1
	62	SIMILAJAU	2	SIMILAJAU	2
	63	SUAI	1	SUAI	1
	64	NIAH	4	NIAH	2
				SEKALOH	2
	65	SIBUTI	6	KABULOH	2
				KEJAPIL	1
				SATAP	1
				SIBUTI	2
	66	MIRI	7	ADONG	1
				DALAM	1
				LUTONG	2

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
SARAWAK	66	MIRI		MIRI	2
				PADANG LIKU	1
	67	BARAM	5	BARAM	4
				TUTOH	1
	68	LIMBANG	5	LIMBANG	5
	69	TRUSAN	1	TRUSAN	1
	70	LAWAS	3	LAWAS	3
SABAH	71	MENGGALONG	2	MENGGALONG	2
	71A	LAKUTAN	1	LAKUTAN	1
	71B	LINGKUNGAN	2	BUKAU	1
				LINGKUNGAN	1
	72	PADAS	10	ANSIP	1
				BUNSIT	1
				LIAWAN	1
				PADAS	3
				PANGATAN	1
				PEGALAN	2
				TANDULU	1
	73	MEMBAKUT	1	MEMBAKUT	1
	74A	BONGAWAN	1	BONGAWAN	1
	74	KIMANIS	1	KIMANIS	1
	75	PAPAR	3	PAPAR	3
	76	MOYOG	4	MOYOG	4
	76A	SEMBULAN	2	SEMBULAN	2
	76B	LIKAS	8	DARAU	1
				INANAM	3
				LIKAS	2
	76			MENGGATAL	2
	76C	TELIPOK	2	TELIPOK	2
	77	TUARAN	5	DAMIT	2
				SONG SAI	1
				TUARAN	2
	78	KEDAMAIAN	4	KEDAMAIAN	1
				TEMPASUK	2
				WARIU	1
	78T	TENGHILAN	1	TENGHILAN	1
	79	BINGKONGAN	6	BANDAU	1
				BINGKONGAN	2
				MENGGARIS	2
				TANDEK	1
	80	BENGKOKA	2	BENGKOKA	2
	82	PAITAN	1	PAITAN	1
	83	SUGUT	6	BONGKUD	1
				LOHAN	1
				MERALI	1
				SUGUT	3
	84	LABOK	7	KINIPIR	2
				LABOK	1
				LIWAGU	2
				MALIAU	1
				TUNGUD	1

Jadual 4.9 : JAS : Senarai Lembangan Sungai dan Sungai-sungai yang Dipantau, 2009
Table 4.9 : DOE: List of the River Catchment And River Monitored, 2009

Negeri / State	Kod WKA / Code WQR	Lembangan Sungai / River Basin	Bil. Stesen / No. of Stations	Sungai Diawasi / Rivers Monitoted	Bil. Stesen / No. of Stations
SABAH	84A	SAPI	4	SAPI	3
				SUALONG	1
	85	MOUNAD	2	MOUNAD	2
	85A	SEGALIUD	2	SEGALIUD	2
	86	KINABATANGAN	10	KARAMUAK	1
				KINABATANGAN	2
				KOYAH	1
				LEEPANG	1
				MENANGGUL	1
				PIN	1
				TAKALA	1
				TENEGANG BESAR	2
	87	SEGAMA	3	SEGAMA	3
	88	TUNGKU	2	TUNGKU	2
	88A	SILABUKAN	2	SILABUKAN	2
	89	TINGKAYU	2	TINGKAYU	2
	90	KALUMPANG	5	KALUMPANG	3
				PANG BURONG 1	1
				PANG BURONG 2	1
	91A	APAS	1	APAS	1
	91B	BALUNG	1	BALUNG	1
	91	TAWAU	4	TAWAU	4
	92	MEROTAI	3	MEROTAI	3
	93	UMAS-UMAS	1	UMAS-UMAS	1
	94	BRANTIAN	1	BRANTIAN	1
	95	KALABAKAN	3	KALABAKAN	3
JUMLAH / TOTAL					**1,063**

Stesen Persampelan di Pulau Redang, Terengganu / Monitoring Station in Pulau Redang, Terengganu

PEMANTAUAN KUALITI AIR TANAH
GROUNDWATER MONITORING

Pada tahun 2009, sebanyak 338 sampel daripada 111 buah telaga pemantauan kualiti air tanah di seluruh Malaysia telah dianalisis. Telaga dibina di kawasan-kawasan mengikut kategori guna tanah pertanian, perindustrian, padang golf, tapak pelupusan sampah, pelupusan tapak bangkai haiwan, kawasan bekalan air, bekas tapak perlombongan, perbandaran dan luar bandar di seluruh Malaysia (**Jadual 4.13**).

Pengukuran parameter-parameter fizikal kualiti air tanah dibuat secara in-situ manakala parameter kimia dan biologi dianalisis di makmal. 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 2009, 338 groundwater samples were drawn on a quarterly basis from 111 monitoring wells in Malaysia for analysis. The wells had been constructed in areas categorized according to landuse agriculture, industrial, golf course, solid waste landfill, animal burial, municipal water supply, ex-mining (gold mine) and urban/suburban areas (**Table 4.13**).

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

Jadual 4.13 JAS: Taburan Telaga-telaga Pemantauan Air Bawah Tanah, 2009
Table 4.13 DOE: Distribution of Groundwater Monitoring Wells, 2009

Kategori / Category	Bilangan Telaga / Number of Wells
Kawasan Pertanian/ Agricultural Areas	12
Bandar / Urban Suburban Areas	11
Tapak Perindustrian/ Industrial Sites	18
Tapak Pelupusan Sampah/ Landfills	25
Padang Golf/ Golf Courses	7
Luarbandar / Rural Areas	5
Bekas Lombong/ Ex-Mining	3
Bekalan Air Tempatan/ Municipal Water Supply	9
Tapak Pelupusan Bangkai Haiwan/ Animal Burial	14
Kolam Akuakultur/ Aquaculture Farms	6
Peranginan/ Resorts	1
Jumlah/ Total	**111**

RANCANGAN KONTIGENSI KEBANGSAAN KAWALAN TUMPAHAN MINYAK (RKKKTM)
NATIONAL OIL SPILL CONTINGENCY PLAN (NOSCP)

RKKKTM ditadbir oleh Jawatankuasa Kebangsaan Kawalan Tumpahan Minyak (JKKTM) yang dianggotai oleh 18 Jabatan dan agensi, dipengerusikan oleh Jabatan Alam Sekitar Malaysia (JAS) dan dibantu Jabatan Laut Malaysia (JLM).

Di samping itu penubuhan beberapa rangkaian stokpil peralatan kawalan tumpahan minyak (KTM) di lokasi-lokasi strategik sepanjang Pantai Barat dan Pantai Timur Malaysia dapat membantu dan menyegerakan tindakan kawalan tumpahan minyak sekiranya berlaku. JAS juga memberi penekanan terhadap latihan-latihan berstruktur dan berkala bagi semua kakitangan yang terlibat dengan Oil *Spill Response* (OSR) dalam tindakbalas KTM.

Latihan-latihan berkenaan adalah bagi memastikan semua kakitangan JAS dan agensi-agensi yang akan terlibat dalam KTM dibekalkan dengan pengetahuan dan kemahiran yang mencukupi dalam pengendalian peralatan dan pengurusan krisis. *Resolusi 7 International Convention on Oil Spill Preparedness and Response*, telah menggariskan komitmen di peringkat Antarabangsa dalam hal-ehwal berhubung dengan latihan. Keperluan latihan ini telah dimasukkan ke dalam mekanisma tindakbalas RKKKTM.

Pada tahun 2009, JAS telah menyerahkan tiga (3) Stokpil Peralatan Melawan Tumpahan Minyak (OSRE) miliknya di Pulau Langkawi, Bintulu dan Kota Kinabalu kepada Jabatan Laut Semenanjung Malaysia, Jabatan Laut Sarawak dan Jabatan Laut Sabah. Penyerahan ini bermakna semua Stokpil OSRE Peringkat Ke-2 akan ditadbir oleh JLM. Majlis penyerahan telah diadakan di pejabat JAS Sabah di Kota Kinabalu pada 19 Februari 2009 dengan disaksikan oleh wakil daripada JAS dan Jabatan Laut Ibu Pejabat, Sabah dan Sarawak.

The NOSCP is administered by the National Oil Spill Control Committee (NOSCC) consisting of 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, DOE places equal emphasis on scheduled and periodical training activities for personnel involved in Oil Spill Response (OSR).

Such training is aimed to ensure DOE officers involved in OSR are well 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 to training and preparedness. This preparedness and training requirement has been incorporated into the NOSCP response system.

In 2009, DOE handed over three (3) of its Oil Spill Response Equipments (OSRE) Stockpiles located in Pulau Langkawi, Bintulu and Kota Kinabalu to Marine Department Peninsular Malaysia, Marine Department Sarawak and Marine Department Sabah respectively. This handing over means all National Tier 2 OSRE Stockpiles will be administered by Marine Department Malaysia. The handing over ceremony took place at DOE Sabah office in Kota Kinabalu on 19 February 2009 witnessed by representatives from DOE and Marine Department Headquarters, Sabah and Sarawak.

Majlis Penyerahan Peralatan Melawan Tumpahan Minyak oleh Jabatan Alam Sekitar kepada Jabatan Laut Semenanjung Malaysia, Jabatan Laut Sabah dan Jabatan Laut Sarawak pada 19 Februari 2009

The Handing Over Ceremony of Oil Spill Response Equipments by the Department of Environment to Marine Department Peninsular Malaysia, Marine Department Sabah and Marine Department Sarawak on 19th February 2009

JAWATANKUASA TABUNG PUSINGAN BAGI SELAT MELAKA DAN SELAT 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 *Malacca Straits Council* bagi pihak Jepun untuk mewujudkan Tabung Pusingan Selat Melaka dan Selat Singapura sebagai salah satu usaha bersama ketiga-tiga negara untuk mengawal kejadian tumpahan minyak yang berpunca dari kapal-kapal yang melayari perairan Selat Melaka dan Selat Singapura.

Pengurusan Tabung Pusingan berkenaan ditadbir oleh *Maritime and Port Authority* (MPA), bagi pihak Singapura untuk tempoh lima (5) tahun mulai 1 April 2006 hingga 31 Mac 2011.

Di antara aktiviti-aktiviti yang dilaksanakan oleh Jawatankuasa Tabung Pusingan pada tahun 2009 adalah seperti berikut:

- Tiga (3) orang peserta masing-masing dari Malaysia, Singapura dan Indonesia telah dibiayai ke *International Chemical and Oil Pollution Conference and Exhibition (ICOPCE) Pre-conference Workshop* di Singapura pada 21 April 2009;
- Tiga (3) orang peserta masing-masing dari Malaysia, Singapura dan Indonesia telah dibiayai untuk menghadiri ke *International Chemical and Oil Pollution Conference and Exhibition (ICOPCE)* di Singapura dari 22-23 April 2009;
- Mesyuarat Pengurusan Jawatankuasa Tabung Pusingan ke-30 telah diadakan di Singapura dari 20-21 Mei 2009; dan
- Mesyuarat Teknikal Jawatankuasa Tabung Pusingan telah berlangsung di Singapura pada 22 Oktober 2009.

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 Straits of Singapore.

The Fund is administered by Maritime and Port Authority of Singapore on behalf on Republic of Singapore for duration of five (5) years beginning 1 April 2006 until 31 March 2011.

Among the activities carried out by the RFC in the year 2009 are:

- Three (3) participants from Malaysia, Singapore and Indonesia were sponsored to the International Chemical and Oil Pollution Conference and Exhibition (ICOPCE) Pre-conference Workshop in Singapore on 21 April 2009;
- Three (3) participants from Malaysia, Singapore and Indonesia were sponsored to attend the International Chemical and Oil Pollution Conference and Exhibition (ICOPCE) in Singapore from 22-23 April 2009;
- 30 Revolving Fund Committee (RFC) Management Meeting was held from 20 to the 21 May 2009 in Singapore; and
- RFC Technical Meeting 2009 convened in Singapore on 22 October 2009.

Mesyuarat Pengurusan Jawatankuasa Tabung Pusingan Ke-30,
20-21 Mei 2009, Singapura
30th Meeting of the Revolving Fund Committee (RFC),
20 – 21 May 2009, Singapore

Mesyuarat Jawatankuasa Teknikal Tabung Pusingan,
22 Oktober 2009, Singapura
Technical Meeting of the Revolving Fund Committee (RFC),
22 October 2009, Singapore

PENCEMARAN MARIN
MARINE POLLUTION

Pada tahun 2009, terdapat 21 kes pencemaran marin berpunca daripada tumpahan minyak dilaporkan, enam (6) kes dikesan di Laut China Selatan, dua (2) di Selat Melaka, satu (1) di Laut Sulu dan dua belas (12) di Selat Johor (**Jadual 4.14**). Kebanyakan kejadian tumpahan minyak adalah kecil dan tidak melibatkan kerja-kerja pembersihan.

In 2009, 21 cases of marine pollution from oil spills were reported, six (6) cases in the South China Sea, two (2) in the Straits of Malacca, one (1) in Sulu Sea and twelve (12) in the Johor Straits (**Table 4.14**). Most of the oil spill incidents were minor and did not require clean up.

Tindakan rondaan yang berterusan oleh Agensi Penguatkuasaan Perundangan Maritim (APPM) dan operasi bersepadu marin telah dipertingkatkan dalam menangani kejadian pelepasan dan pembangunan haram sisa minyak ke dalam perairan Malaysia.

Continuous surveillance by Maritime Law Enforcement Agencies (MLEA) and Joint Marine Enforcements were intensified to overcome illegal discharges and dumping of oily waste into Malaysian Waters.

Operasi bersepadu penguatkuasaan marin yang dijalankan di perairan Malaysia di antara Agensi Penguatkuasaan Perundangan Maritim Kebangsaan dan negara jiran bagi menangani pelbagai isu termasuk pencemaran marin.

Continuous joint marine enforcements were conducted in Malaysian Waters with National Maritime Law Enforcement Agencies and neighbouring countries to tackle various maritime issues including marine pollution.

Jadual 4.14 JAS: Kejadian Pencemaran Minyak, 2009
Table 4.14 DOE: Oil Pollution Incidents, 2009

Lokasi / Location	Kawasan / Area		Bil. Kes / No. of Cases
Laut China Selatan/ South China Sea	Perairan Malaysia Malaysia Territory	Semenanjung/Peninsular	1
		Malaysia Timur/ East Malaysia	5
	Zon Ekonomi Eksklusif (EEZ)/ Exclusive Economic Zone (EEZ)		0
Laut Sulu/Sulu Sea	Perairan Malaysia/ Malaysia Territory	Sabah	1
Selat Melaka/ Straits of Malacca	Perairan Malaysia/Malaysia Territory		2
	Zon Ekonomi Eksklusif (EEZ)/ Exclusive Economic Zone (EEZ)		0
Selat Johor/ Straits of Johor	Perairan Malaysia/ Malaysia Territory	Bahagian Barat/ West Part	0
		Bahagian Timur/ East Part	12
Jumlah / Total			**21**

PENGURUSAN BUANGAN TERJADUAL
SCHEDULED WASTES MANAGEMENT

Kebenaran Bertulis dan Lesen Premis Yang Ditetapkan

Sebanyak 125 Kebenaran Bertulis telah dikeluarkan oleh Ketua Pengarah untuk pembinaan kemudahan pengolahan dan pelupusan buangan terjadual pada tahun 2009. Kebenaran Bertulis berkenaan telah dikeluarkan kepada 50 kemudahan pemerolehan kembali separa (e-waste), 29 kemudahan pemerolehan kembali (bukan e-waste), 12 kemudahan pemerolehan kembali penuh (e-waste), dua (2) kemudahan penstoran luar tapak, 28 kemudahan pengolahan luar tapak, tiga (3) insinerator buangan terjadual dan satu (1) kemudahan tapak pelupusan selamat (**Jadual 4.15**).

Di samping itu, sejumlah 612 lesen dikeluarkan kepada kemudahan baru dan kemudahan sediada untuk pemerolehan kembali luar tapak, penstoran luar tapak-pengangkutan, insinerator, buangan terjadual, pengolahan atas tanah, pengolahan luar tapak dan tapak pelupusan selamat (**Jadual 4.16**).

Written Permission and Licences for Prescribed Premises

One hundred and twenty-five (125) Written Permissions were issued by the Director General in 2009 for the construction of treatment and disposal facility for scheduled wastes, 50 off-site partial recovery plants (e-waste), 29 off-site recovery plants (non e-waste), 12 off-site full recovery plants (e-waste), two (2) off-site storage facilities, 28 off-site treatment facilities, three (3) scheduled waste incinerator and one (1) secured landfill (**Table 4.15**).

In addition, a total of 612 licences 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 4.16**).

Bahan Yang Disyaki Buangan Terjadual / Suspected Scheduled Wastes

Jadual 4.15 JAS: Status Permohonan Kebenaran Bertulis (KB) Bagi JAS Negeri Kemudahan Pengolahan Dan Pelupusan Buangan Terjadual, 2009

Table 4.15 DOE: Written Permission (KB) for Scheduled Waste Treatment and Disposal Facilities, 2009

Bil. / No.	Kemudahan / Facility	Kebenaran Bertulis / Written Permission															Jumlah/ Total
		JHR	KDH	KLN	MLK	N.S	PHG	PRK	PRS	PP	SBH	SRK	SLG	TRG	WP (KL)	WP (LAB)	
1	Insinerator Buangan Terjadual / Scheduled Waste Incinerator	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	**3**
2	Kemudahan Pemerolehan Kembali / Off Site Recovery Facilities																
	a. Pemerolehan Kembali Penuh bukan e-Waste / Full Off Site Recovery none e-Waste	1	-	-	-	-	-	3	1	15	-	1	7	1	-	-	**29**
	b. Pemerolehan Kembali Penuh e-Waste / Full Off Site Recovery e-Waste	-	4	-	-	-	-	-	-	6	-	-	2	-	-	-	**12**
	c. Pemerolehan Kembali Separa e-Waste / Half-Off Site Recovery e-Waste	1	2	-	3	-	-	2	-	37	-	-	4	-	1	-	**50**
3	Kemudahan Penstoran Luar Tapak / Off Site Storage Facilities											2					**2**
4	Kemudahan Pengolahan Luar Tapak / Off Site Treatment Facilities																
	a. Logi rawatan Fizikal/kimia / Chemical/Physical Treatment Plant	-	28	-	-	-	-	-	-	-	-	-	-	-	-	-	**28**
	b. Logi Solidifikasi (Solidification plant) / Solidication Plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
	c. Logi Rawatan Air Resapan / Diffusion Water Treatment Plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
5	Kemudahan Pengolahan Di Tanah / Land Treatment Facility	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6	Tapak Pelupusan Selamat / Secured Landfill	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	**1**
	Bil. KB Yang Dikeluarkan / No. of Written Permission	**2**	**34**	**-**	**3**	**-**	**-**	**5**	**1**	**61**	**-**	**4**	**13**	**1**	**1**	**-**	**125**

Nota: / Note

JHR - JOHOR
KDH - KEDAH
KLN - KELANTAN
MLK - MELAKA
N.S - NEGERI SEMBILAN
PHG - PAHANG
PRK - PERAK
PRS - PERLIS
PP - PULAU PINANG
SBH - SABAH
SRK - SARAWAK
SLG - SELANGOR
TRG - TERENGGANU
WP (KL) - WILAYAH PERSEKUTUAN KUALA LUMPUR
WP (LAB) - WILAYAH PERSEKUTUAN LABUAN

Jadual 4.16 JAS : Lesen-Lesen Yang Dikeluarkan Bagi Kemudahan Pengolahan Dan Pelupusan Buangan Terjadual Yang Diluluskan Oleh Jabatan Alam Sekitar, 2009

Table 4.16 DOE: Licensed Scheduled Waste Treatment and Disposal Facilities, 2009

Kemudahan / Facility	Negeri / State														
	JHR	KDH	MLK	N.S	PHG	PRK	PRS	PP	SBH	SRK	SLG	TRG	WP (KL)	WP (LAB)	JUMLAH
Penstoran Luar Tapak-Pengangkutan / Off Site Storage-Transport	45	20	17	13	5	24	1	57	6	24	58	3	9	4	**286**
Penstoran Luar Tapak / Off Site Storage	-	-	-	1	-	-	-	-	-	11	-	-	-	2	**14**
Pemerolehan Kembali / Off Site Recovery															**0**
a. Pemerolehan Kembali Penuh bukan e-Waste / Full Off Site Recovery none e-Waste	27	5	1	8	7	23	1	15	-	5	28	3	-	-	**123**
b. Pemerolehan Kembali Penuh e-Waste / Full Off Site Recovery e-Waste	3	1	3	1	-	-	-	6	-	-	2	-	-	-	**16**
c. Pemerolehan Kembali Separa e-Waste / Half Off Site Recovery e-Waste	17	12	12	5	-	4	-	37	-	5	25	-	5	-	**122**
Insinerator Buangan Terjadual / Scheduled Waste Incinerator	6	1	1	3	1	2		3	5	10	5	4		1	**42**
Pengolahan Di Tanah / Landfarm	-	-	-	-	-	-	-	-	-	1	-	-	-	1	**2**
Pengolahan Luar Tapak /Off Site Treatment	-	-	-	2	-	-	-	-	-	-	-	-	-	-	**2**
Tapak Pelupusan Selamat / Secured Landfill	-	1	-	2	-	-	-	-	-	1	-	1	-	-	**5**
Bil. Lesen / No. of License	98	40	34	35	13	53	2	118	11	57	118	11	14	8	**612**
Bil. Premis / No. of Premises	49	22	17	19	9	30	1	63	10	37	62	7	10	4	**340**

NOTA / Note :

JHR - JOHOR
KDH - KEDAH
MLK - MELAKA
N.S - NEGERI SEMBILAN
PHG - PAHANG
PRK - PERAK
PP - PULAU PINANG
SBH - SABAH
SRK - SARAWAK
SLG - SELANGOR
TRG - TERENGGANU
WP (KL) - WILAYAH PERSEKUTUAN KUALA LUMPUR
WP (LAB) - WILAYAH PERSEKUTUAN LABUAN

SKIM NOTIFIKASI DAN PENDAFTARAN BAHAN-BAHAN BERBAHAYA ALAM SEKELILING (EHSNR)
ENVIRONMENTALLY HAZARDOUS SUBSTANCE NOTIFICATION AND REGISTRATION SCHEME (EHSNR)

Skim Notifikasi dan Pendaftaran Bahan-Bahan Berbahaya Alam Sekeliling (EHSNR) telah diwujudkan oleh Jabatan Alam Sekitar (JAS).

Skim Notifikasi dan Pendaftaran Bahan-Bahan Berbahaya Alam Sekeliling (EHSNR) telah dilancarkan dengan rasminya oleh Timbalan Menteri, Kementerian Sumber Asli dan Alam Sekitar pada 15 Julai 2008. Skim ini telah diimplementasi secara sukarela bermula dari 1 Januari 2009. Semua pengimport dan pengilang EHS adalah amat digalakkan untuk membuat notifikasi semasa skim ini dijalankan secara sukarela memandangkan mereka adalah pengimport dan pengilang EHS.

Notifikasi tersebut akan dijadikan mandatori apabila Peraturan baru bagi skim ini digubal.

Sehingga 31 Disember 2009, 1,084 syarikat berasaskan kimia telah dikenalpasti berpotensi sebagai pengilang dan pengimport EHS. Sejumlah 154 syarikat berasaskan kimia telah mendaftar dan 346 EHS telah didaftarkan ke dalam skim. Jumlah EHS yang telah dinotifikasi secara rasmi ialah 215 dan daripada jumlah tersebut 60 EHS memerlukan notifikasi secara terperinci. Sebanyak 29 EHS telah dinotifikasi secara terperinci.

Sistem *on-line* EHSNR ini telah dibuat penambahbaikkan dengan memberi kebenaran kepada pembekal luar negara untuk menghantar maklumat notifikasi terperinci terus kepada JAS. Pengimport tempatan boleh mendaftarkan pembekal mereka dari luar negara dan memohon mereka memberi data yang berkaitan untuk tujuan notifikasi terperinci bermula awal tahun 2010.

The Environmentally Hazardous Substance Notification and Registration Scheme (EHSNR) has been developed by the Department of Environment (DOE).

Officially launched by the Deputy Minister of Environment, Ministry of Natural Resources and Environment on 15 July 2008. The scheme was subsequently implemented on a voluntary basis on 1 January 2009. All importers and manufacturers of Environmentally Hazardous Substance (EHS) are strongly encouraged to notify DOE on the EHS they are importing or producing under the Scheme during this voluntary period.

The notification will be made mandatory when the new regulation for this scheme is enacted.

Until 31 December 2009, 1,084 chemical companies had been identified as potential manufacturers and importers for EHS. One hundred and fifty-four (154) chemical companies had registered and 346 EHS had been entered under the scheme. The number of EHS that had been officially notified were 215 and out of this, 60 EHS were required to do detailed notification. The number of EHS which had already notified in detail to DOE were 29.

The EHSNR online system is further enhanced for allowing overseas suppliers to submit the detailed notification of EHS directly to DOE. Local importers can register their overseas suppliers and request them to provide the data necessary for detailed notification by early 2010.

PENGUATKUASAAN TERHADAP AKTIVITI PEMBAKARAN TERBUKA
ENFORCEMENT AGAINST OPEN BURNING ACTIVITIES

Sepanjang tahun 2009, semua pejabat Jabatan Alam Sekitar (JAS) Negeri telah meneruskan operasi rondaan mencegah pembakaran terbuka di kawasan-kawasan yang dikenalpasti sebagai kawasan yang cenderung berlaku kebakaran. Sejumlah 3,883 kes pembakaran terbuka yang dikesan dan disiasat termasuk hotspot yang dikesan melalui satelit (**Jadual 4.17 & Jadual 4.18**).

Throughout 2009, Department of Environment (DOE) State Offices continued to conduct daily ground surveillance of fire prone areas. A total of 3,883 open burning cases were investigated, including hotspots detected via satellites (**Table 4.17 & Table 4.18**).

Kejadian pembakaran terbuka yang utama sering berlaku adalah di kawasan pertanian (1,297), ladang (544), hutan (395) dan belukar (310) terutamanya semasa cuaca panas dan kering iaitu pada bulan Februari (337), Jun (373), Ogos (851) dan Oktober (436). Daripada 3,883 kes pembakaran terbuka tersebut, 404 kes telah dikompaun sebanyak RM349,600.00 dan 11 kes telah dikenakan tindakan mahkamah.

Frequent incidents of open burning mainly were found to occur in agricultural areas (1,297), plantations (544), forests (395) and bushes (310) especially during the hot and dry period in the months of February (337), June (373), August (851) and October (436). Out of 3,883 open burning cases detected, 404 cases were issued compounds amounting to RM349,600.00 and 11 cases were prosecuted in court.

Pengawasan Melalui Udara

Program Pengawasan Melalui Udara diteruskan pelaksanaannya pada tahun 2009 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 serta pembangunan di kawasan tanah tinggi dan pembangunan di pulau-pulau. Maklumat mengenai kejadian pencemaran alam sekitar yang dikesan melalui pengawasan dari udara ini disalurkan terus ke bilik operasi JAS untuk diambil tindakan penguatkuasaan oleh pegawai penguatkuasa di lapangan.

Airborne Surveillance

The National Airborne Surveillance Programme continued in 2009 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. Information on the environmental pollution activities detected from the air surveillance would be transmitted directly to the DOE operation room for follow up on enforcement actions by ground surveillance staff.

Sejumlah RM1,877,434.89 diperuntukkan di bawah Projek Pembangunan pada tahun 2009 untuk pelaksanaan program ini. Sepanjang program ini, sebanyak 271 bilangan penerbangan yang melibatkan 972.01 jumlah jam penerbangan telah dilaksanakan.

A development budget of RM1,877,434.89 was allocated in 2009 for aerial surveillance. In this programme, 271 flights with a total of 972.01 flight hours were undertaken.

Jadual 4.17 JAS: Bilangan Kes Pembakaran Terbuka Mengikut Negeri, 2009
Table 4.17 DOE: Number of Open Burning Cases by State, 2009

Negeri / State	Ladang / Plantation	Pertanian / Agriculture	Belukar / Bushes	Hutan / Forest	Tapak Pembinaan / Construction Sites	Tapak Pelupusan/ Disposal Sites	Industri / Industry	Lain-lain / Others
PERLIS	6	13	0	0	0	0	0	1
KEDAH	7	65	9	2	31	19	15	34
P. PINANG	3	1	3	4	12	15	4	276
PERAK	6	12	3	2	23	0	21	53
SELANGOR	21	74	118	45	55	67	10	166
WP KL	0	0	0	0	8	6	4	42
N.SEMBILAN	6	3	11	2	9	1	5	73
MELAKA	3	1	0	0	4	0	1	2
JOHOR	54	25	37	23	12	15	17	26
PAHANG	69	21	43	162	1	1	3	25
TERENGGANU	7	0	20	22	8	1	15	30
KELANTAN	22	8	3	39	12	1	3	28
SARAWAK	328	979	33	51	5	1	18	97
SABAH	12	95	19	43	6	8	18	20
WP LABUAN	0	0	9	0	2	0	0	7
Jumlah / Total	**544**	**1,297**	**310**	**395**	**188**	**135**	**134**	**880**
Jumlah Keseluruhan / Total Amount : 3,883								

Jadual 4.18 JAS: Bilangan Kes Pembakaran Terbuka Bulanan, 2009
Table 4.18 DOE: Number of Open Burning Cases by Month, 2009

Negeri / State	Ladang / Plantation	Pertanian / Agriculture	Belukar/ Bushes	Hutan / Forest	Tapak Pembinaan / Construction Sites	Tapak Pelupusan/ Disposal Sites	Industri / Industry	Lain-lain / Others
Januari/ January	42	48	17	20	28	17	16	107
Februari/ February	36	82	46	40	25	9	20	79
Mac/ March	23	38	13	10	17	6	15	65
April/ April	54	60	10	26	19	9	6	65
Mei/ May	35	58	11	20	9	2	6	54
Jun/ June	49	86	58	43	24	10	8	95
Julai/ July	30	176	54	58	14	15	13	103
Ogos/ August	99	475	44	83	14	37	10	89
September/ September	30	108	10	26	7	14	10	56
Oktober/ October	106	110	30	61	17	12	21	79
November/ November	24	33	8	4	7	1	5	37
Disember/ December	16	23	9	4	7	3	4	51
Jumlah / Total	**544**	**1,297**	**310**	**395**	**188**	**135**	**134**	**880**
Jumlah Keseluruhan / Total Amount : 3,883								

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

Sehingga akhir tahun 2009, sebanyak 19,016,782 buah kenderaan bermotor telah berdaftar di Malaysia, iaitu pertambahan sebanyak 1,044,881 buah kenderaan (5.81%) berbanding tahun 2008. Pecahan keseluruhan kenderaan bermotor yang berdaftar mengikut jenis kenderaan adalah seperti di **Rajah 4.12**.

By the end of 2009, there were about 19,016,782 registered motor vehicles in Malaysia, an increase of 1,044,881 (5.81%) compared to 2008. The breakdown of the total registered vehicles according to vehicle types is given in **Figure 4.12**.

Dari sejumlah 1,017,361 buah kenderaan baru yang didaftarkan dalam tahun 2009, kategori motokar merupakan yang tertinggi iaitu 513,954 unit (50.52%) diikuti motosikal sebanyak 441,545 unit (43.4%), manakala sebanyak 61,862 unit (6.08%) adalah dari lain-lain jenis kenderaan termasuk lori, bas, van dan sebagainya.

Out of 1,017,361 new vehicles registered in 2009, motorcars made up the highest number with 513,954 units (50.52%) followed by motorcycles 441,545 units (43.4%), while the remaining 61,862 (6.08%) were from the other vehicle types such as lorries, buses, vans and others.

Taburan bilangan kenderaan bermotor di Malaysia mengikut negeri adalah seperti di **Rajah 4.13**. Wilayah Persekutuan Kuala Lumpur masih mendahului negeri-negeri lain dengan mempunyai bilangan kenderaan yang tertinggi iaitu sebanyak 4.32 juta (atau 22.73%) daripada keseluruhan bilangan kenderaan yang berdaftar di negara ini, diikuti oleh negeri 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 vehicles registered of 4.32 million (22.73%) 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 (NOx) 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, hydrocarbons, oxides of nitrogen and particulate matter 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 adalah melalui Program AWASI (*Area Watch And Sanction Inspection*). Melalui Program AWASI ini, skuad peronda JAS akan

Control of Black Smoke Emission From Diesel Vehicles

The control of excessive black smoke emission emitted from diesel vehicle exhausts is by the AWASI (Area Watch And Sanction Inspection) Programme. Through this programme the DOE's mobile squad

menjalankan rondaan, pemerhatian pelepasan asap hitam dari ekzos kenderaan, memberhentikan kenderaan untuk menjalankan ujian asap ke atas kenderaan-kenderaan diesel yang diperhatikan mengeluarkan asap hitam berlebihan.

would go round patrolling the streets, observing and testing diesel vehicles belching excessive smoke.

Tindakan kompaun akan diambil serta-merta kepada pemandu dan tuanpunya kenderaan yang didapati gagal mematuhi had pelepasan asap 50 Unit Asap Hartridge (HSU). Kompaun serta perintah larangan menggunakan kenderaan di jalanraya akan dikeluarkan sekiranya kenderaan didapati melepaskan asap hitam melebihi 70 HSU.

Compounds were issued on-the-spot to the drivers and owners if their vehicle fails to comply to the stipulated smoke limit of 50 HSU, and a prohibition order (prohibiting vehicle use) will be issued if the smoke limit exceeds 70 HSU.

Pada tahun 2009, sebanyak 1,523 operasi penguatkuasaan telah dilaksanakan di bandar-bandar di seluruh negara. Sebanyak 118,441 buah kenderaan diesel telah diperiksa dan dari jumlah tersebut, sebanyak 3,349 buah kenderaan telah dikompaun kerana gagal mematuhi had pelepasan asap hitam sebanyak 50 HSU, manakala 539 daripadanya telah dikenakan perintah larangan beroperasi sehingga dibaikpulih dan lulus ujian asap semula oleh JAS. Pada keseluruhannya, peratus pematuhan oleh kenderaan diesel adalah 97.17%.

In 2009, a total of 1,523 enforcement programmes were conducted in the cities throughout the country. A total of 118,441 diesel vehicles were visually inspected, out of which 3,349 vehicles were compounded for failing to comply the 50 HSU smoke limit including 539 vehicles issued with the prohibition order. Vehicles issued with prohibition order were required to undergo smoke retest by the DOE before allowed on the road. Overall compliance of diesel vehicles was 97.17%.

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 telah juga diambil ke atas 380 pemandu serta tuan-tuan punya kenderaan kerana gagal menjelaskan kompaun yang telah dikenakan.

The number of vehicles summoned and their percentage of compliance according to vehicle types is given in **Figure 4.14** and **Figure 4.15** shows the number of vehicles compounded, number of prohibition order issued and the percentage of compliance according to the states. Court actions were also taken against 380 drivers and vehicle owners for failing to settle the compounds issued.

Kawalan Pelepasan Gas CO dan HC Dari Kenderaan Petrol

Control of CO and HC Gas Emissions from Petrol Vehicles

Sepanjang tahun 2009, sejumlah 9,236 buah kenderaan petrol telah diuji pelepasan CO dan HC dengan menggunakan meter gas CO-HC Analyzer melalui kaedah 'ujian idling'. Sebanyak 145 buah kenderaan telah dikompaun kerana gagal mematuhi had pelepasan yang dibenarkan. Peratus pematuhan secara keseluruhannya adalah 98.43%.

Throughout 2009, a total of 9,236 petrol powered vehicles were tested using the CO-HC gas analyzer by the idling test method. A total of 145 vehicles were compounded for failing to comply with the stipulated CO and HC limits. The overall percentage of compliance was 98.43 %.

Surat amaran juga telah dikeluarkan kepada pemandu-pemandu kenderaan yang gagal mematuhi had-had pelepasan CO dan HC supaya segera membaiki kenderaan masing-masing untuk memastikan kenderaan sentiasa mematuhi had pelepasan yang ditetapkan.

Warning letters were issued to drivers to take immediate repairs on their vehicles to ensure compliance.

Ujian Kelulusan Jenis (Kenderaan Petrol)

Type Approval Test (Petrol Vehicles)

Malaysia telah memperkenalkan standard pelepasan pencemar untuk model baru kenderaan motor dengan tujuan memperbaiki pelepasan pencemar menggunakan rekabentuk enjin baru dan teknologi kawalan pelepasan.

Malaysia had established exhaust emission standard for new vehicles in order to improve exhaust emission by utilizing new engine design and emission control technology.

Pada atau selepas 1 Januari 2000, mana-mana model baru kenderaan motor dikehendaki mematuhi standard pelepasan pencemar yang ditetapkan dalam Jadual Ketiga, Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Enjin Petrol),1996 di mana jisim karbon monoksida yang dibenarkan hendaklah tidak melebihi 2.2 g/km, manakala kombinasi hidrokarbon dan nitrogen oksida hendaklah tidak melebihi 0.5 g/km. Pada tahun 2009, Jabatan Alam Sekitar telah mengeluarkan sebanyak 59 Sijil Ujian Kelulusan Jenis bagi model baru kenderaan yang akan dipasarkan di Malaysia.

Any new model of motor vehicle that is commissioned on and after 1 January, 2000 is 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 combination of Hydrocarbon and Nitrogen Oxides shall not exceed 0.5 g/km. In 2009, the Department Of Environment had issued 59 Type Approval Test Certificate for new model to be marketed in Malaysia.

Pengwujudan Kemudahan Yang DiLuluskan (KYDL)

Establishment of Approved Testing Facilities

Bagi membolehkan orang ramai menghantar kenderaan mereka untuk menjalani ujian pelepasan asap dan gas, JAS melalui program "Kemudahan Yang DiLuluskan (KYDL)" telah memberi pengiktirafan kepada bengkel-bengkel kenderaan yang memenuhi kriteria-kriteria yang telah ditetapkan. Tindakan segera untuk membaiki kenderaan boleh dilakukan di pusat-pusat yang diluluskan oleh JAS.

To facilitate convenient public access to workshops for smoke and gaseous emission testing, DOE accredited to 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.

Sehingga akhir tahun 2009, sebanyak 58 bengkel serta pusat-pusat pemeriksaan kenderaan di seluruh negara telah diberikan sijil pengiktirafan sebagai "Kemudahan Yang Diluluskan".

By end 2009, a total of 58 workshops and vehicle testing centers throughout the country were registered as "Approved Testing Facilities".

Kawalan Pelepasan Asap Daripada Motosikal

Pelepasan asap daripada motosikal dikawal melalui Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Motosikal), 2003. 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 adalah dikehendaki 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 2009, sebanyak lima (5) Sijil Kelulusan Jenis telah dikeluarkan kepada pembuat, pemasang dan pengimport motorsikal untuk pasaran dalam negara.

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 motorsikal telah dilaksanakan secara bersama oleh pejabat-pejabat JAS negeri dengan kerjasama Polis DiRaja Malaysia (Cawangan Trafik). Pada tahun 2009, sejumlah 4,998 buah motosikal telah ditahan untuk menjalani ujian. Dari jumlah ini, 224 penunggang motosikal telah dikompaun oleh pihak polis kerana melanggar had bunyi bising yang dibenarkan. Peratus pematuhan secara keseluruhannya ialah 95.52 % (**Rajah 4.16**).

Control of Emission from Motorcycles

The emission from motorcycle exhausts is controlled under the Environmental Quality (Control of Emission from Motorcycles) Regulations, 2003. The emissions standards adopted are as follows :-

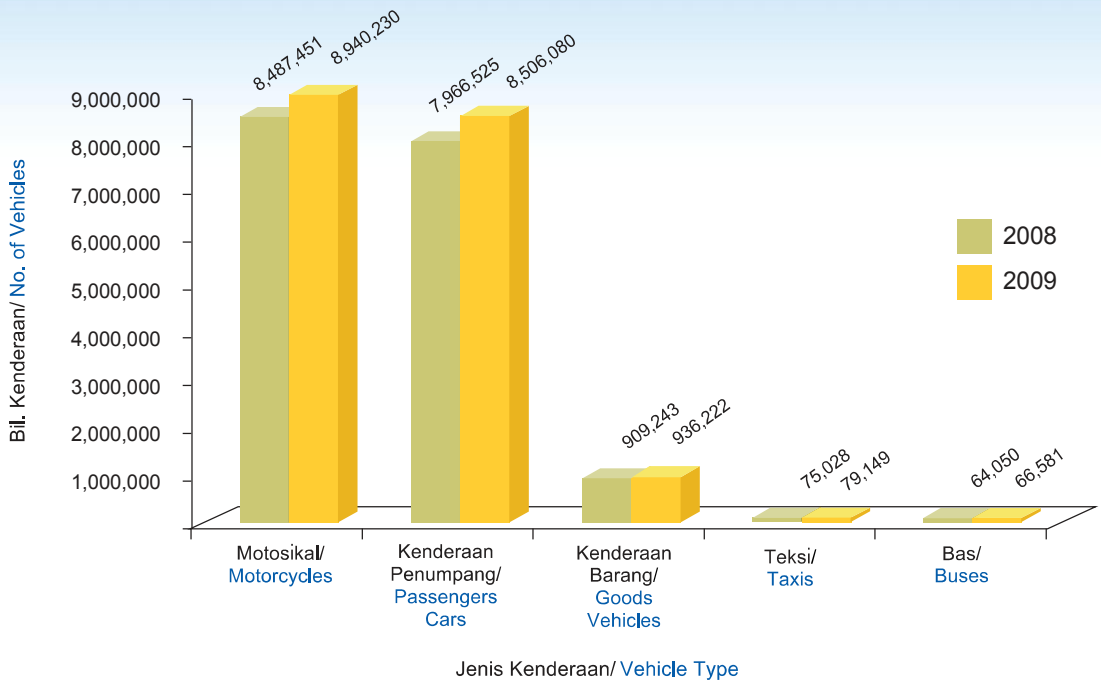
- Type Approval Emission Standard for new motorcycles : 97/24/EC
- Idling Emission Standard for in-use motorcycles : 4.5 % CO (Carbon Monoxide)

Motorcycles importers are required to comply with the new emission standards effective from 1 January 2005 for new models and 1 July 2005 for current models, while the local manufactures 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 2009, a total of five (5) Type Approval Test Certificate were issued to manufacturers, assemblers and importers of motorcycles for the domestic market.

Noise from Motor Vehicles

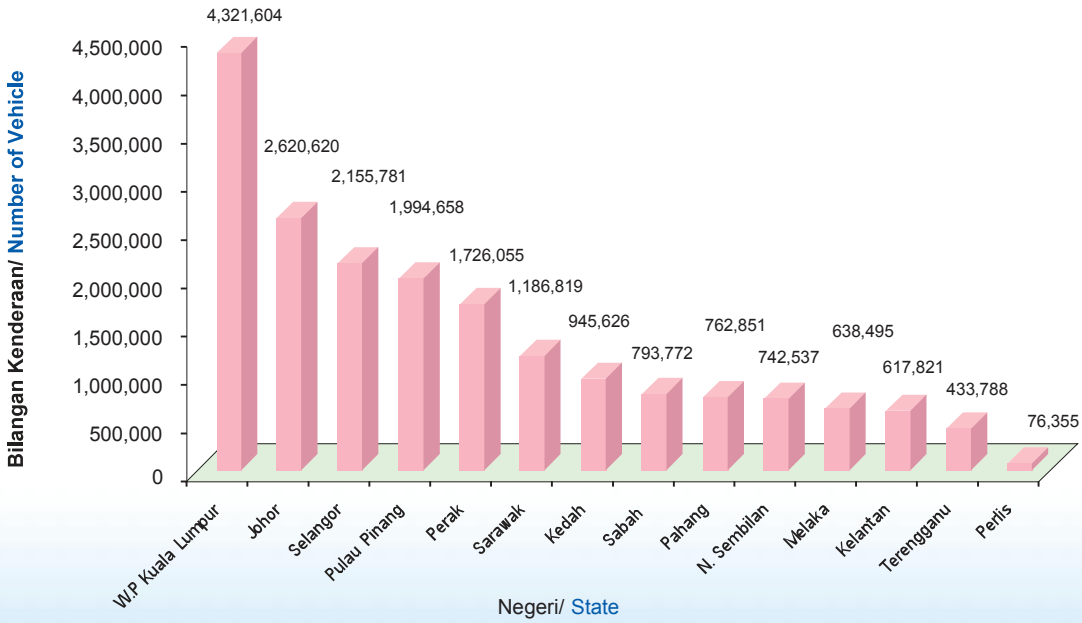
The control of noise from motor vehicles is enforced under the Environmental Quality (Motor Vehicle Noise) Regulations, 1987.

Enforcement campaigns to control excessive noise from motorcycles were jointly conducted by the DOE and the Traffic Police. In 2009, a total of 4,998 motorcycles were stopped for inspection. From the above total, 224 motorcyclists were summoned for violating the stipulated noise limits. The overall percentage of compliance was 95.52 % (**Figure 4.16**).



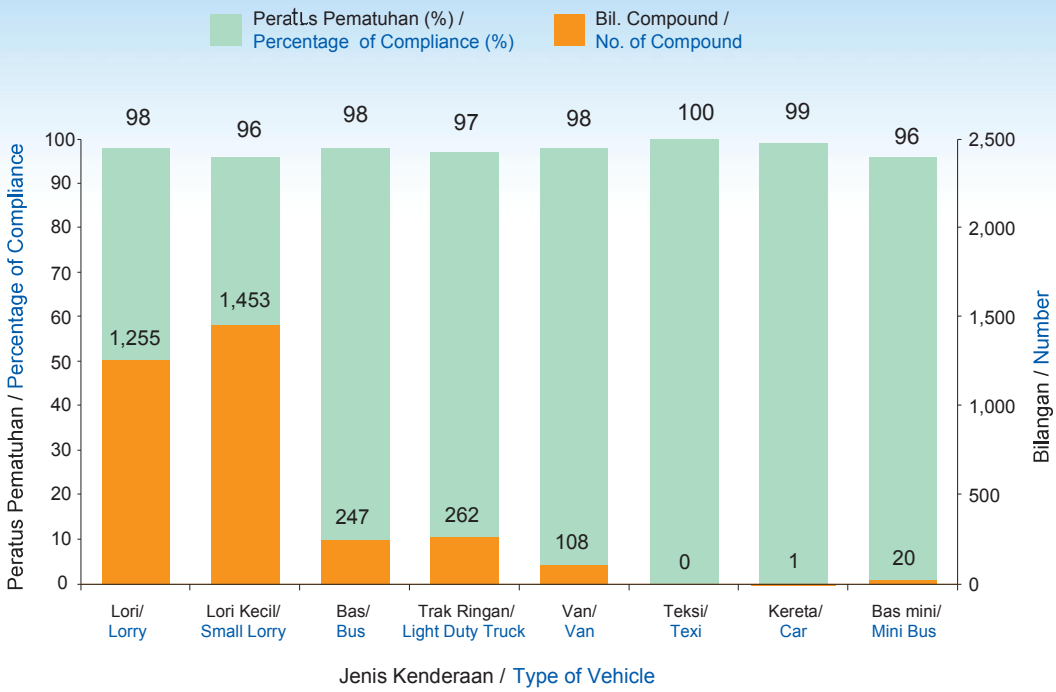
Rajah 4.12 JAS: Bilangan Kenderaan Bermotor Mengikut Jenis, 2009

Figure 4.12 DOE: Number of Motor Vehicles by Type, 2009



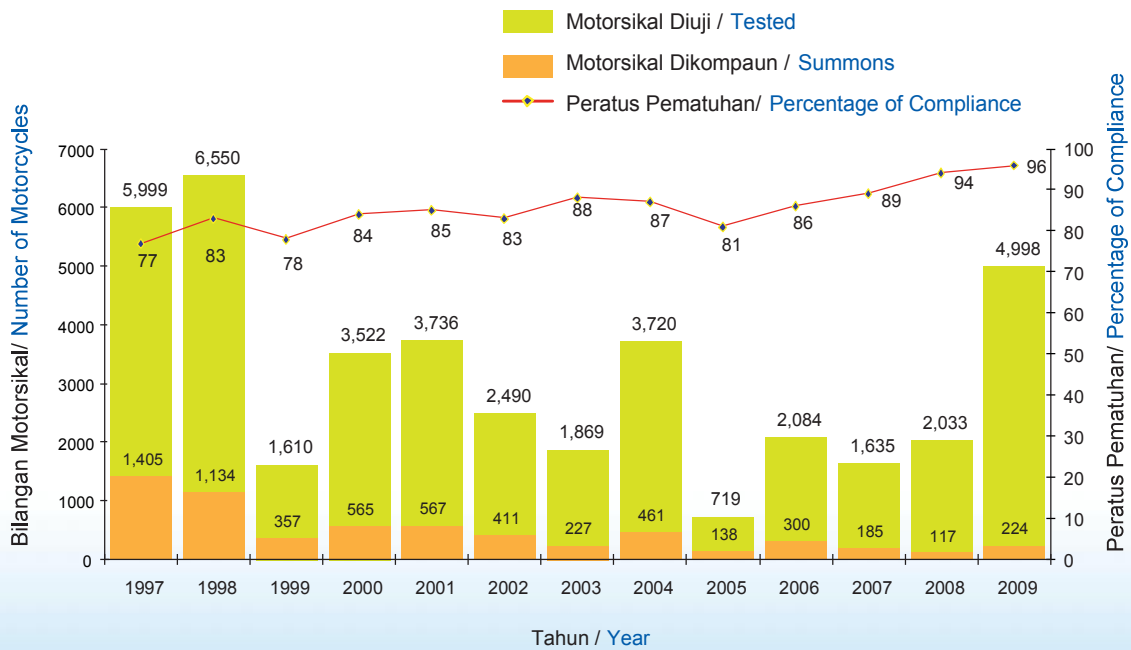
Rajah 4.13 JAS: Bilangan Kenderaan Bermotor Mengikut Negeri, 2009

Figure 4.13 DOE: Number of Motor Vehicles by Status, 2009



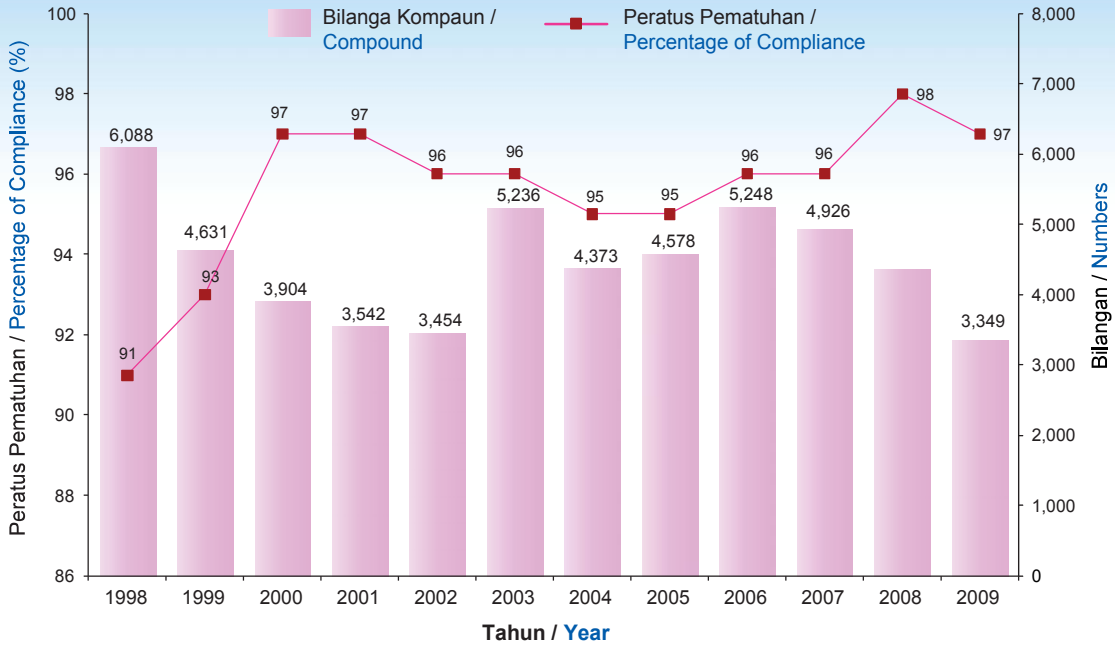
Rajah 4.14 JAS: Penguatkuasaan Pelepasan Asap Hitam Kenderaan Mengikut Jenis Kenderaan, 2009

Figure 4.14 DOE: Enforcement of Vehicular Black Smoke Emission by Types, 2009



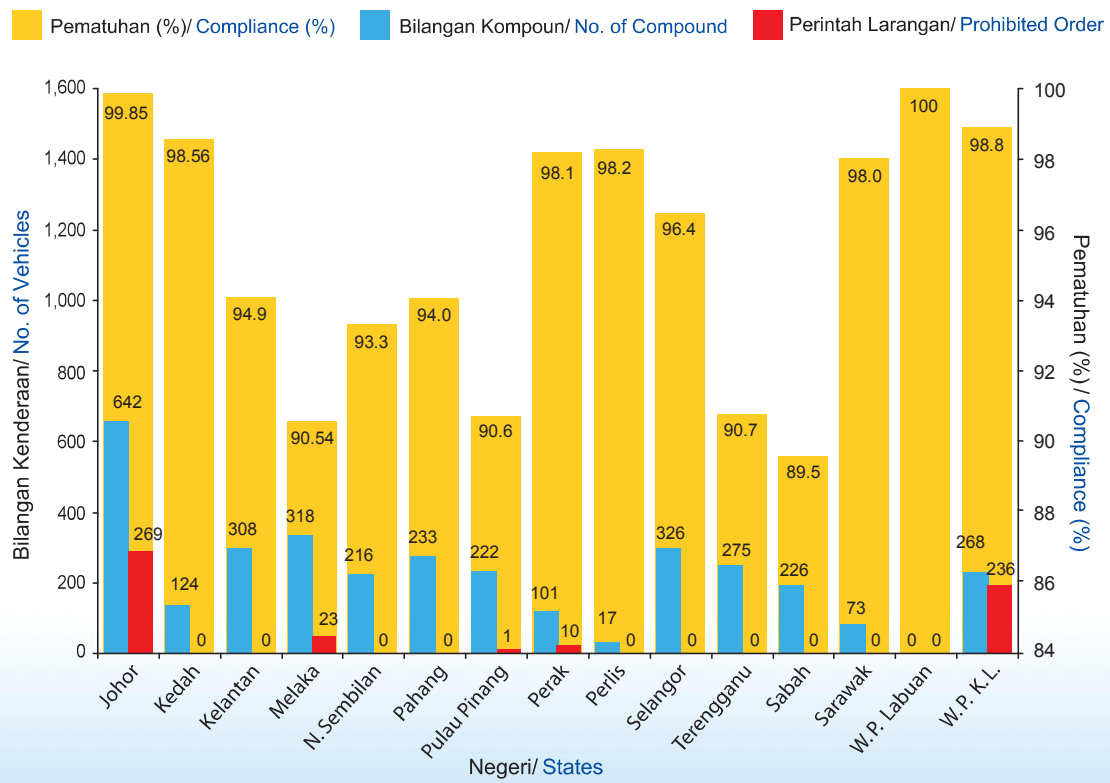
Rajah 4.15 JAS: Penguatkuasaan Pelepasan Bunyi Bising Motosikal, 1997-2009

Figure 4.15 DOE: Enforcement of Motorcycle Noise Emission, 1997-2009



Rajah 4.16 JAS: Penguatkuasaaan Pelepasan Asap Hitam Kenderaan Mengikut Tahun, 2009

Figure 4.16 DOE: Enforcement of Vehicular Black Smoke Emission by Year, 2009



Rajah 4.17 JAS: Penguatkuasaaan Pelepasan Asap Hitam Kenderaan Mengikut Negeri, 2009

Figure 4.17 DOE: Enforcement of Vehicular Black Smoke by State, 2009

TINDAKAN UNDANG-UNDANG
LEGAL ACTION

Pendakwaan

Pada tahun 2009, sejumlah 940 kes kesalahan di bawah Akta Kualiti Alam Sekeliling (AKAS) yang melibatkan denda berjumlah RM6,060,700.00 (**Rajah 4.18**).

Daripada jumlah keseluruhan tersebut, sebanyak 555 (59.04%) kes melibatkan pelepasan asap dari kenderaan bermotor melebihi had yang ditetapkan di bawah Seksyen 22(1) dengan jumlah denda sebanyak RM757,500.00. Terdapat 173 (18.40%) kes yang melibatkan pelepasan efluen melebihi had yang ditetapkan di bawah Seksyen 25(1) AKAS, 1974 dengan jumlah denda sebanyak RM2,933,000.00.

Selain itu, sebanyak 135 (14.36%) kes adalah melibatkan kesalahan pelanggaran syarat lesen di bawah seksyen 16 dengan jumlah denda sebanyak 1,304,500.00 sementara 77 (8.19%) kes yang selebihnya adalah kesalahan-kesalahan lain di bawah AKAS, 1974 (**Rajah 4.19**).

Kompaun

Sejumlah 5,427 kompaun telah dikeluarkan sepanjang tahun 2009 kepada premis dan syarikat untuk pelbagai kesalahan di bawah AKAS, 1974. Daripada jumlah keseluruhan tersebut, sebanyak 3,409 (62.82%) kompaun adalah kesalahan di bawah Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Dari Enjin Diesel), 1996, sebanyak 838 (15.44%) kompaun adalah kesalahan di bawah Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 2005, sebanyak 617 (11.37%) kompaun adalah kesalahan di bawah Peraturan Kualiti Alam Sekeliling (Udara Bersih), 1978, sebanyak 397 (7.32%) kompaun adalah kesalahan di bawah Seksyen 29A, AKAS, 1974 dan sebanyak 166 (3.05 %) kompaun adalah kesalahan di bawah Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan dari Enjin Petrol), 1996 (**Rajah 4.20**).

Prosecution

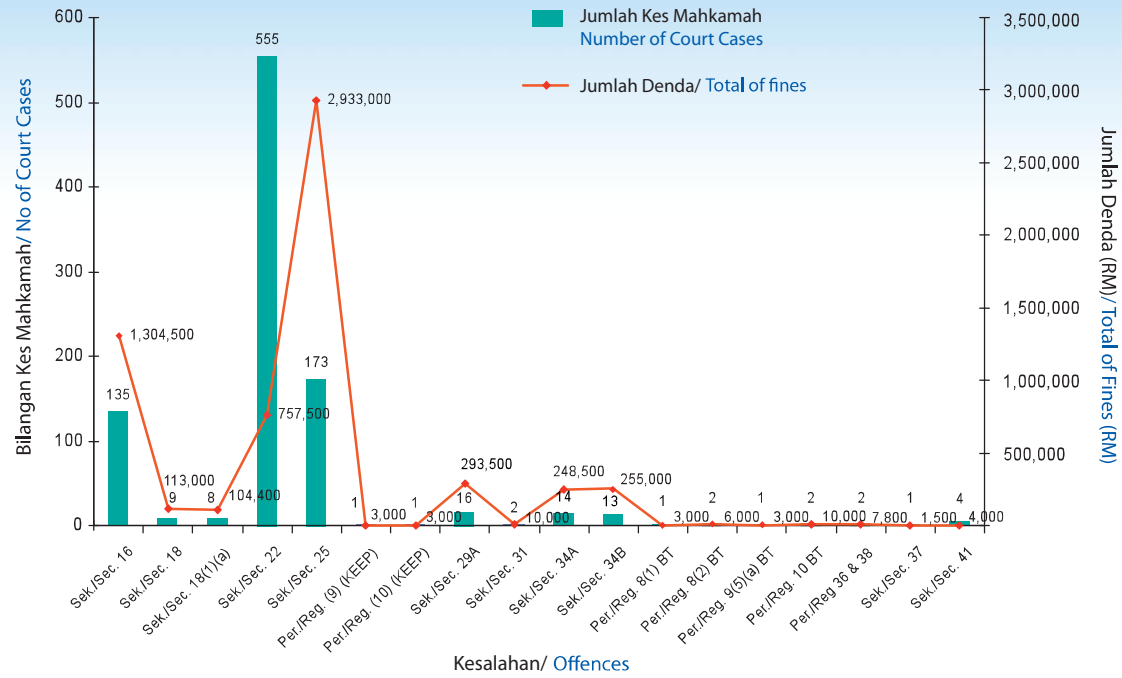
In 2009, a total of 940 offences were prosecuted under the Environmental Quality Act (EQA) and fined a total of RM6,060,700.00 (**Figure 4.18**).

Out of this total, 555 (59.04%) cases involved offences from motor vehicles emissions above the stipulated standard under Section 22(1) of the EQA, 1974 and fined a total of RM757,500.00. There were 173 (18.40%) cases involved in effluent discharges above the stipulated standard under Section 25(1) of the EQA, 1974 and fined 2,933,000.

Apart from that, 135 (14.36%) cases were involved in violating conditions of licences undersection 16 and fined RM1,304,500.00 while the remaining 77 (8.19%) cases were prosecuted for others offences under EQA, 1974 (**Figure 4.19**).

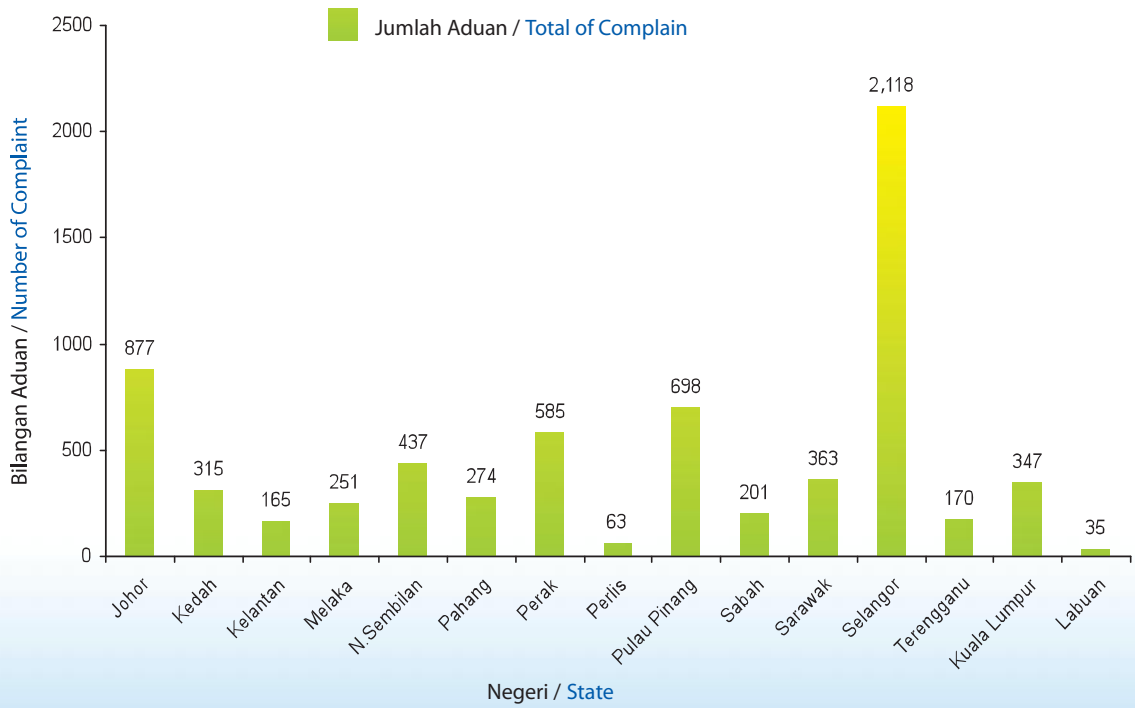
Compounds

A total of 5,427 compounds were issued in 2009 against premises and companies for various offences under EQA, 1974. Out of this total, 3,409 (62.82%) were offences under the Environmental Quality (Control of Emission from Diesel Engines) Regulations, 1996, 838 (15.44%) were offences under the Environmental Quality (Scheduled Wastes) Regulations, 2005, 617 (11.37%) were offences under the Environmental Quality (Clean Air) Regulations, 1978, 397 (7.32%) were offences under Section 29A of EQA, 1974 and 166 (3.05 %) were offences under Environmental Quality (Control of Emission from Petrol Engines) Regulations, 1996 (**Figure 4.20**).



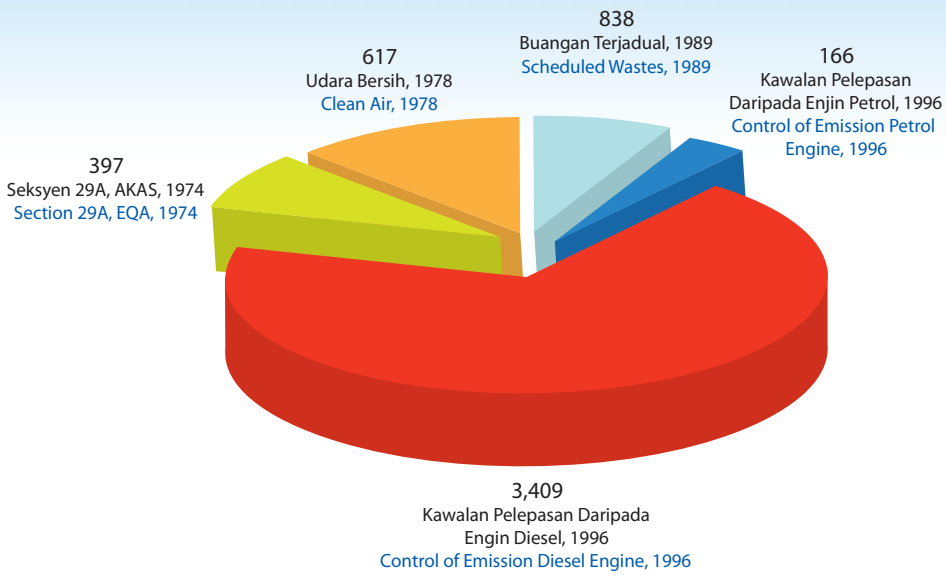
Rajah 4.18 JAS: Bilangan Kes Mahkamah dan Denda, 2009

Figure 4.18 DOE: Number of Court Cases, 2009



Rajah 4.19 JAS: Bilangan Aduan Mengikut Negeri, 2009

Figure 4.19 DOE: Number of Complain by State, 2009



Rajah 4.20 JAS: Bilangan Kes Kompaun, 2009

Figure 4.20 DOE: Number of Compound Cases, 2009

Kenderaan Diesel Diperhatikan Mengeluarkan Asap Hitam / Diesel Vehicles Emitting Excessive Smoke

MAKLUMBALAS TERHADAP PENGADUAN AWAM
RESPONSE TO PUBLIC COMPLAINTS

Pada tahun 2009, sejumlah 6,889 aduan pencemaran alam sekitar telah diterima oleh Jabatan Alam Sekitar (JAS). Daripada jumlah tersebut, sebanyak 5,552 kes aduan telah disiasat oleh pejabat JAS Negeri, manakala 1,337 kes selebihnya adalah diluar bidangkuasa JAS dan telah dirujuk kepada agensi lain yang berkaitan.

Pada tahun 2009, Selangor menerima 2,118(30.74%) aduan yang tertinggi, diikuti oleh Johor sebanyak 877 kes (12.73%) dan Pulau Pinang sebanyak 698 kes (10.13%). Wilayah Persekutuan Labuan menerima aduan yang paling sedikit iaitu sebanyak 35 kes (0.51%) (**Rajah 4.21**).

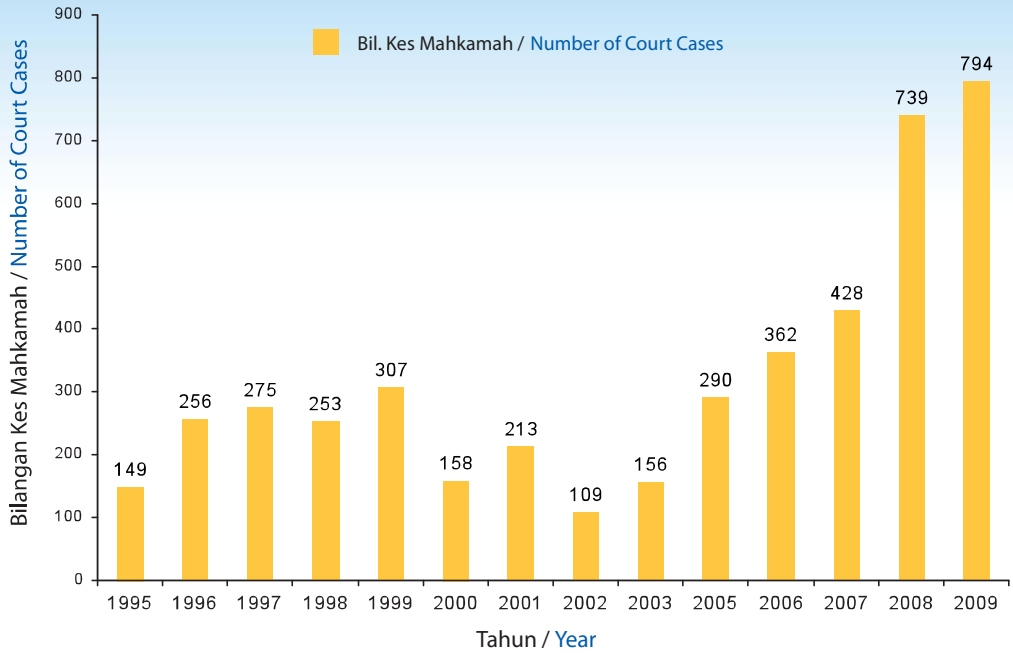
Seperti tahun-tahun yang sebelumnya, kebanyakan aduan yang diterima adalah berkaitan dengan pencemaran udara iaitu sebanyak 5,149 kes (74.74%), diikuti oleh 758 kes (11.00%) berkaitan pencemaran air, sebanyak 212 kes (3.08%) berkaitan pencemaran bunyi, sebanyak 159 kes (2.31%) berkaitan pelupusan haram buangan terjadual, sebanyak 37 kes (0.54%) berkaitan pencemaran tanah, sebanyak 88 kes (1.28%) berkaitan tumpahan minyak dan sebanyak 486 kes (7.05%) lain-lain aduan (**Rajah 4.22**).

The Department of Environment (DOE) received 6,889 environmental pollution complaints in 2009. Out of this, 5,552 cases were investigated by the State DOE Offices and the remaining 1,337 cases outside the jurisdiction of DOE were referred to other relevant agencies.

In 2009, Selangor recorded 2,118 (30.74%) the highest number of complaints received, followed by Johor 877 (12.73%) and Penang recorded 698 (10.13%). Federal Territory of Labuan recorded the least number of complaints received 35 (0.51%) (**Figure 4.21**).

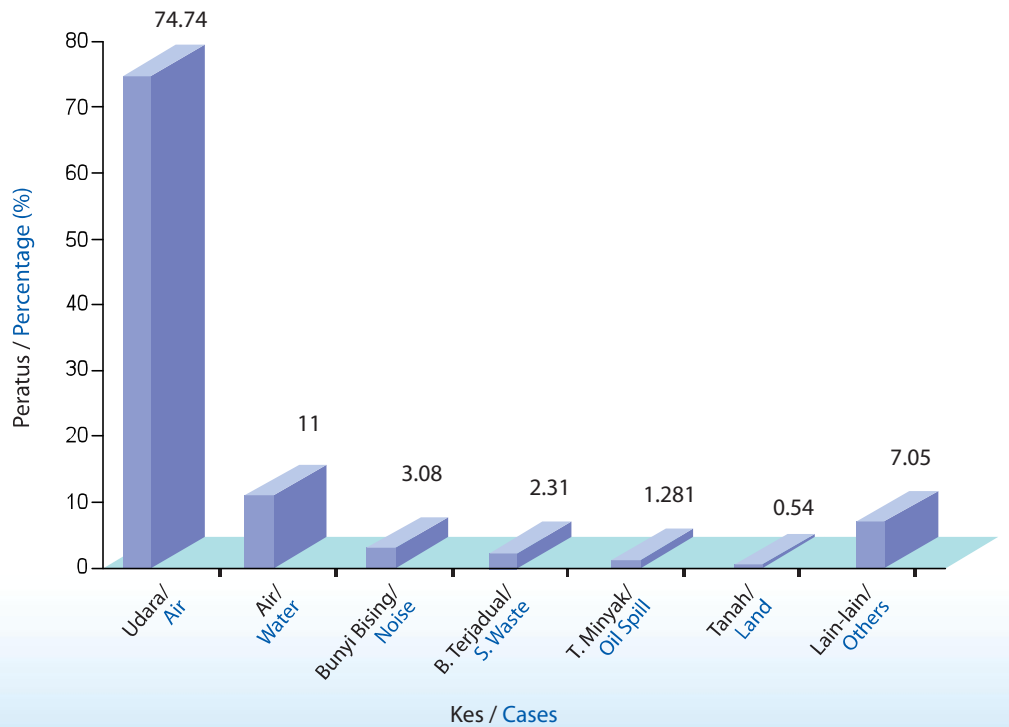
As in the previous years, most of the complaints received are related to air pollution 5,149 (74.74%), followed by 758 (11.00%) water pollution, 212 (3.08%) noise pollution, 159 (2.31%) illegal dumping of scheduled or toxic wastes, 37 (0.54%) land pollution, 88 (1.28%) oil spillage and 486 (7.05%) others (**Figure 4.22**).

Projek Pembangunan di Kawasan Tanah Tinggi / Development Project on Highland Areas



Rajah 4.21 JAS: Bilangan Kes Mahkamah, 2009

Figure 4.21 DOE: Number of Court Cases, 2009



Rajah 4.22 JAS: Bilangan Kes Aduan Mengikut Jenis, 2009

Figure 4.22 DOE: Number of Complaint Cases by Types, 2009